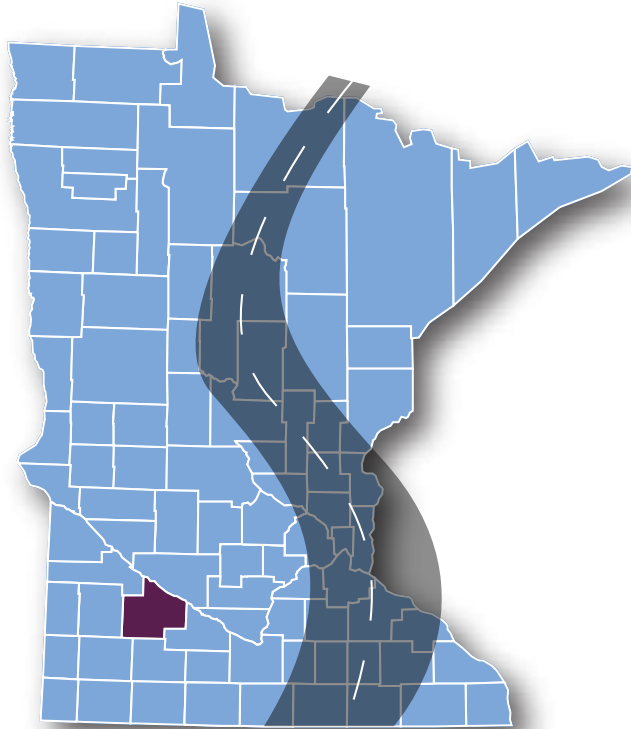


Redwood County

COUNTY ROADWAY



Safety PLAN

Moving Toward ZERO Deaths

March 2023

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Executive Summary

This Safety Plan for Redwood County was prepared as part of the County Road Safety Plan update process (CRSP 2). It aligns with the state's Strategic Highway Safety Plan (SHSP) and supports the state's Towards Zero Deaths (TZD) program. This safety plan was developed in a collaborative effort with county safety stakeholders to reduce severe crashes or those involving fatalities and serious injuries. This plan process utilizes a data-driven approach, documents at-risk locations, identifies effective and proven safety improvement strategies, and recommends safety projects to better position the county to compete for available federal safety funds in the Highway Safety Improvement Program (HSIP).

The first round of the County Roadway Safety Plans (CRSP 1) began in 2009 and was completed in 2014. Increased investments in local safety projects and implementation of these low-cost and high-impact safety strategies have contributed to a 22 percent reduction in the number of fatal crashes on the county system while at the same period the state system showed a 3 percent reduction in fatal crashes.

To date, nearly 85 percent of Minnesota counties have participated in HSIP with more than \$86 million in safety improvements deployed across the county system. Since the completion of Redwood County's initial safety plan, the County secured approximately \$0.7 million in HSIP funding to support the implementation of 6 safety projects. These safety projects included shoulder and striping improvements.

This Redwood County Safety Plan includes:

- Description of Safety Focus Areas (Section 3.1)
- Identification of a short list of high-priority low-cost strategies (Section 3.3)
- Candidate location for highway safety funds, which are considered at-risk location (Appendix D)
- Development of \$3.5 million recommended safety projects – these projects are actual application for HSIP funds (Appendix F)

This information is provided to Redwood County to reduce the number of severe crashes on their highway system and it is understood that the final decision to implement any of the recommended projects resides with the Redwood County Engineer. The County is encouraged to coordinate with MnDOT to pursue a partnership that identifies a path toward implementation for projects that involve State trunk highways and/or right-of-way. This Plan does NOT set requirements or mandates, is NOT a standard and is neither intended to be, NOR does it establish, a legal standard of care.

In an effort to help reduce the potential exposure to claims of negligence associated with motor vehicle crashes on Redwood County's highway system, three key points should be considered:

1. Federal law (23 U.S.C. Section 409) established that information generated as part of the statewide safety planning process is considered privileged and unavailable to the public. The privileged status includes crash data, where value/detail has been added by analysts during the safety planning process (for example; computation of crash rates, disaggregation

of crashes by type or severity, documentation of contributing factors), the lists of at-risk locations, and information supporting the development and evaluation of potential safety projects. The federal law and the privileged status of the safety information was upheld by the U. S. Supreme Court in the case of *Pierce County (Washington) v. Guillen*.

2. Minnesota tort law provides for discretionary immunity for decisions made by agency officials when there is documentation of the decision and evidence of consideration of social, economic, and political issues. To help establish immunity for decisions relative to moving forward with development of recommended safety improvement projects, the County Engineer is encouraged to prepare a memorandum/plan of action for the County Board. This document would identify the projects selected for implementation and those they choose to dismiss and why.
3. Minnesota tort law also provides for official immunity for decisions made by agency staff where there is written documentation of the thought process supporting project development and implementation.

As with any transportation plan, the expected shelf life of this document is not infinite. The distribution of crashes can change over time as well as roadway and traffic conditions that can contribute to the occurrence of crashes. This Plan contains \$3.5 million of potential safety projects, which could provide Redwood County with a sufficient backlog of projects for approximately 5 years. As a result, Redwood County is encouraged to consider periodically updating this Safety Plan to continue to reduce fatalities and serious injuries on Minnesota roadways.

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Acronyms and Abbreviations

AADT	annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ADT	average daily traffic
ATP	Area Transportation Partnership
CR	County Road
CRSP	County Roadway Safety Plan
CSAH	county state aid highway
EV	entering vehicles
FAST	Fixing America's Surface Transportation Act
FHWA	U.S. Federal Highway Administration
HSIP	Highway Safety Improvement Program
LED	light-emitting diode
MAP-21	Moving Ahead for Progress in the 21st Century Act
MnDOT	Minnesota Department of Transportation
mph	miles per hour
MVMT	million vehicle miles traveled
NCHRP	National Cooperative Highway Research Program
NV	no value
RE + SSSD	rear end and sideswipe same direction
RRFB	rectangular rapid flash beacon
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SHSP	Strategic Highway Safety Plan
TZD	Toward Zero Deaths
vpd	vehicle(s) per day

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This CRSP 2 was developed in collaboration with FHWA, MnDOT Office of State Aid and Office of Traffic Engineering.

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1.0 Introduction

County safety stakeholders and the Minnesota Department of Transportation (MnDOT) have collaborated to reduce fatalities and serious injuries on local roadways to achieve Minnesota's vision of zero roadway fatalities. The first major initiative was the development of County Roadway Safety Plans (known as CRSP 1), which began in 2009 and was completed in 2014 (CH2M HILL and SRF Consulting Group, Inc., 2014). Counties began implementing the CRSP 1 recommended safety projects in 2013 and have made significant progress.

MnDOT Highway Safety Improvement Program (HSIP) managers indicated local agency participation in the HSIP program has specifically increased due to:

- CRSP 1 development and resulting safety projects
- Dedicated safety funding for safety strategies
- Technical assistance

Emphasis on local roadways and CRSP as a planning and implementation tool, have become integral to the statewide safety program. In 2016, County engineers and MnDOT initiated an update of the CRSPs (known as CRSP 2) to further reduce fatalities and serious injuries on Minnesota local roadways. CRSP 2 is more collaborative, utilizes the most current safety data, and provides a refreshed list of HSIP eligible safety projects. This CRSP 2 document outlines results of a comprehensive safety analysis that used crash data and roadway characteristics to identify the most crucial County transportation safety planning needs and associated safety treatments to reduce fatal and serious injury related crashes.

As part of this CRSP 2 development, the following tasks were completed.

- Review of all county road segments, curves, and intersections
- Data-driven review of crashes on county roadways
- Summary of safety focus areas and priority crash types
- List of recommended high priority safety strategies
- Prioritized list of locations that are most at-risk for severe crashes
- Prioritized list of recommended safety projects – specific strategies at specific locations

1.1 Background

Efforts to reduce statewide traffic fatalities and achieve Minnesota's long-term zero fatality vision requires increasing local agency involvement in the State's safety program. Local agencies are responsible for more than 90 percent of the State's roadway miles and approximately 60 percent of severe crashes (those involving a fatality or serious injury) occur on local Minnesota roads. As a result, the Minnesota's 2007 *Strategic Highway Safety Plan* (SHSP) (MnDOT, 2007) and the current 2020 SHSP identified the need to fully engage local road authorities in statewide highway safety program.

MnDOT, the U.S. Federal Highway Administration (FHWA), and Minnesota's county engineers partnered to establish the CRSP 1 initiative that developed CRSPs for all 87 Minnesota counties. This multiagency effort had two key components:

1. MnDOT dedicated approximately 50 percent of HSIP funds to support implementation of safety projects along the county roadway system. Prior to this, virtually all safety funds were used for projects along State trunk highways.
2. MnDOT provided technical assistance to all 87 counties to analyze and document the outcome of a systemwide systemic risk assessment, prioritize each county's roadway facilities, and share a list of recommended, high priority safety projects for at-risk locations.

Counties have implemented safety treatments using a variety of methods and funding sources. To date, nearly 85 percent of Minnesota counties have participated in HSIP with more than \$123 million in safety improvements deployed across the county system. The most common types of safety projects implemented were relatively low-cost and highly effective in reducing severe crashes. Examples of these countermeasures include:

- Shoulder improvements and striping along rural segments
- Chevrons on curves
- Upgraded traffic signs and intersection markings and street lighting at intersections

A further breakdown of typical safety projects implemented by Minnesota counties between 2008-2020 is shown in Table 1-1.

Table 1-1. County Implemented Safety Projects

HSIP Approved 2008-2020	No of Projects	HSIP Funding
Segments		
Edgeline Improvement	6	\$1,140,000
Shoulder Improvement	108	\$26,433,000
Signing	4	\$399,000
Miscellaneous Improvements	1	\$630,000
Rumble Strip	29	\$2,478,000
Striping	218	\$25,872,000
Guardrail	2	\$220,000
Rumble StripE	13	\$1,779,000
Lane Reassignment	1	\$245,000
Clear Zone	2	\$298,000
Total Segments	384	\$59.5 million
Intersections		
Geometrics	24	\$11,188,000
Lighting	59	\$5,100,000
Signing	31	\$1,741,000
Roundabout	20	\$16,513,000
Miscellaneous Improvements	28	\$14,161,000
Signal System	27	\$6,178,000
RICWS	11	\$1,743,000
Pavement Markings	2	\$274,000
Intersections Totals	202	\$56.9 million
Curves		
Chevrons	51	\$3,780,000
Geometrics	1	\$424,000
Shoulder Improvement	5	\$1,291,000
High Friction Surface Treatment	2	\$952,000
Guardrail	1	\$130,000
Total Curves	56	\$6.6 million
Totals	646	\$123 million

Note:

^a Geometrics refers to geometric improvements or changes such as changing a stop-controlled intersection to a roundabout or change of curve horizontal or vertical curvature.

The impact of the increased investment in local safety projects has been dramatic. While the number of fatal crashes has increased nationally, the fatal crashes in Minnesota continue to steadily decline until 2019. Since 2013, there has been an approximate 3 percent reduction of fatal crashes on the State system and a 22 percent reduction in the number of fatal crashes on the county system (Figure 1-1). This time period coincides with the completion of CRSP 1 plans and the implementation of the associated safety projects. However, since 2020 the state has shown a steep increase in fatal crashes. This County Road Safety Plan coupled with strategic investment in traffic safety using available state and federal HSIP funds, will be instrumental in achieving continued declines in fatal and serious injury crashes.

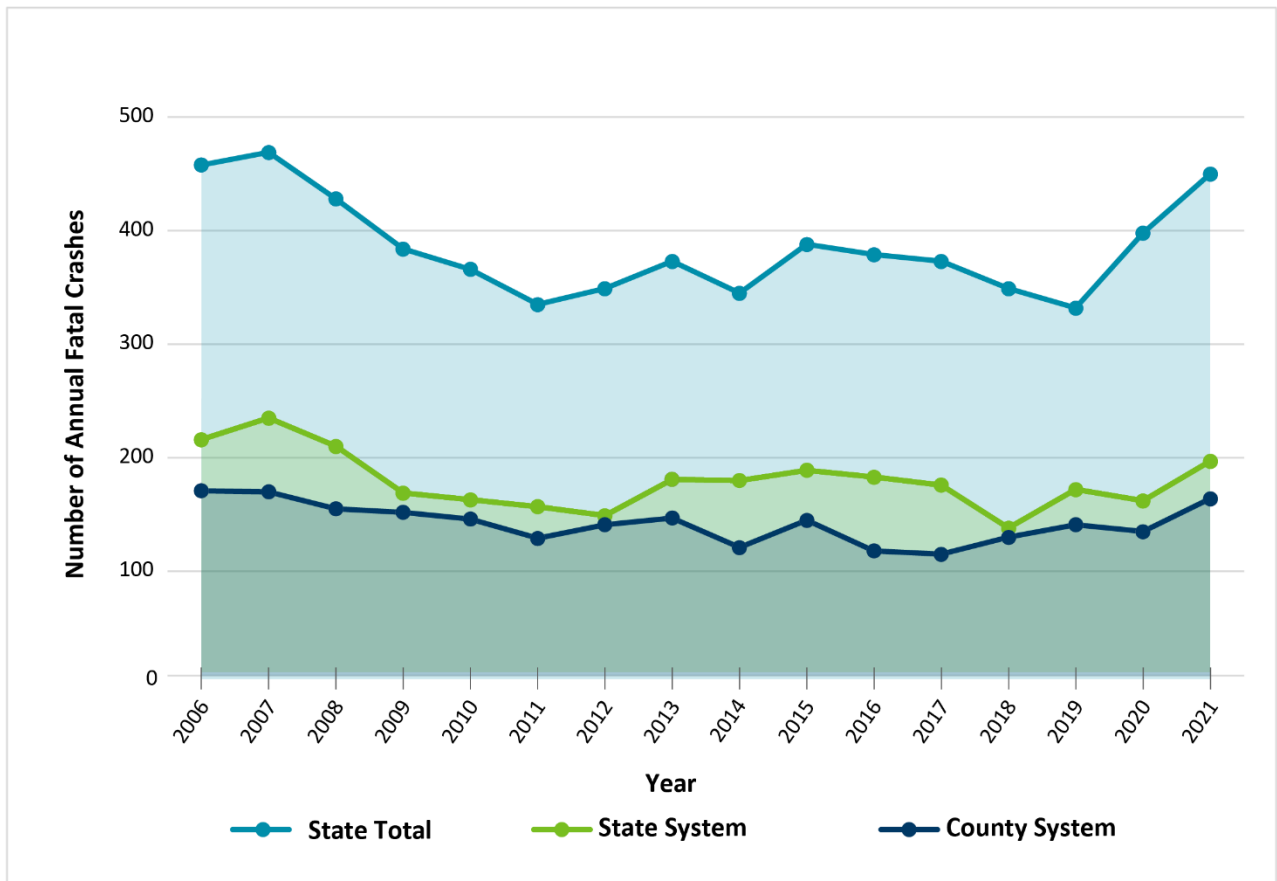


Figure 1-1. Fatal Crashes along Minnesota Roads

1.2 National Context

The HSIP is a core federal-aid program that began in 2005 with the authorization of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users or SAFETEA-LU. SAFETEA-LU required all States to develop data-driven, multidisciplinary SHSPs focused on reducing fatalities and serious injuries on all public roadways. Subsequent transportation legislation, the Moving Ahead for Progress in the 21st Century Act (MAP-21), the Fixing America's Surface Transportation Act (FAST) and the Infrastructure Investment and Jobs Act (IIJA) or the Bipartisan Infrastructure Law (BIL) signed in 2021 extends through 2026, continued

to focus transportation funding on improving safety for all public roadways. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance.

The trendline of fatalities throughout the United States and in Minnesota (Figure 1-2), indicates HSIP investments have resulted in lives saved and injuries prevented since 2005. However, traffic crashes still pose a major public health issue in the United States. In 2021, approximately 42,000 people were killed in traffic crashes; an average of 115 people killed every day (FARS, 2021).

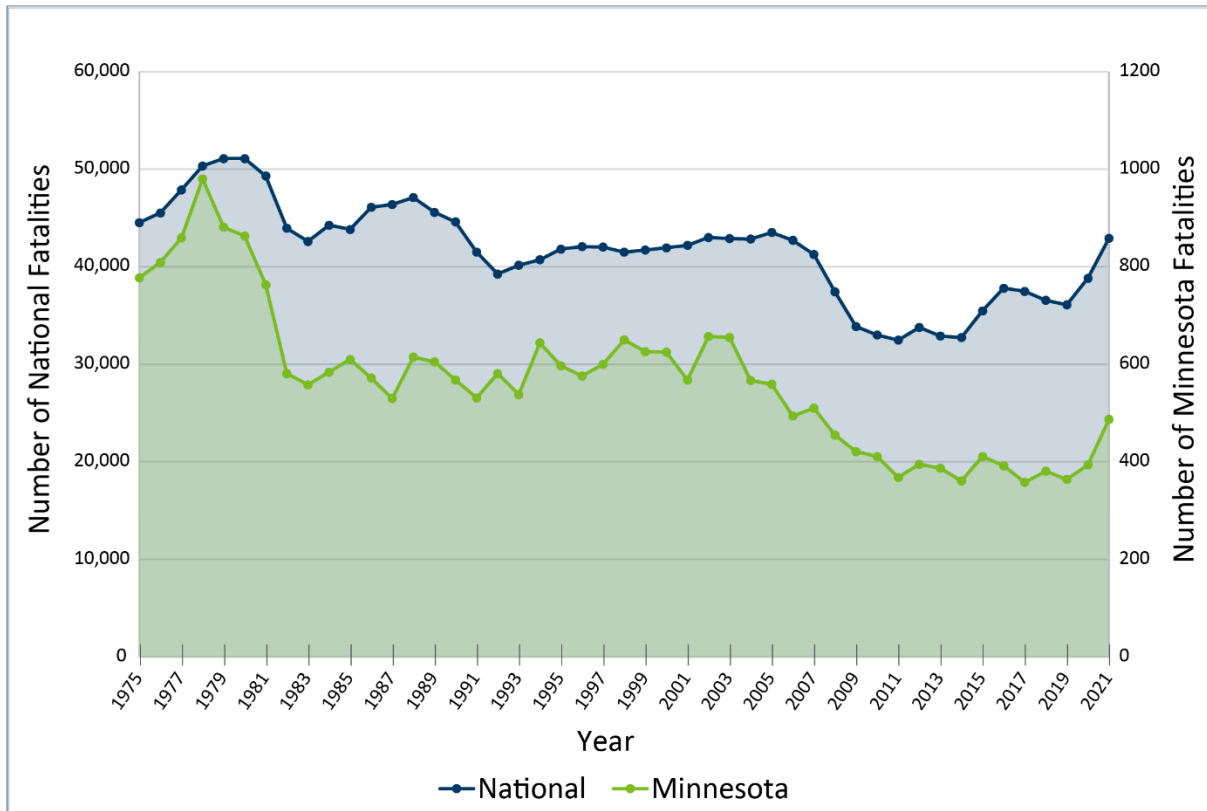


Figure 1-2. Trend in Traffic Fatalities in United States and Minnesota

Achieving greater results and realizing the vision of zero fatalities requires continuous improvements to transportation safety planning and program management. Each state may allocate their transportation and HSIP funding in a manner that addresses their unique needs. The legislative requirement to address safety on all roads is founded on two key facts:

1. Nationally, local governments own and operate almost 76 percent of all public roads (FHWA, 2019) and approximately 35 percent of traffic fatalities occur along these roads (FARS, 2017).
2. Historically, state departments of transportation manage the statewide safety programs, and, in most states, the majority of safety funding has been dedicated to improvements along the state highway system.

States can only achieve significant severe crash reductions if safety on local roads is an integral part of each state's safety planning and investment efforts. In response to federal legislation, all states have accepted an oversight role for safety across all roads in the state and a number of states have dedicated a portion of their HSIP funds to local system improvements. However, only a few states have successfully integrated local agencies into statewide safety planning efforts, Minnesota being one of them.

1.3 State Context

Starting in 2007, Minnesota's SHSP highlighted the need to improve safety of all public roads, including local roads. The current SHSP (2020) continues to emphasize local roads and the plan identified 16 focus areas based on data analysis and stakeholder outreach. The top four focus areas include:

- Intersections (47 percent of severe crashes)
- Lane Departure (31 percent of severe crashes)
- Impairment (25 percent of severe crashes)
- Speed (20 percent of severe crashes)

Total severe crash percentages will be greater than 100 percent because crashes may have multiple contributing factors. For example, an impaired driver may run off the road resulting in a severe injury. In this situation, the crash would be counted as both Lane Departure and Impaired Roadway User focus areas. The SHSP also identified Minnesota's high priority infrastructure-based safety strategies and countermeasures, including:

- Lane Departure
 - Center and edge rumble strips
 - Enhanced pavement markings (6-inch edgelines and embedded markings)
 - Center buffers
 - Wider/paved shoulders
 - Maintain clear zones
- Intersections
 - Enhanced traffic signs and markings
 - Street lights
 - Alternative Intersections (i.e. Roundabouts)
 - Pedestrian/Bicycle strategies (i.e. Pedestrian leading intervals, intersection design)
 - Red light running enforcement assistance (confirmation lights)
 - Restricted/channelized intersections (along divided roadways)

1.4 Redwood County – Local System Description

There are approximately 139,000 miles of roadways in Minnesota. Counties own and operate almost 45,000 miles (32 percent) of those roadways. Approximately 32,000 of these roadway miles are paved (70 percent) and the remaining 13,000 miles have a gravel surface. Statewide analysis of County roads indicated a majority of the severe crashes occurred on paved rather

than gravel roadways, 90 percent and 10 percent, respectively. As a result, the focus of CRSP 2 is on paved County roads.

Figure 1-3 shows Redwood County roads that were analyzed as part of this project (does not include gravel roads) and county boundary. The Redwood County Highway Department in Minnesota is responsible for maintenance and management of a system that includes:

- 509 total miles of county roads, of which 333 miles have a paved surface and 176 miles have a gravel surface
- 391 miles of county state-aid highways (CSAH) roadways, which are eligible for direct State Trunk Highway funding
- 118 miles of county roads
- 954 miles of township roads
- 280 bridges in the County and township system
- 522 miles of public drainage ditches
- 1,106 miles of tile main

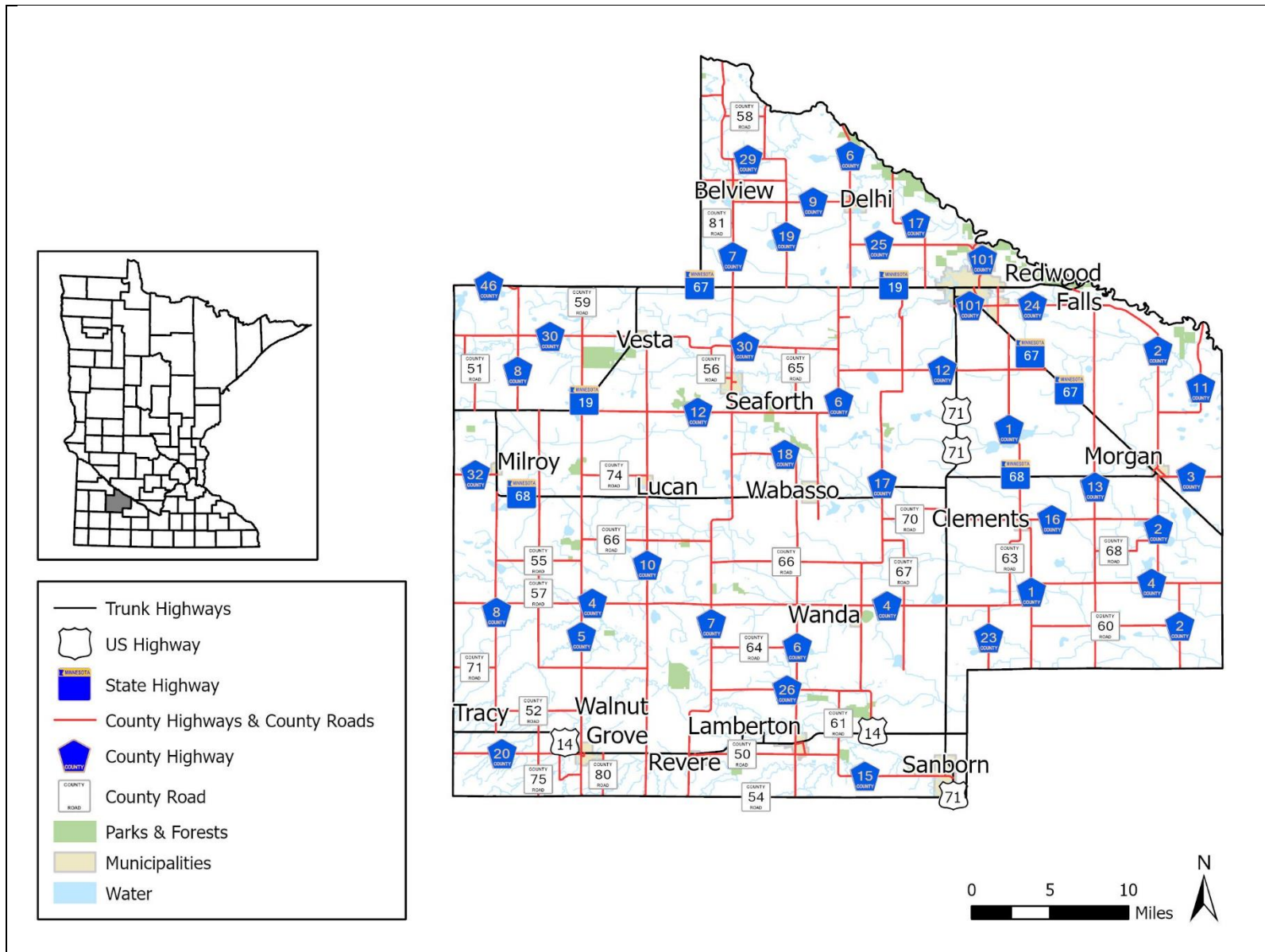


Figure 1-3. Redwood County Map

Between the years 2008-2020, Redwood County secured approximately \$0.7 million in HSIP funding to support the implementation of 6 safety projects (Table 1-2). These safety projects included shoulder and striping improvements.

Table 1-2. Redwood County Highway Safety Improvement Program Overview

Project Description	No. of Projects	Project Costs
<i>Segments</i>		
Shoulder Improvement	1	\$204,000
Striping	5	\$491,000
<i>Total Segments</i>	<i>6</i>	<i>\$0.70 million</i>
<i>Total Projects</i>	<i>6</i>	<i>\$0.70 million</i>

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2.0 Approach

CRSP 2 aligns with the Minnesota SHSP and supports the TZD statewide target of fewer than 225 traffic fatalities and 980 serious injuries by the year 2025.

In recognition of the TZD Program, Redwood County identified the following goals for this update:

- Provide the basis for a shared understanding of the approach used to analyze and address safety on Redwood County's roadway system
- Provide improved understanding of the effectiveness (at reducing crashes) of safety and maintenance strategies
- Document a prioritized list of HSIP-eligible projects and safety-related maintenance activities
- Document safety issues in Redwood County's small cities and townships
- Provide information to increase understanding of pedestrian safety issues
- Conduct a data-driven safety analysis of the county's roadway system
- Identify and prioritize candidate locations for safety investment
- Develop safety projects – with specific strategies at specific locations

The CRSP 1 and CRSP 2 approach has been to work closely with county safety stakeholders to establish program goals and develop a collaborative, data-driven plan along with safety treatments at appropriate locations to direct the local safety program. This was accomplished through data analysis, identification of safety emphasis areas, development of a comprehensive list of safety strategies, coordination with safety stakeholders through meetings and workshops, narrow the list of strategies to county specific strategies, identify safety projects and develop the safety plan. Workshop and meeting summaries can be found in Appendix B. This section of the plan discusses the project approach in more detail.

2.1 Proactive Systemic Safety Analysis

From the beginning of the Federal highway safety program in the 1970s, the primary method for conducting a safety analysis largely involved a reactive approach by searching along highway systems for high-crash locations. A corridor segment or intersection is generally considered a high-crash location if the severe crash rate exceeds the severe critical crash rate. Using this methodology was a barrier to local systems participating in the statewide safety program because no locations along the local roadway systems met the high-crash definition. As a result, almost all safety investments were made along the state's system of trunk highways.

Minnesota's 2007 SHSP prioritized increasing the level of local highway agency involvement in statewide safety planning efforts (MnDOT, 2007). Following adoption of the SHSP, MnDOT and Minnesota's county engineers developed a new safety analysis process to supplement the high-crash location search. This systemic risk assessment, which uses a data-driven process, looked at crash patterns to determine high-risk locations that would be safety investment candidates. The five key steps in the CRSP systemic process include:

1. Conduct a crash analysis that includes reviewing each of the approximate 2,500 statewide locations along the county roadway system where severe (fatal + serious injury) crashes occurred during a 5-year study period.
2. Identify roadway and traffic characteristics common at locations with severe crashes.
3. Adopt a list of risk factors that show locations with a specific risk factor and a higher density (number of severe crashes per mile, curve, or intersection per year) of crashes rather than locations that don't contain this risk factor.
4. Conduct a census of each county system of roadway segments, curves, and intersections and record the number of risk factors at each location.
5. Prioritize the county roadway system for safety investment based on the number of risk factors at each location. The greater the number of risk factors, the greater the risk of a severe crash and, therefore, the higher the priority the candidate location is for safety investment.

This systemic risk analysis was conducted across all 87 counties as part of the CRSP 1 efforts. At the end of that project, a final review concluded that the new process was successful. More than \$300 million in low-cost safety improvements along the county system were identified and over \$123 million of HSIP-funded CRSP safety projects were implemented in CRSP programs.

Successful CRSP project implementation led the FHWA to approve and adopt this systemic risk analysis technique as a model for their own, national, data-driven safety analysis initiative. Most significantly, the systemic approach allowed agencies to move from a reactive approach of addressing severe crashes to a proactive approach of deploying safety projects at high priority at-risk locations.

Based on success in the CRSP 1 effort, this CRSP 2 systemic risk analysis follows the same five key steps used in the CRSP 1 effort.

2.2 Safety Workshop

In addition to the technical analysis, an integral part of CRSP 2 included holding a safety workshop. Redwood County's workshop was held on December 11, 2018 at the Redwood County Government Center; a Redwood County Board CRSP Update preceded the workshop (refer to Appendix C for details). The workshop was attended by 15 of the county's safety partners representing engineering, enforcement, education, and emergency response as well as the County's elected officials; the preceding board discussion included 8 participants.

The CRSP Project Team's primary workshop goals included creating a shared understanding of the technical approach to updating the CRSP, having participants identify what they considered important themes to advance road safety in Redwood County, and providing feedback to help the County prioritize infrastructure safety strategies. Figure 2-1 shows participants at the Redwood County Safety Workshop.



Figure 2-1. Redwood County Safety Workshop

During the workshop, the CRSP 2 Project Team outlined the technical approach and described key parts of the data-driven analytical process, including the proactive systemic risk evaluation, and provided an overview of the county system crash data. Participants in the workshop identified key safety themes, including:

- A range of driver-related issues
 - The county's over-representation of impaired and unbelted fatal and serious injury crashes; seatbelt use is in the low 80 percentile (vs. 93% statewide) contributing to fatal injuries
 - A rise in distracted driving-related crashes
 - A growing older-driver population

- The need for on-going safety outreach and education for out-of-county drivers to help prevent crashes and serious injuries while driving Redwood County roads
- TZD Coalition includes both Redwood and Lyon Counties which supports a broader outreach and education effort to out-of-town motorists traveling through Redwood

In addition to the County highlighting implemented safety projects, the Project Team offered a discussion of featured infrastructure safety strategies for Redwood County's consideration such as shoulder paving, edgeline rumble strips, mumble strips, enhanced edgelines, clear zone maintenance/enhancements, rural intersection street lights, LED stop signs, reconstruct TT to single T intersections, Rural Intersection Crossing Warning System (RICWS) and installing offset, channelized turn lanes.

The safety workshop concluded with a discussion on a priority site location, the intersection of TH 19 and CSAH 7. Workshop participants discussed an overview of the site, their safety concerns and observed trends; crash facts; County-installed safety improvements; and explored alternative new safety strategies. Potential safety recommendations included stop bar enhancement, streetlighting, installing RICWS on the major (most popular) or minor road, review signs obstructing intersection visibility and strengthened collaboration with law enforcement to examine crash data and determine best strategies moving forward. Recent MnDOT research data showed RICWS provides little to no benefit. As such RICWS will not be an eligible safety strategy for federal HSIP grants.

3.0 Crash Analysis

The CRSP 2 is based on a data-driven analytical process to identify optimal safety investment candidates. A data-driven process is necessary, so all crash types and roadway facilities are not mistakenly considered equal candidates for safety projects. However, prior studies show that while crashes involving fatalities and serious injuries are widely scattered across Minnesota's local system of roads (an average of 0.006 severe crashes per mile per year), these crashes are neither uniformly nor randomly scattered. As a result, analysis of crash data and roadway system characteristics are necessary to support prioritization, which is an integral part of the strategic safety planning process.

The level of statewide safety funding is not sufficient to support wide deployment of projects that address all crash types. Therefore, states are encouraged to adopt a short list of safety focus areas among the categories that include the greatest number of severe crashes. Focusing safety investment on the top-ranked focus areas is likely to result in the greatest opportunity for crash reduction derived from a data-driven analytical process. This process involved three steps:

1. Disaggregate crash types into categories (focus areas) defined by FHWA, then rank each category based on the number of crashes that involve fatalities and serious injuries (severe crashes).
2. Identify the types of roadway facilities at which the priority crash types occur in the greatest numbers.
3. Identify high priority safety countermeasures/strategies linked to the specific crash types.

3.1 Safety Focus Areas

Consistent with FHWA guidance, Minnesota adopted the number of fatal and serious injury (severe crashes) vehicle related crashes as the safety performance measure underlying development of the CRSP 2. Crash data from the 5-year period 2016 through 2020 were assembled, analyzed, and disaggregated into 16 safety focus areas, which are shown in Table 3-1. In addition to disaggregating by safety focus area, severe crashes were also disaggregated by state highways versus county roadways. This 2011 to 2015 timeframe was selected as the study period since Minnesota's new crash records system was not populated with enough years of more recent data at the onset of this update effort to support a 5-year study period.

Based on statewide data analysis, the most frequent contributing factors for severe crashes are given priority in Minnesota's SHSP (MnDOT, 2020) as Safety Focus Areas, which are shown in Figure 3-1. The colors of the groups also correspond with the colors in Table 3-1, which will be discussed shortly.



Figure 3-1. Focus Area Priorities

The analysis reviewed statewide crash data across all systems. Crashes that occurred along the County jurisdiction were disaggregated by the state, Area Transportation Partnership (ATP) and county levels also including Greater Minnesota Area and Metro areas. Table 3-1 shows crashes at the statewide level and within the Greater Minnesota Area and Metro areas for all systems and county system only. Table 3-2 shows the same crashes but for ATP 8 and for Redwood County.

Assigning crashes to the safety focus areas often involves double or triple counting because the number of severe crashes documented is greater than the actual number of crashes across the state and county systems. Multiple counting is the result from a crash potentially having many contributing factors. An example could be a single severe crash involving an unbelted, older driver at an intersection. This crash would include driver behavior of unbelted and the older driver safety focus areas. Therefore, the actual number of crashes across the state and county systems may be lower than the total number of crashes when broken down by safety focus areas.

Figure 3-2 shows the various ATPs throughout the state. The analysis relied on statewide and district level crash trends because in most cases, the total number of severe crashes that occur in a 5-year timeframe within a single county is too small and would not be considered statistically reliable. To have a statistically reliable dataset at any level, a minimum of 500 crashes is required (Minnesota Local Road Research Board, 1998).

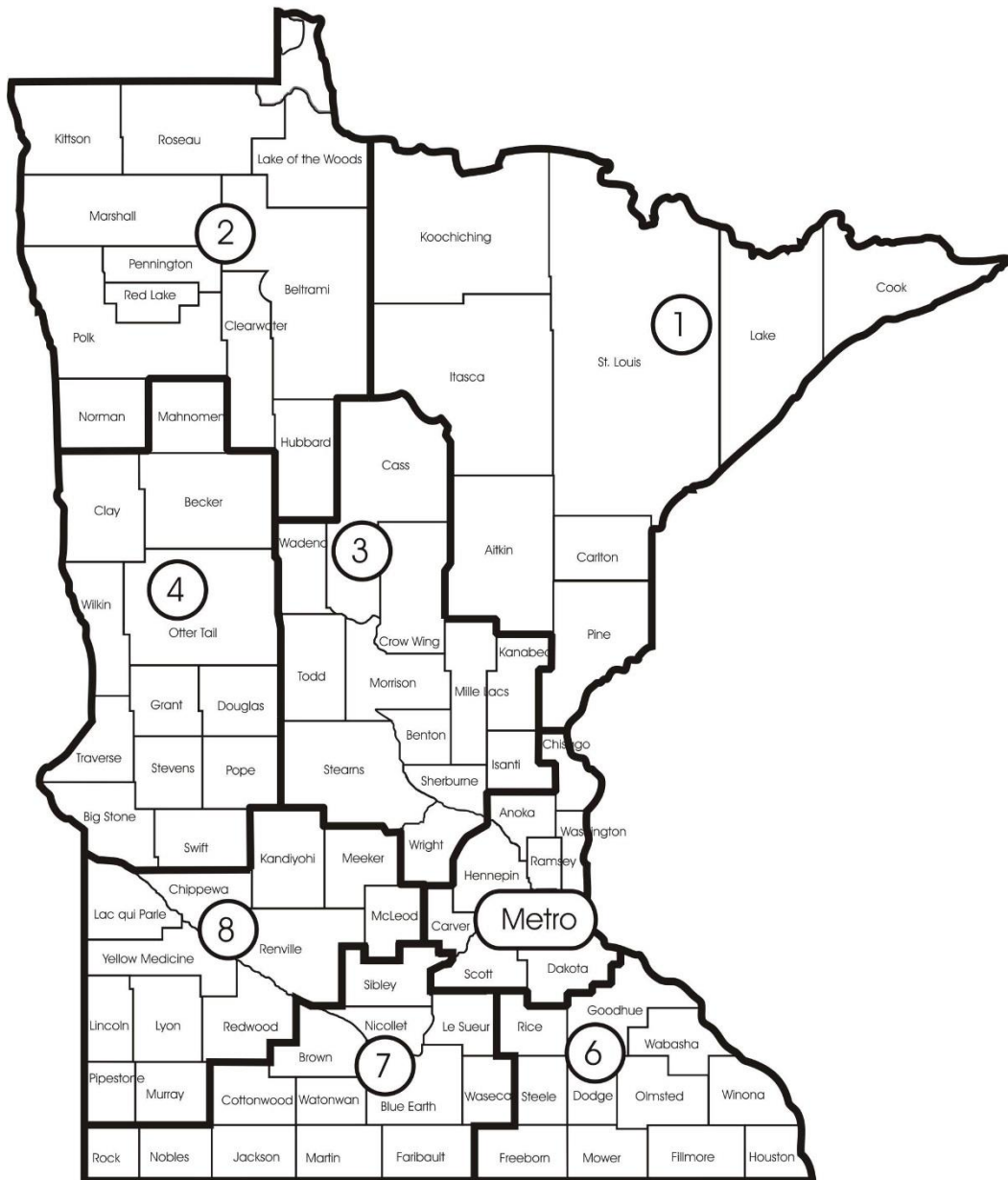


Figure 3-2. Minnesota’s Eight Area Transportation Partnerships

Results of the analysis were consistent among Greater Minnesota, ATP 8, and Redwood County and support adoption of the following infrastructure-based safety focus areas:

- Lane Departure (run-off-road and head-on)
- Intersections
- Non-motorized (pedestrians/bicyclists)

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Table 3-1. Minnesota Crash Focus Areas (2016-2020)

		Statewide				Greater Minnesota				Metro			
		All Systems		County System		All Systems		County System		All Systems		County System	
Total Severe Crashes		8960	100%	3388	100%	4859	100%	1962	100%	4100	100%	1426	100%
Core Areas	Intersection	4358	49%	1583	47%	1991	41%	721	37%	2367	58%	862	60%
	Lane Departure	3852	43%	1639	48%	2465	51%	1132	58%	1387	34%	507	36%
	<i>Run-Off-Road</i>	2850	32%	1238	37%	1890	39%	929	47%	960	23%	309	22%
	<i>Head-On</i>	1002	11%	401	12%	575	12%	203	10%	427	10%	198	14%
	Impaired	2449	27%	963	28%	1429	29%	618	31%	1020	25%	345	24%
	Speed	2012	22%	693	20%	1132	23%	437	22%	880	21%	256	18%
	Unbelted	1362	15%	507	15%	955	20%	380	19%	407	10%	127	9%
	Inattentive	904	10%	365	11%	537	11%	230	12%	367	9%	135	9%
Strategic	Older Driver	1609	18%	600	18%	969	20%	339	17%	640	16%	261	18%
	Motorcycle	1502	17%	659	19%	851	18%	404	21%	651	16%	255	18%
	Younger Driver	1422	16%	531	16%	819	17%	321	16%	603	15%	210	15%
	Non-motorist	1445	16%	383	11%	477	10%	110	6%	968	24%	273	19%
	<i>Pedestrian</i>	1104	12%	273	8%	369	8%	74	4%	735	18%	199	14%
	<i>Bicyclist</i>	343	4%	110	3%	109	2%	36	2%	234	6%	74	5%
	Commercial Vehicles	794	9%	237	7%	521	11%	149	8%	273	7%	88	6%
	Work Zone	202	2%	58	2%	85	2%	24	1%	117	3%	34	2%
Connected	Unlicensed	1572	18%	559	16%	792	16%	322	16%	780	19%	237	17%
	Trains	23	0%	5	0%	21	0%	5	0%	2	0%	0	0%
	Deer/Animal	176	2%	109	3%	156	3%	98	5%	20	0%	11	1%
	Winter Weather	1066	12%	358	11%	668	14%	236	12%	398	10%	122	9%

- a. Focus Area definitions consistent with the 2020-2024 Minnesota Strategic Highway Safety Plan unless otherwise noted.
- b. County System via crash report attribute 'Route System' values CSAH (4) and County Road (7)
- c. Head-on here includes sideswipe opposite direction (per SHSP) but omits Deer/Animal Crashes.

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Table 3-2. Redwood County Crash Focus Areas (2016-2020)

		Redwood County				ATP 8			
		All Systems		County System		All Systems		County System	
Total Severe Crashes		35	100%	18	100%	432	100%	161	100%
Core Areas	Intersection	11	31%	3	17%	179	41%	53	33%
	Lane Departure	17	49%	10	56%	218	50%	89	55%
	<i>Run-Off-Road</i>	12	34%	9	50%	161	37%	70	43%
	<i>Head-On</i>	5	14%	1	6%	57	13%	19	12%
	Impaired	11	31%	5	28%	126	29%	43	27%
	Speed	7	20%	2	11%	99	23%	33	20%
	Unbelted	7	20%	2	11%	101	23%	43	27%
	Inattentive	5	14%	3	17%	51	12%	20	12%
Strategic	Older Driver	7	20%	4	22%	96	22%	34	21%
	Motorcycle	4	11%	2	11%	63	15%	33	20%
	Younger Driver	5	14%	3	17%	94	22%	37	23%
	Non-motorist	2	6%	1	6%	24	6%	7	4%
	<i>Pedestrian</i>	2	6%	1	6%	19	4%	5	3%
	<i>Bicyclist</i>	0	0%	0	0%	5	1%	2	1%
	Commercial Vehicles	9	26%	4	22%	69	16%	12	7%
	Work Zone	0	0%	0	0%	5	1%	1	1%
Connected	Unlicensed	4	11%	3	17%	55	13%	17	11%
	Trains	0	0%	0	0%	2	0%	0	0%
	Deer/Animal	1	3%	1	6%	13	3%	11	7%
	Winter Weather	2	6%	0	0%	48	11%	9	6%

- a. Focus Area definitions consistent with the 2020-2024 Minnesota Strategic Highway Safety Plan unless otherwise noted.
- b. County System via crash report attribute 'Route System' values CSAH (4) and County Road (7)
- c. Head-On here includes sideswipe opposite direction (per SHSP) but omits Deer/Animal crashes.

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3.2 Roadway Facilities

As part of the data-driven prioritization process, crash trees were developed using statewide (Figure 3-3) and Redwood County (Figure 3-4) data to document a disaggregation by state versus local systems, by rural versus urban areas, and by roadway segment versus intersection related crashes.

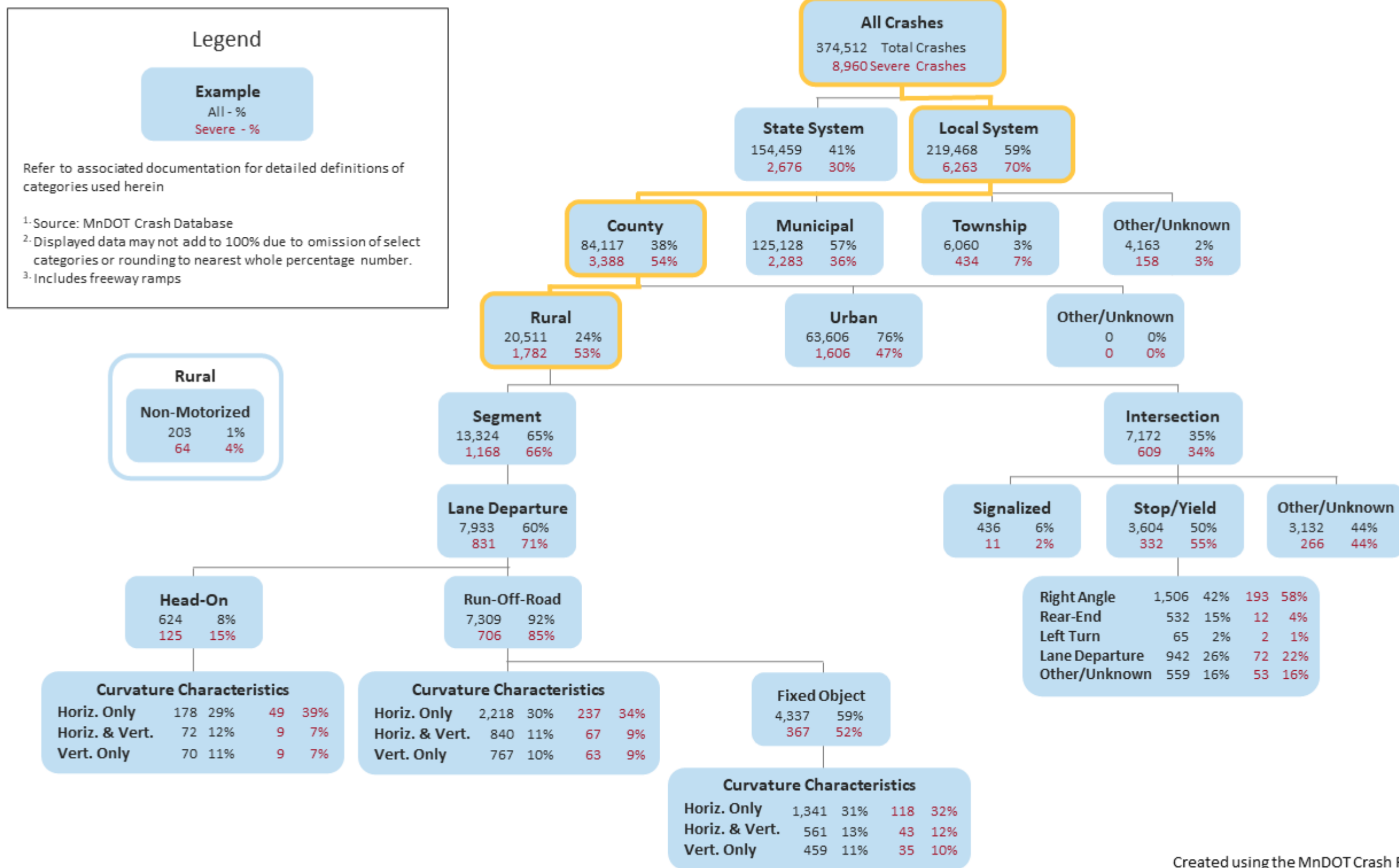
A statewide crash tree was developed because the results would not meet the threshold to be considered statistically significant since there were 3.6 severe crashes per year on Redwood County only roadways. The percentages associated with the various disaggregation between statewide and county values varied slightly, the key takeaways were the same and suggest the following priorities for Redwood County:

- Rural roadways (83 percent of severe crashes)
- Lane Departure crashes along segments (69 percent), including both single-vehicle run-off-road (89 percent) and multi-vehicle head-on (11 percent)
- Lane Departure crashes in curves (33 percent)
- Right-angle crashes at through/stop controlled rural Intersections

The four bullets above are shown visually in Redwood County's rural crash tree. Eighty-three percent of the severe crashes in a rural environment is found in the fourth row, first box from the left, titled Rural. Following the tree down to the segment box shows 87 percent of severe crashes and stepping down twice below the Lane Departure box shows that "Run-Off-Road" severe crashes comprise 89 percent of Lane Departure and the other 11 percent were identified in the Head-On box. For Lane Departure crashes in curves, the 33 percent is calculated by adding up severe crashes in the Curvature Characteristics boxes for horizontal and/or vertical curvature related divided by the total number of Lane Departure crashes.

Additional analysis of severe crashes was conducted to help focus attention on the portion of county roadway system at higher risk. This analysis concluded that paved county roadways across the state account for approximately 70 percent of roadway miles but around 94 percent of severe crashes. Paved county roadways also have a crash density (0.02 severe crashes per mile per year) that is 10 times higher than the crash density on gravel roads. This information supports the focus of the analytical process on paved county roadways. The severe crash overrepresentation along paved county roads also has been documented in North Dakota, South Dakota, and Iowa. The proportion of paved versus gravel roads and the distribution of severe crashes varies from state to state, but the trend is the same in each case, with severe crashes overrepresented along paved county roadways.

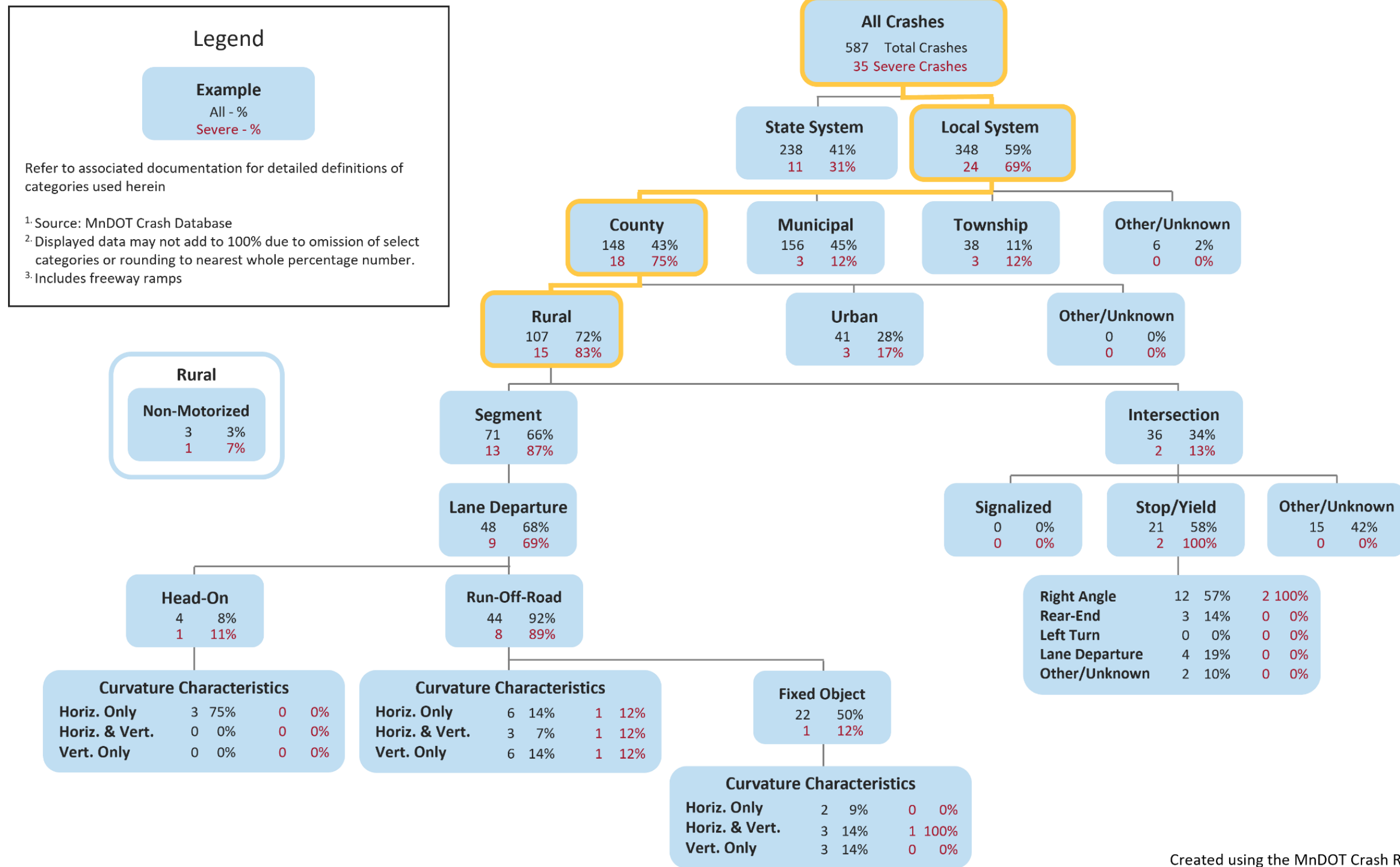
Detailed analysis of severe crashes was also extended to rural county roadway intersections. Based on a sample of over 11,000 rural intersections (all Phase 1 counties), county roadway intersections with state highways and other county roadways accounted for 36 percent of intersections but 72 percent of severe crashes. County roadway intersections with township roads accounted for 64 percent of intersections but only 28 percent of severe crashes. County roadway intersections with state highways and other county roadways also have a crash density (0.03 severe crashes per intersection per year) that is 5 times higher than at county roadway intersections with township roads. This information supports the decision to focus the remainder of the analytical process on county roadway intersections with state highways and other county roadways.



Created using the MnDOT Crash Report Tool on 12/14/2022.

Figure 3-3. Minnesota Statewide Crash Tree - County Rural System (2016-2020)

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Created using the MnDOT Crash Report Tool on 12/14/2022.

Figure 3-4. Redwood County Crash Tree – County Rural System (2016-2020)

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3.3 Safety Strategies and Countermeasures

Adoption of the Lane Departure, Intersections, and Non-motorized safety focus areas began the process for determining appropriate safety strategies. Several safety research reports were reviewed, including:

- National Cooperative Highway Research Program's (NCHRP's) Report 500 Series (2003-2009)
- FHWA's Crash Modification Factor Clearinghouse (2014)
- American Association of State Highway and Transportation Officials' (AASHTO's) Highway Safety Manual (2010)

Following the review, priority was given to adopted safety focus areas to reduce the number of potential infrastructure-related safety strategies from more than 100 to around 60. From there, Redwood County screened the list of strategies based on factors such as proven effectiveness (to reduce severe crashes), implementation cost, consistency with Minnesota's SHSP priorities, probability of being supported by HSIP funding, prior experience and acceptance in Redwood County, and safety partner input. This process resulted in the selection of the 26 priority safety strategies listed below for use in the subsequent safety project development exercise.

- Rural Segments
 - Centerline Rumble Strip
 - Shoulder/Edgeline Rumble Strips (Including New Mumble Design – Figure 3-5)
 - Safety Edge (Figure 3-6)
 - Enhanced Edgeline (6" & 8")
 - Shoulder Paving (2', 4', 6')
 - Clear Zone Enhancements
 - Ditch/Embankment Improvements
 - Separated Bike Trail/Path
- Rural Curves
 - Curve Warning Sign, Speed Advisory & Chevrons or Arrow Board (Figure 3-7)
 - Delineators
 - High-Friction Surface Treatment (HFST)
 - Dynamic Curve Signing (Figure 3-8)
 - Lighting
 - Clear Zone Enhancements
 - Reconstruct TT to a Single T (Figure 3-9)

- Rural Intersections
 - Upgrade Signs and Pavement Markings
 - Street Lights (Figure 3-10)
 - Thru Stop to All-Way Stop/Yield (Figure 3-11)
 - Rural Intersection Conflict Warning System (RICWS)
 - Off-set T-Intersections (provide offset between opposing turn lanes to improve sight distance)
 - Roundabout
 - Turn Lanes (Offset, Channelized)
 - Continuous Green T
 - Mainline Dynamic Warning System
 - LED Stop Signs
 - Remove Skew / Realign Intersections

After reducing the number of safety strategies to these shown, data analysis of the roadway network continued to identify the prioritized locations and correlate the appropriate treatments to develop effective recommended projects.



Figure 3-5. Mumble Strip Design – Traditional versus Mumble Strips
Wave-shaped design produced less external noise than MnDOT's current design



Figure 3-6. Safety Edge



Figure 3-7. Chevrons



Figure 3-8. Dynamic Curve Signing



Figure 3-10. Street Light



Figure 3-9. Reconstruct TT to a Single T



Figure 3-11. Thru Stop to All-Way Stop/Yield

4.0 System Evaluation

The analytical approach that underlies CRSP 2 is a proactive systemic safety evaluation that identifies, evaluates, and prioritizes roadway safety deficiencies based on crash risk.

Prior to undertaking Minnesota CRSPs, the traditional method supporting safety project development for HSIP in Minnesota involved searching across the state's highway system for intersections and roadway segments with multiple crashes – considered high-crash locations. Around the time that MnDOT adopted increasing local agency involvement in the HSIP, they also recognized that reliance on the high-crash method of analysis presented two major problems. First, the method was entirely reactive – crashes had to occur before any safety investments could be made. This resulted in the public asking agencies after a severe crash occurred – “How many people have to die before something is done?” Under this high-crash analytical method, crashes had to occur and be counted prior to making safety improvements.

Experience suggested that when using the high-crash methodology there were only a few locations across Minnesota's expansive local system that would qualify as a high-crash location. Relying on this method alone was a barrier to deploying safety improvement projects along local systems.

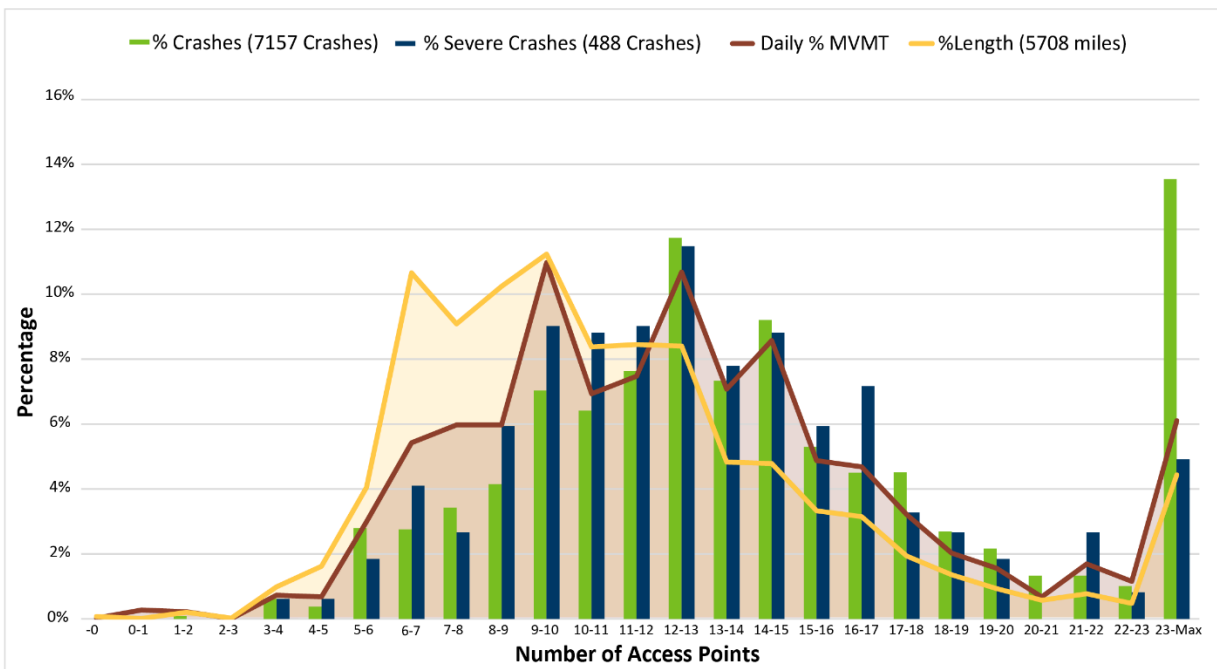
The solution to these problems was the development of a new safety analysis approach – the proactive systemic method that resulted from collaboration between MnDOT and the counties. The underlying premise for this systemic process is that severe crashes along the county roadway system are infrequent and widely scattered – 0.01 severe crashes per year per mile across the 45,000-mile county system. However, the expectation was that these severe crashes were neither uniformly nor randomly scattered and that a set of roadway characteristics could be found at severe crash locations that could help predict where crashes were most likely to occur at future locations.

The systemic process used for CRSP 2 was refined from the CRSP 1 effort. While both analyses consisted of reviewing basic roadway and traffic characteristics along the county system that documented severe crashes, CRSP 2 increased the total number of data elements collected as well as expanded the detail of prior data elements across segments, intersections and curves. For example, the data element “Alignment Skew” in CRSP 1 had a binary option (yes/no) however data analysts for CRSP 2 data collection efforts measured the actual angle of skew to the nearest five degrees. In total, there were 79 unique data elements collected for the CRSP 1 effort for segments, intersections, and curves in rural and urban areas. There was an approximate 50 percent increase (117) in the total number of data elements that were collected for CRSP 2. This additional detail resulted in the generation of more risk factors through a crash frequency analysis leading to a more comprehensive prioritization effort. The following sections describe in more detail how risk factors were identified and the subsequent prioritization process.

4.1 Risk Factor Identification

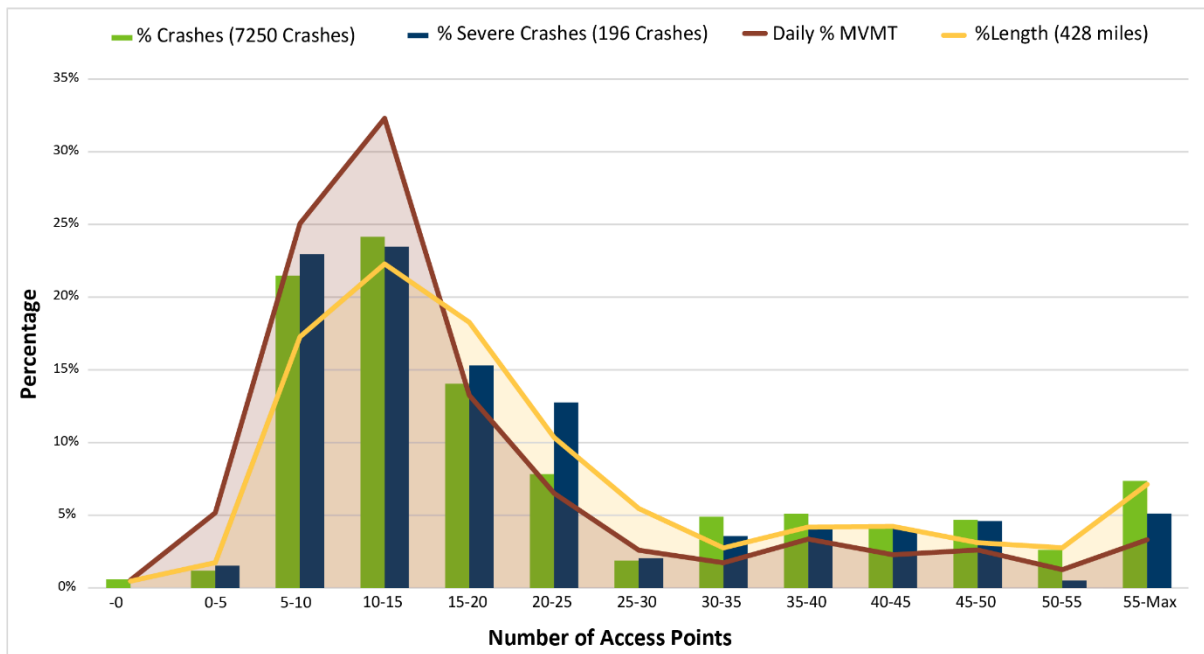
The process of identifying risk factors for CRPS 2 followed a similar process to that of CRSP 1; review the locations with severe crashes, note the roadway and traffic characteristics, and test for over-representation. Examples of the results of the testing for over-representation include:

- **Rural Segments:** Segments where access density (field entrances + private driveways + public road intersections/mile of roadway) is between 7 and 18 per mile accounted for 80 percent of all severe crashes and 85 percent of severe Lane Departure crashes versus 73 percent of rural roadway miles (Figure 4--1).
- **Urban Segments:** Segments where access density is between 15 and 25 per mile accounted for 28 percent of all severe crashes and 18 percent of severe rear-end plus sideswipe same direction crashes versus 29 percent of urban roadway miles in Greater Minnesota (Figure 4-2).
- **Rural Intersections:** Intersections with total entering traffic volumes exceeding 2,000 vehicles per day accounted for 67 percent of all severe crashes and 70 percent of severe right-angle crashes versus 31 percent of all rural intersections (Figure 4-3).
- **Urban Intersections:** Intersections with total entering traffic volumes exceeding 12,000 vehicles per day accounted for 63 percent of all severe crashes and 59 percent of severe right-angle crashes versus 40 percent of all rural intersections (Figure 4-4).



Note: MVMT = million vehicle miles traveled

Figure 4-1. Systemic Risk Factor Rural Segment Access Density



Notes: MVMT = million vehicle miles traveled

Figure 4-2. Systemic Risk Factor Urban Segment Access Density

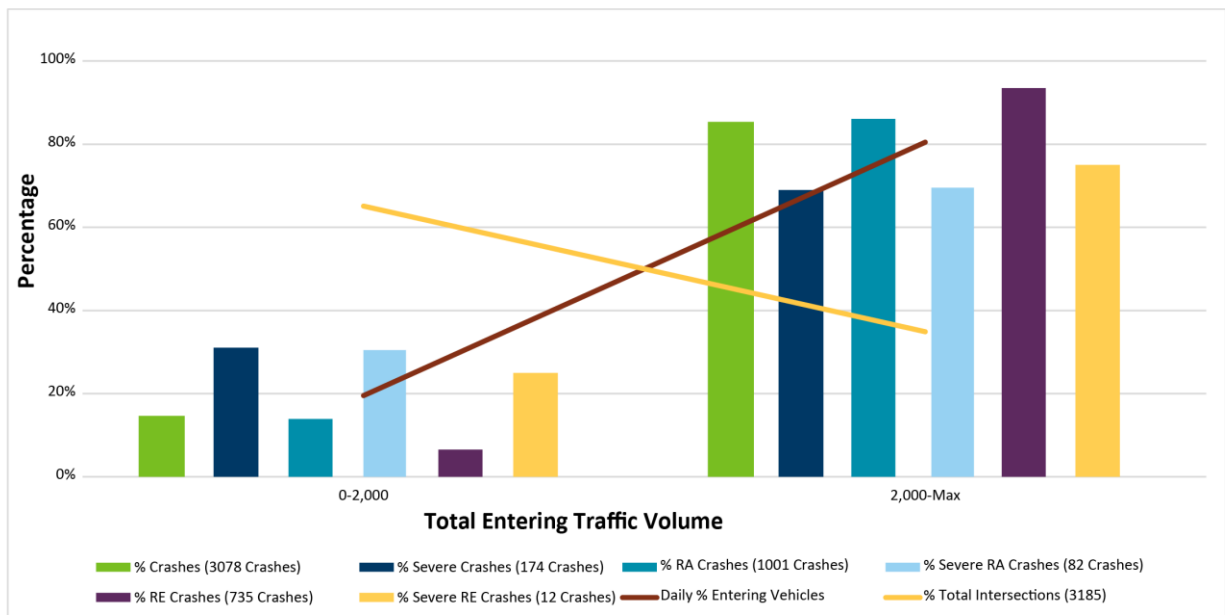


Figure 4-3. Systemic Risk Factor Rural Intersection Total Entering Traffic Volume

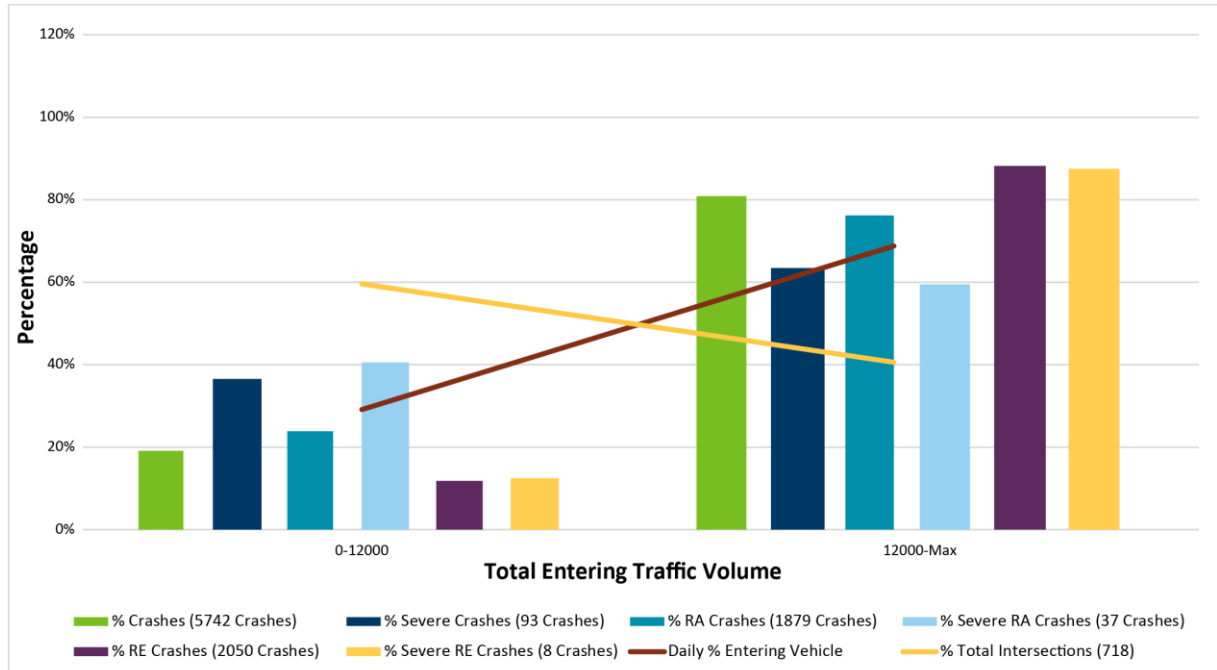


Figure 4-4. Systemic Risk Factor Urban Intersection Vehicle Related Total Entering Vehicles

In addition to testing each risk factor for over-representation, tests were also conducted to demonstrate that increasing numbers of risk factors were associated with greater risk, as measured by the density of crashes. Examples of the testing results for increased crash density include:

- Rural Intersections: Intersections with 5 risk factors present had a severe crash density that were twice the average for all rural intersections and the severe crash density for intersections with 6 or more risk factors were at least four times higher than the average (Figure 4-5).
- Rural Curves: Curves with 6 to 8 risk factors present had severe crash densities and severe Lane Departure crash densities as much as six times higher than the average for all rural curves (Figure 4-6).

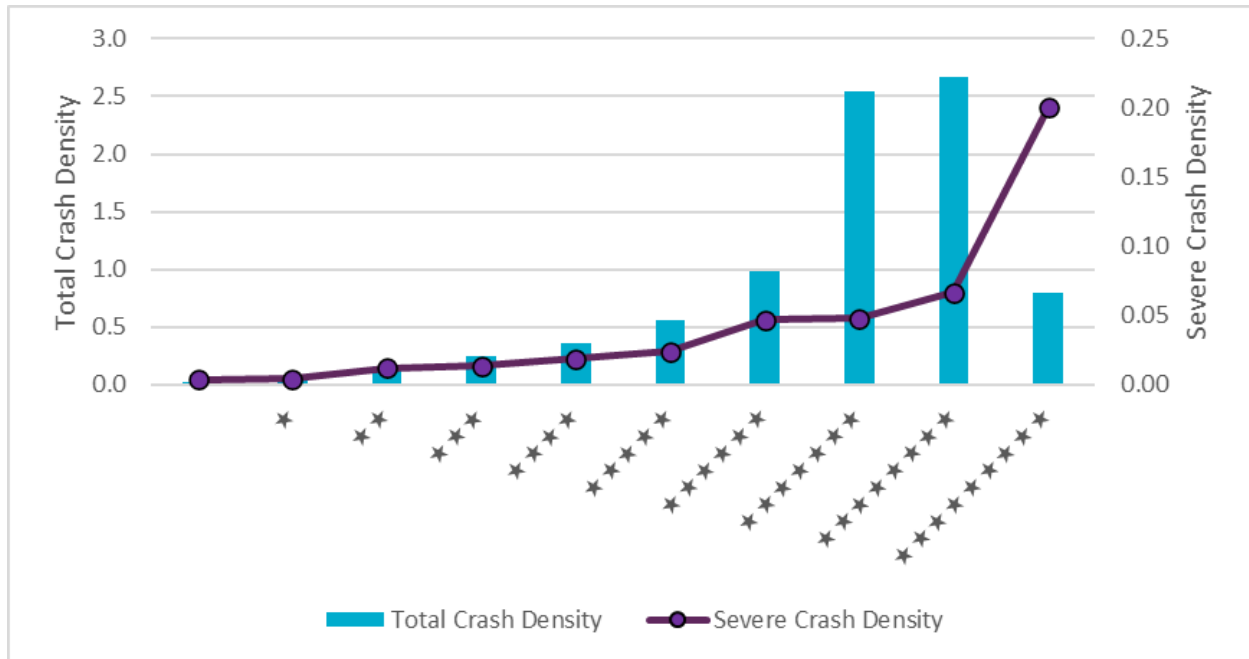


Figure 4-5. Rural Intersection Crash Density Distribution Versus Systemic Risk Rating

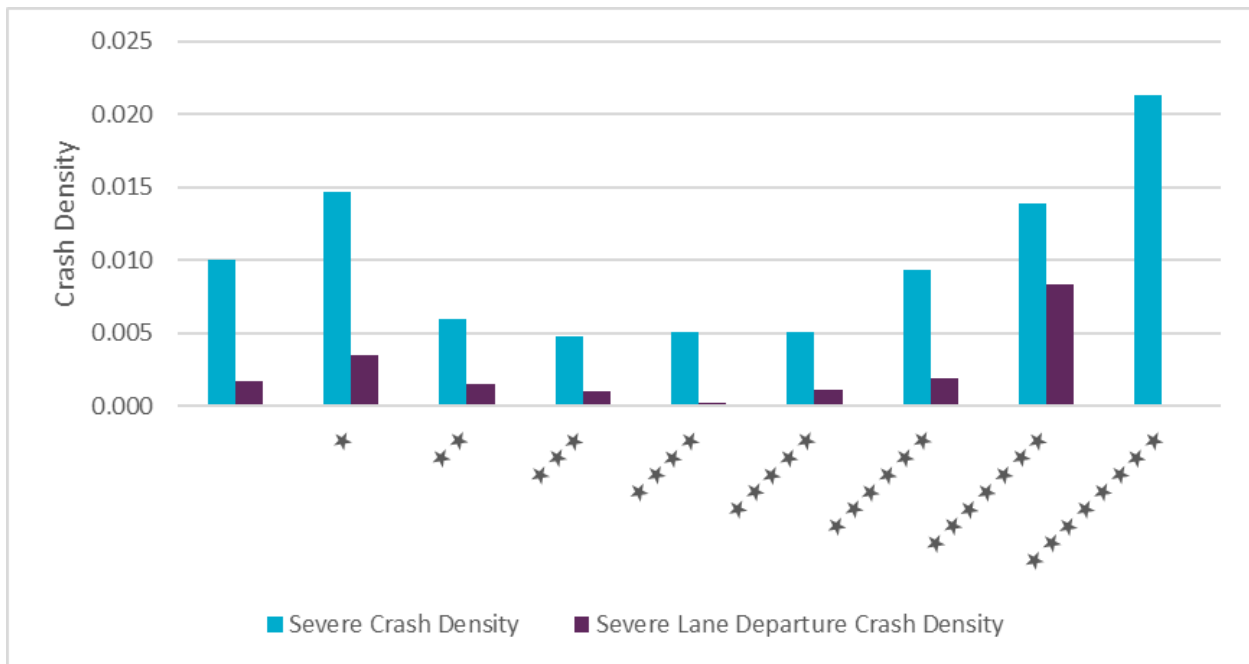


Figure 4-6. Rural Curve Severe Crash Density Distribution Versus Systemic Risk Rating

The results of over-representation testing and severe crash distribution along with additional data recommended the use of an expanded list of risk factors for Redwood County. The adopted risk factors for rural segments, curves and intersections plus urban segments and intersections in Redwood County are documented in Tables 4-1 through 4-6.

Table 4-1. Rural Segment Risk Factors

Risk Factor	Risk Factor Criteria
<i>Speed Limit</i>	55 miles per hour or greater
<i>ADT Single Vehicle</i> ¹	500 to 2,000 vehicles per day
<i>ADT Multi-Vehicle</i> ²	1,250 vehicles per day and greater
<i>Access Density</i>	More than 7 accesses per mile (driveways, field entrances, and public streets), but less than 18 per mile
<i>Curve Density</i>	.6 or more curves per mile
<i>Edge Risk</i>	2S with no shoulder or steep slopes or 3 deficiencies (no shoulder, steep slope, or fixed objects)

¹Risk factor intended to address severe crashes involving single vehicles

²Risk factor intended to address severe crashes involving multiple vehicles

Table 4-2. Curves Risk Factors

Risk Factor	Risk Factor Criteria
<i>Speed Limit</i>	-
<i>Radius</i>	500 feet to 1,400 feet
<i>Traffic Volume</i>	200 to 800 vehicles per day
<i>Lane Width</i>	Less than 12 feet
<i>Shoulder Type</i>	None, gravel, composite
<i>Total Cross Section Width</i>	28 to 34 feet
<i>Adjacent Intersection</i>	Roadway or railroad crossing
<i>Visual Trap</i>	Present
<i>Outside Edge Risk</i>	2S or 3 deficiencies (no shoulder, steep slope, or fixed objects)

Table 4-3. Rural Intersection Risk Factors

Risk Factor	Risk Factor Criteria
<i>Context Zone</i>	Commercial, industrial, mixed use, or residential
<i>Total Entering ADT</i> <i>OR</i> <i>ADT Cross Product</i>	Volume $\geq 2,000$ vehicles per day OR Greater than 1,000,000 vehicles per day
<i>Leg Configuration</i>	4
<i>Alignment Skew</i>	Greater than 10 degrees
<i>Adjacent Railroad Crossing</i>	Present
<i>Adjacent Curve</i>	Horizontal, vertical, or both
<i>Adjacent Commercial Development</i>	Present
<i>Previous STOP</i>	Greater than 5 miles
<i>Major Approach Speed Limit</i>	60 miles per hour or greater on either major approach
<i>Major Approach Turn Lane Configuration</i>	Left/through/through/right, and turn/bypass on either major approach

Table 4-4. Urban Segment Risk Factors

Risk Factor	Risk Factor Criteria
<i>Context Zone</i>	Commercial and mixed use
<i>Speed Limit</i>	50 and above miles per hour
<i>Lane Width</i>	10 to 11.5 feet
<i>Edgeline Striping</i>	None
<i>Parking</i>	Present
<i>ADT</i>	4,000 to 14,000 vehicles per day
<i>Access Density</i>	Greater than 15 accesses per mile (driveways, field entrances and public streets), but less than 25 per mile
<i>Cross Section</i>	Multi-lane
<i>Edge Risk</i>	3 deficiencies (no shoulder, steep slope, or fixed objects)
<i>Shoulder Width</i>	Less than 3 feet

Table 4-5. Urban Intersection Risk Factors/Vehicle Related Crashes

Risk Factor	Risk Factor Criteria
<i>Context Zone</i>	Commercial
<i>Traffic Control Device</i>	Signal
<i>Total Entering ADT</i> OR <i>ADT Cross Product</i>	Greater than 12,000 vehicles per day OR Greater than 20,000,000 vehicles per day
<i>Leg Configuration</i>	4
<i>Major Division Type</i>	Divided
<i>Alignment Skew</i>	Greater than 10 degrees
<i>Adjacent Commercial Development</i>	Present
<i>Major Approach Speed Limit</i> OR <i>Minor Approach Speed Limit</i>	40 miles per hour and greater OR 35 miles per hour and greater
<i>Major Approach Left Turn Phasing</i>	Any type of permitted operation
<i>Major Approach Turn Lane Configuration.</i>	2 left turn lanes OR 2 or more through lanes

Table 4-6. Urban Intersection Risk Factors/Pedestrian/Bike Related Crashes

Risk Factor	Risk Factor Criteria
<i>Traffic Signal</i>	Present
<i>Total Entering ADT</i>	12,000 and greater
<i>Adjacent Development</i>	Present
<i>Number of Lanes Crossed</i>	4 or more
<i>Presence of Sidewalk</i>	Some or none
<i>Crossing Type</i>	Markings only

4.2 Prioritization of Candidate Locations

The analytical process applied the adopted risk factors to Redwood County's roadway segments, curves, and intersections to generate a priority listing – the greater the number of locational risk factors, the higher the candidate priority for safety project development. The overall objective was to use the risk factors to identify a minority of the county system that contained a majority of severe crashes and designate these locations as high priority candidates.

The number of risk factors varies by facility type, from a low of three risk factors for urban intersections related to Pedestrian/Bike crashes to a high of twelve risk factors for urban intersections related to Vehicle crashes. The distribution of severe crashes by risk factors also varies by facility type. As a result, the threshold for designating locations as high priority also varied, from a low of two for urban segments to a high of six for Vehicle Related urban intersections. However, across all counties, the sliding scale of risk factors generally resulted in between 20 percent and 50 percent of the system designated as high priority for safety project development. This was considered a reasonable fraction of the county system based on factors such as the amount of HSIP funding available, the typical cost of safety projects, the extraordinarily low density of severe crashes, and the goal of widely deploying safety projects across the county system.

Results of the prioritization process in Redwood County include identifying the following high priority candidate locations for safety project development. Tables 4-7 through 4-12 show an example (first 10 projects) of the full project lists included in Appendix D:

- Rural Segments:
 - 91 segments (329 miles) evaluated
 - 26 segments (100 miles) designated as high priority (3 or more risk factors)
- Rural Curves:
 - 68 curves evaluated
 - 22 curves designated as high priority (5 or more risk factors)
- Rural Intersections:
 - 140 intersections evaluated
 - 44 intersections designated as high priority (3 or more risk factors)
- Urban Segments:
 - 3 segments (2 miles) evaluated
 - 1 segments (.09 miles) designated as high priority (2 or more risk factors)
- Urban Intersections (Vehicle Related):
 - 8 intersections evaluated
 - 4 intersections designated as high priority (3 or more risk factors)
- Urban Intersections (Pedestrian/Bike Related):
 - 8 intersections evaluated
 - 4 intersections designated as high priority (2 or more risk factors)

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Table 4-7. Rural Segment Prioritization – Example Table

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Length (Miles)	ADT [vpd]	Speed Limit	ADT Single-Vehicle	ADT Multi-Vehicle	Access Density	Curve Density	Edge Risk	Total Stars
47	1	2.005	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	11.01	1338	★	★	★	★	★		★★★★★
4	2	1.004	CSAH	1	Intersection of CSAH1 and MN 67	Intersection of CSAH 1 and US 71	1.72	1975	★	★	★	★			★★★★★
28	3	13.002	CSAH	13	Intersection of CSAH13 and MN 67	Intersection of CSAH 13 and CSAH 2	5.15	1500	★	★	★	★			★★★★★
58	4	32.001	CSAH	32	2.0 Miles West of Intersection of CSAH32 and MN 68	Intersection of CSAH 32 and MN 68	2.00	1350	★	★	★	★			★★★★★
63	5	46.001	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	4.59	560	★	★		★	★		★★★★★
64	6	5.001	CSAH	5	Intersection of CSAH55 and CSAH 7	Intersection of CSAH 5 and Clark St	1.50	790	★	★		★	★		★★★★★
69	7	6.003	CSAH	6	Intersection of CSAH6/Ilex St and US 14	2790 ft North of Intersection of CSAH 6 and of 130th St	1.00	1300	★	★	★	★			★★★★★
75	8	6.009	CSAH	6	3497 ft North of Intersection of CSAH6 and 400th St	.16 Miles North of Intersection of 410th St and CSAH 6	1.04	760	★	★		★	★		★★★★★
10	9	101.004	CSAH	101	Intersection of CSAH101 and US 71	400 ft South of Intersection of CSAH 101 and of Burr Oak Rd	0.81	2850			★	★	★		★★★
12	10	101.006	CSAH	101	2415 north of Intersection of CSAH101/Main St and Burr Oak Rd	56 ft South of Intersection of CSAH 101 and of Front St	0.29	2850			★	★	★		★★★

See Appendix D for complete table of prioritized locations

Notes: ADT = average daily traffic

CRSP 2 ID Example: 1.001: 1 = Route Number 1; 001 = First Segment

Table 4-8. Rural Curve Prioritization - Example Table

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Radius [Feet]	ADT [vpd]	Lane Width [Feet]	High Side Shoulder Type	Total Cross Section Width [Feet]	Adjacent Intersection	Visual Trap	Outside Edge Risk	Total Stars
23	1	17.002	CSAH	17	Intersection of CSAH17/Dalton Ave and Morristown Blvd	Intersection of NW 70th Ave and Dalton Ave	★	★	★	★		★	★	★	★★★★★★
22	2	17.001	CSAH	17	Intersection of CSAH17/Dalton Ave and Morristown Blvd	Intersection of NW 70th Ave and Dalton Ave	★	★	★	★		★	★	★	★★★★★★
21	3	15.004	CSAH	15	66 ft East of Intersection of CSAH15/E Central St and Public St	Intersection of CSAH 15 and US 71	★	★			★	★	★	★	★★★★★★
47	4	5.001	CSAH	5	Intersection of CSAH55 and CSAH 7	Intersection of CSAH 5 and Clark St	★	★		★	★	★		★	★★★★★★
39	5	30.002	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	★	★	★		★	★	★		★★★★★★
46	6	46.003	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	★	★		★	★	★		★	★★★★★★
20	7	15.002	CSAH	15	404 ft East of Intersection of CSAH15 and S Birch St	187 ft West of Intersection of CSAH 15 and S Yeager St	★	★		★	★	★	★		★★★★★★
43	8	45.001	CSAH	45	.46 Miles West of Intersection of CSAH45/310th Ave and 241st St	Intersection of CSAH 45 and 310th Ave	★			★	★	★	★	★	★★★★★★
29	9	2.002	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71		★	★	★	★			★	★★★★★
52	10	7.001	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	★		★	★		★		★	★★★★★

See Appendix D for complete table of prioritized locations.

Notes: CR = County Road; mph = mile(s) per hour;

CRSP 2 ID Example: 1.001: 1 = Route Number 1; 001 = First Curve

Table 4-9. Rural Intersection Prioritization - Example Table

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach	Minor Approach	Context Zone	Total Entering ADT or Cross Product ^a	Leg Configuration	Alignment Skew [Degrees]	Adjacent Railroad Crossing	Adjacent Curve	Adjacent Commercial Development	Previous STOP [> 5 Miles]	Major Approach Speed Limit	Major Approach Turn Lane Configuration	Total Stars
98	1	6.004	CSAH	6	US 14	CSAH 6 (Ilex St)	★	★	★	★	★			★			★★★★★★
22	2	105.001	CSAH	105	US 14	CSAH 105 (6th St)	★	★	★		★			★			★★★★★
24	3	115.001	CSAH	115	US 71	CSAH 155 (Main St)		★		★		★		★	★		★★★★★
28	4	127.001	CSAH	127	CSAH 127 (1st St)	CR 50 (Main St)	★		★	★	★			★			★★★★★
44	5	17.003	CSAH	17	CSAH 17 (Railroad St)	CSAH 117 (Main St)	★		★	★		★		★			★★★★★
48	6	17.007	CSAH	17	MN 68	CSAH 17 (Kenwood Ave)			★	★		★		★	★		★★★★★
55	7	2.006	CSAH	2	MN 68 (Front St)	CSAH 2 (Sommerville St)	★	★	★	★				★			★★★★★
68	8	30.003	CSAH	30	MN 19	CSAH 30 (Center St)	★	★	★			★		★			★★★★★
86	9	5.004	CSAH	5	US 14	CSAH 5 (8th St)	★	★	★		★			★			★★★★★
10	10	10.002	CSAH	10	US 14	CSAH 10		★	★		★			★			★★★★

See Appendix D for complete table of prioritized locations.

Notes:^a Units of measure differ. Entering ADT is vpd, cross product is vpd²
CRSP 2 ID Example: 1.001: 1 = Route Number 1; 001 = First Intersection

Table 4-10. Urban Segment Prioritization - Example Table

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Length [Miles]	ADT [vpd]	Context Zone	Speed Limit	Lane Width	Edgeline Striping	Parking	ADT	Access Density	Cross Section and Design	Edge Risk	Shoulder Width	Total Stars
2	2	101.003	CSAH	101	42 ft South of Intersection of CSAH101/S Dekalb St and E 2nd St	Intersection of CSAH 101 and US 71	0.09	3600	★							★			★★
1	1	101.002	CSAH	101	Intersection of CSAH101 and Magnolia Ave	42 ft South of Intersection of CSAH 101 and of E 2nd St	1.24	2550				★							★
3	3	101.008	CSAH	101	116 ft South of Intersection of CSAH101 and Cedar Cliff Rd	.35 Miles North of Intersection of River Rd W and CSAH 101	0.46	1800											

See Appendix D for complete table of prioritized locations.

Note: CRSP 2 ID Example: 1.001: 1 = Route Number 1; 001 = First Segment

Table 4-11. Urban Intersection Prioritization Vehicle Related - Example Table

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach Name	Minor Approach Name	Context Zone	Traffic Control Device	Total Entering ADT or Cross Product ^a	Leg Configuration	Major Division Type	Alignment Skew [Degrees]	Adjacent Commercial Development	Major/Minor Approach Speed Limit	Major Approach Left Turn Lane Phasing	Major Approach Turn Lane Configuration	Total Stars
4	1	101.006	CSAH	101	MN 19 (Bridge St)	CSAH 101 (Dekalb ST)	★	★	★	★			★	★	★		★★★★★★
5	2	101.007	CSAH	101	MN 19 (Bridge St)	CSAH 101	★		★	★				★			★★★★
2	3	101.004	CSAH	101	MN 67	CSAH 101 (Normandale Rd)				★		★		★			★★★
7	4	101.009	CSAH	101	CSAH 101	MSAS 104 (Northwood Dr)	★			★				★			★★★
1	5	25.003	CSAH	25	CSAH 25 (River Rd)	CSAH 101					★			★			★★
3	6	101.005	CSAH	101	CSAH 101 (Dekalb ST)	MSAS 108 (Cook St)				★		★					★★
6	7	101.008	CSAH	101	CSAH 101	MSAS 116 (Industrial Dr)	★							★			★★
8	8	101.010	CSAH	101	CSAH 101	MSAS 109 (Activaide Rd)				★				★			★★

See Appendix D for complete table of prioritized locations.

Notes: ^a Units of measure differ. Entering ADT is vpd, cross product is vpd².
CRSP 2 ID Example: 1.001: 1 = Route Number 1; 001 = First Intersection

Table 4-12. Urban Intersection Prioritization Pedestrian/Bike Related - Example Table

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach Name	Minor Approach Name	Traffic Control Device	Total Entering ADT	Adjacent Commercial Development	Max Number of Lanes Crossed	Presence of Sidewalk	Pedestrian Crossing Type	Total Stars
4	1	101.006	CSAH	101	MN 19 (Bridge St)	CSAH 101 (Dekalb ST)	★	★	★	★	★	★	★★★★★★
5	2	101.007	CSAH	101	MN 19 (Bridge St)	CSAH 101		★		★	★		★★★
3	3	101.005	CSAH	101	CSAH 101 (Dekalb ST)	MSAS 108 (Cook St)					★	★	★★
8	4	101.010	CSAH	101	CSAH 101	MSAS 109 (Activaide Rd)				★	★		★★
2	5	101.004	CSAH	101	MN 67	CSAH 101 (Normandale Rd)					★		★
1	6	25.003	CSAH	25	CSAH 25 (River Rd)	CSAH 101					★		★
6	7	101.008	CSAH	101	CSAH 101	MSAS 116 (Industrial Dr)					★		★
7	8	101.009	CSAH	101	CSAH 101	MSAS 104 (Northwood Dr)					★		★

See Appendix D for complete table of prioritized locations.

Note: CRSP 2 ID Example: 1.001: 1 = Route Number 1; 001 = First Intersection

5.0 Beyond Infrastructure – County Highway Collaboration to Improve Local Road Safety

The focus of CRSP is to identify recommended priority safety projects at priority site locations within the County highway department’s area of responsibility—namely, roadway infrastructure or engineering. However, the CRSP 2 process and this Plan recognize that severe traffic crashes are often largely due to poor driving behavior such as willful disregard for traffic laws and traffic control devices (e.g., texting while driving, not stopping at stop signs, red-light-running, speeding). Consequently, infrastructure safety improvements (e.g., rumble strips, improved intersection signing, etc.) are enhanced when deployed as part of a comprehensive and community-wide traffic safety approach. This section of the Plan looks beyond infrastructure safety improvements to guide county engineering staff to further engage with Regional TZD efforts through interdisciplinary collaboration to improve safety on county roads.

Traffic crashes are complex occurrences that often have multiple crash contributors. Traffic crashes may result from any combination of overlapping crash factors including the roadway or driving environment, the vehicle, and driver behavior. Figure 5-1 illustrates the complex interrelationship among these three crash contributors.

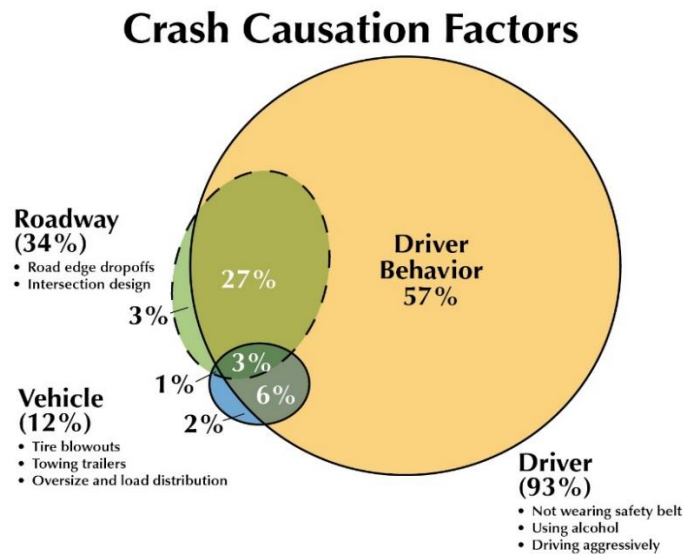


Figure 5-1. Crash Causation Factors¹

Source: *Human Factors and Highway Safety, FHWA Office of Safety Programs*

¹ Figure 5-1 indicates the percentage of crashes influenced by each factor alone represented by non-overlapping sections (driver behavior is yellow, roadway is green, and vehicle is blue) while those sections that do overlap with other crash factors indicate the complex occurrence where multiple factors contribute to a crash. The percentages in the parentheses indicate the total influence a crash factor has to all crashes, whether exclusive or contributing with other factors.

These crash causation factors indicate that 93 percent of traffic crashes are due, in part, to driver behavior. Research supports, and CRSP 2 workshop participants across the state observed, that driver inattention/distractions, driver decision errors/poor judgment, and poor driver performance are primary factors contributing to traffic crashes (NHTSA, 2015a).

Minnesota statewide crash data from 2016 through 2020 was reviewed during CRSP 2 and revealed the following crash factors for the county road system.

- 48 percent Lane Departure while operating a motor vehicle
- 47 percent Intersection Related
- 15 percent Unbelted Motorists
- 28 percent Impaired Driver
- 11 percent Inattentive/Distracted Driver
- 20 percent Speed Related

The risk factors and their percentages, when added together, exceed 100 percent because severe crashes typically involve multiple overlapping factors working in unison to contribute to the crash (e.g., an impaired driver who was driving too fast and departed his lane). In addition to infrastructure safety needs, CRSP 2 workshop participants discussed common themes and expressed concern about the growing number of drivers who:

- Use their smartphone
- Drive under the influence of alcohol and drugs
- Are/have unbelted motorists
- Drive at unsafe speeds
- Fail to stop or yield at stop-through intersections

Minnesota's county highway staff recognizes that engineering and infrastructure investments alone will not eliminate all fatal and severe crashes until motorists also make safer choices. Therefore, county road safety efforts must reach beyond infrastructure or engineering safety strategies and actively support a comprehensive, multi-disciplinary approach to road safety. This approach includes, but is not limited to, effective local traffic law enforcement, public education that touts the risks associated with poor driving choices, and emergency medical responses to effectively treat and transfer crash victims to the appropriate level of hospital care. Leveraging local infrastructure strategies with driver behavior-related safety strategies strengthens the safety impact of county efforts to reduce severe crashes.

5.1 County Highway Engineering Coordination with Minnesota Toward Zero Deaths Program

To foster interdisciplinary cooperation and engagement at the state, regional, and local level, the statewide Minnesota TZD Program employs an integrated approach of engineering, enforcement, education, emergency medical and trauma services, and more (e.g., supportive and informed judicial staff and strong traffic safety legislation) to move Minnesota toward its zero fatality vision. In addition to the statewide TZD Program efforts, regional partnerships created in eight Minnesota geographic areas promote local-level TZD efforts. Each Regional TZD partnership has a

local steering committee, co-led by MnDOT and State Patrol District personnel, to foster cooperation, establish safety priorities and initiatives, and leverage resources.

Minnesota's 87 counties are encouraged to collaborate with local driver-behavior safety partners and with the county's Regional TZD Program Coordinator to improve safety on local roadways. See Appendix E for Regional TZD Coordinator contact information.

5.2 Collaborations to Strengthen Local Road Safety

The following are a few examples of infrastructure-based safety strategies enhanced through interdisciplinary TZD collaboration.

- **Cooperatively conduct county road safety presentations with the assistance of local law enforcement and local safety coalition members.** Extend invitations to local law enforcement and safety coalition members to cooperatively participate in road safety presentations for county board or other public meetings on crash-causation and trends, effective safety countermeasures, and local support needed. Safety presentations that include behavioral safety partners reinforce awareness that preventing roadway deaths cannot be achieved through infrastructure improvements alone but require a comprehensive, interdisciplinary approach.
- **Deploy Lane Departure infrastructure safety strategies coupled with enhanced enforcement and public outreach.** To maximize the expected safety benefit of the Lane Departure safety strategies – such as centerline and edge line rumble or mumble strips, high visibility pavement markings, and adding or widening edgelines – integrate increased enforcement presence at targeted, high-risk locations and timeframes. Coupling infrastructure strategies with additional enforcement, along with public media outreach about the problem/risk, infrastructure deployment and the added enforcement, will improve safety and reduce risky driver behavior by strengthening the public's perceived risk of being stopped.
- **Cooperatively deploy roving vehicle speed display signs, with extra enforcement, to reduce speed.** Speed is a persistent contributor to traffic deaths on Minnesota roads and reductions in speed related crashes have proven difficult. Roving dynamic speed display signs are changeable message signs activated by radar, or other speed-sensing devices, that display an approaching driver's traveling speed. This driver feedback in conjunction with visible enforcement puts the driver on notice to slow down. Deployment of dynamic speed display signs to reduce speed requires the cooperative effort of highway agencies and law enforcement as well as local media to inform the public.
- **Support the expanded use of red light running confirmation lights coupled with enhanced enforcement.** To reduce the most common type of serious crash at signalized intersections (right-angle crashes), an innovative, low-cost red light running confirmation enforcement light enables one officer to monitor an intersection from a downstream location to directly observe red light running violations and issue citations more effectively and safely without requiring pursuit through the intersection. Red light running confirmation lights require only one officer and, because the confirmation lights come on the same instant as the red light of the signal, officers spend less time in court. Red light running confirmation lights require

strong collaboration between county engineering and local law enforcement. In addition, public education and media outreach about the red light running confirmation lights, with supporting enforcement, deters drivers from high-risk red light running.

- **Consider the use of road safety audits and other crash analysis approaches to gain post-crash perspectives of severe crash causation and potential safety improvements.** Although a cornerstone of the CRSP 2 process is the systemic analyses of roadway risk factors contributing to severe crashes and to proactively apply a safety treatment to priority locations to prevent a severe crash, if a fatal or serious injury crash occurs, consider engaging a multi-disciplinary safety team to share perspectives. Local safety stakeholders representing engineering, enforcement, education, and education outreach or local TZD Safe Road Coalition members can offer valuable insight to both the roadway and driver behavior components of a severe crash, its causation, and interdisciplinary approaches to improving the roadway safety and maximizing the impact of infrastructure safety strategies.

Although the focus of the CRSPs is to identify priority infrastructure safety investments at high-risk locations, county highway staff recognize the importance of reaching beyond infrastructure and implementing a collaborative, multi-disciplinary approach to improving road safety, an approach that aligns with the statewide Minnesota TZD Program and the Minnesota SHSP.

6.0 Safety Project Development and Recommended Projects

This CRSP document is developed with a focus on proven effective strategies that can be widely implemented at low-cost and at several locations with a higher probability of risk of severe crashes. A systemic deployment of strategies is implemented to address risk of potential for severe crashes where the crash densities are too low to warrant a spot analysis. In Minnesota, the crash densities are approximately 0.01 severe crashes per mile per year across the county roadway system, which is not statistically significant when observed individually. In the CRSP 2 approach, the presence of a crash is viewed as complimentary to the risk analysis rather than a sole influencer. Additionally, since HSIP provides limited funding, low-cost strategies allow for wider deployment and treatment of more at-risk locations on the county system.

6.1 Safety Project Development Technical Process

The first step in the safety project development process involved documenting existing roadway and traffic volume characteristics of each candidate location and then working through a checklist that considers how these features influence selection of a particular recommended strategy. After the initial check, the second step is developing a **decision tree** for candidate locations. Multiple iterations and refinement went into the development of the six unique decision trees for CRSP 2 that helped guide safety strategies for:

- Rural Segments (See Figure 6.1)
- Rural Curves (See Figure 6.2)
- Rural Intersections (See Figure 6.3)
- Urban Segments (See Figure 6.4)
- Urban Intersections – Vehicle Related (See Figure 6.5)
- Urban Intersections – Ped/Bike Related (See Figure 6.6)

The final step in the technical process of updating the Redwood CRSP involves developing a list of recommended safety projects – a specific infrastructure-based safety strategy for each of the identified high priority locations. The updating process for CRSP 2 is more complex and comprehensive than CRSP 1 because Redwood County has already implemented many of the recommended safety projects identified in CRSP 1. Additionally, CRSP 2 has a large number of strategies that are eligible to compete for HSIP funding.

The process for safety project development utilizes a technical approach to limit subjectivity that could be exhibited when making countermeasure recommendations. Collaboration with County staff was also necessary so that the final lists of recommended projects will be the most impactful and reduce the associated risk and/or address prior crash history at high priority locations. Key points associated with the individual crash trees are described in the following paragraphs and illustrated in the accompanying figures.

6.2 Rural Segments

Preventing Lane Departure crashes, both single vehicle run-off the road and cross center head-on collisions, is the primary focus of safety project development along rural segments. Crash data indicates that single-vehicle crashes are over-represented where traffic volumes are between 500 and 2,000 vehicles per day and multiple Vehicle crashes are over-represented where traffic volumes are 1,250 vehicles per day and greater. This suggests, for single-vehicle related crashes, implementing road edge improvements such as enhanced edgelines or edge/shoulder rumble strips along lower volume segments would be the most beneficial to address the associated risk. As for multi-vehicle related crashes, a combination of edge and centerline improvements such as center rumble strips or center buffers should be implemented along higher volume segments.

Other factors considered include lane width and the presence of noise sensitive receivers (residences, schools, etc.). Implementation of edge rumble strips results in the perception that the width of the road has been narrowed which can increase complaints about vehicle noise in a more residentially dense area. One experimental countermeasure that can improve road edge safety as well as reduce the noise from vehicles striking rumble strips is a newer technology called sinusoidal rumble strips, or mumble strips. Since this is still an experimental strategy and not widely deployed, further research and performance evaluation should be considered before wide deployment. If lane widths are 12 feet, edge rumble strips are recommended. However, if lane widths are less than 12 feet, then enhanced edgelines are recommended, which can consist of, for example, 6-inch edgelines or embedded wet-reflective pavement markings.

Project implementation typically focuses lower cost strategies (enhanced edgelines) on roadways with less volume where crash densities are low and the highest cost strategies (center buffers) are reserved for application along only the highest volume roadways.

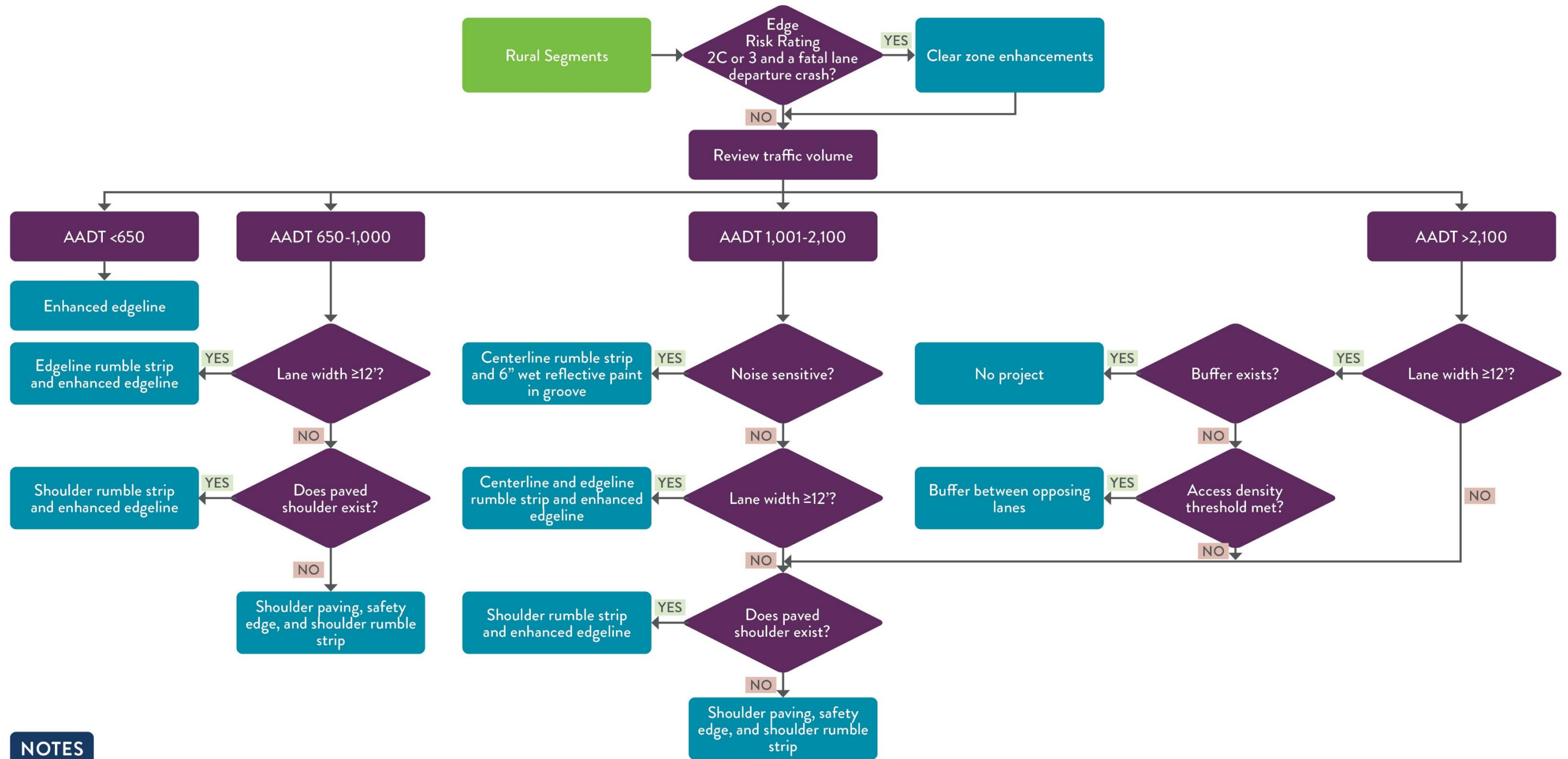
6.3 Rural Curves

Preventing Lane Departure crashes is the primary focus of rural curve safety project development. Safety literature and Minnesota's crash data indicates that the risk of a Lane Departure crash in curves decreases with increasing length of curve radius. However, reconstructing curves to increase their radius typically costs between \$500,000 and \$1,000,000 per curve. There are approximately 30,000 curves along Minnesota's county road system; therefore, reconstruction was not considered a feasible strategy to implement statewide due to limited funding. Instead, a number of lower cost safety strategies for curves were identified and include enhanced warning signs to improve navigation through curves, address slippery surfaces in curves with a history of crashes related to adverse pavement conditions, clear zone maintenance to reduce the severity of crashes when vehicles run off the road, and convert curves with multiple-T intersections to single-T intersections.

When deciding on a package of enhanced warning signs, the primary factor considered is the speed differential between the posted speed limit on the curve approach and either the posted advisory speed in the curve or an inferred advisory speed computed using a formula that accounts for curve radius, super-elevation, and pavement friction. A speed differential of 5 miles per hour typically results in use of an advanced curve warning sign (if not already in-place), 10 miles per hour suggests the use of an advanced sign plus a speed advisory, and a 15 mile per hour differential suggests the use of an advanced sign, a speed advisory, and chevrons.

If the curve has a radius in the critical range and has a visual trap, chevrons would be recommended regardless of the speed differential.

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NOTES

Edge Risk Rating 2C: Usable shoulder, roadside with fixed objects
Edge Risk Rating 3: No usable shoulder, roadside with fixed objects

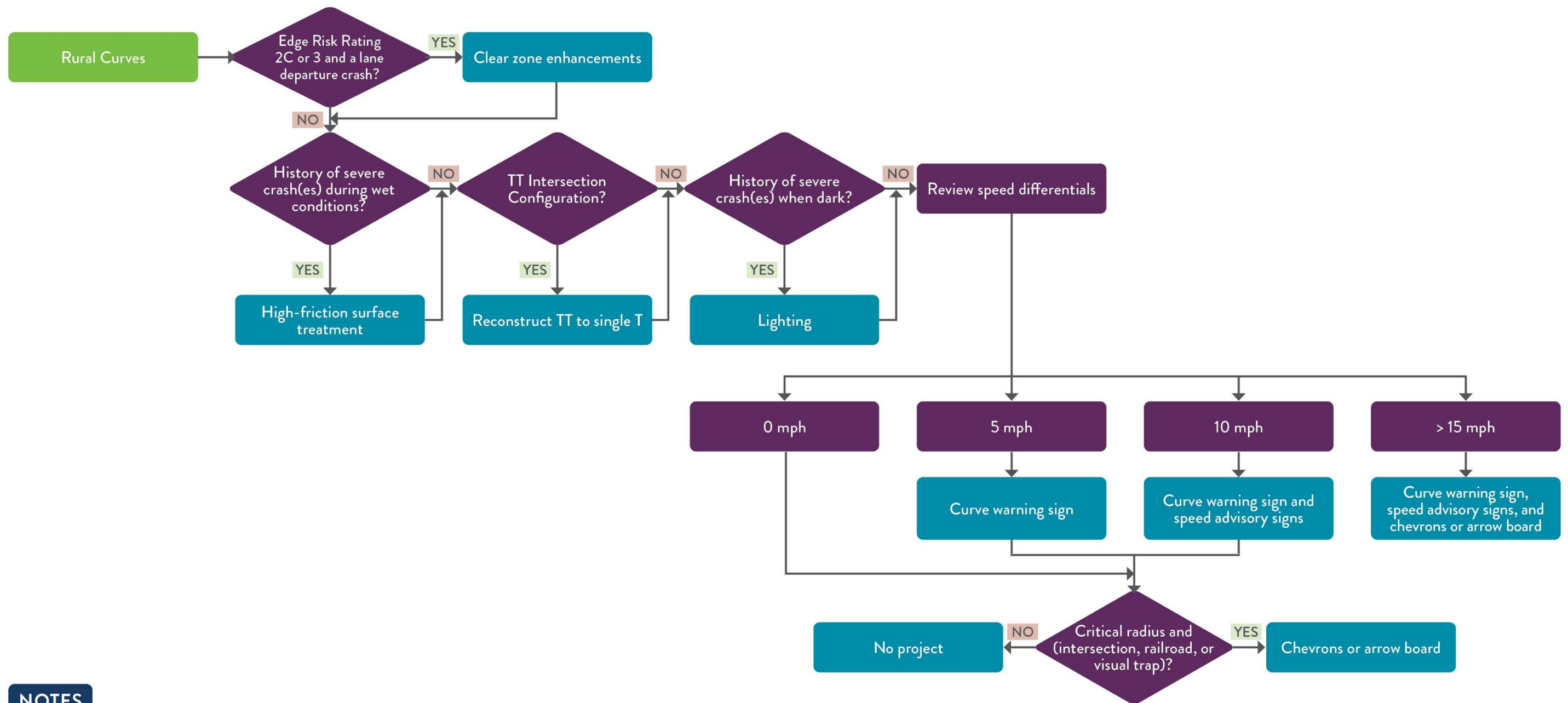
Clear Zone Enhancements: The project includes flattening of slopes, clearing, grubbing, right-of-way, entrance approaches and perhaps utility poles relocated. It does not include clear zone maintenance.

Noise Sensitive: Determined as residential areas, recreational, etc.

Manual Project Assignment: Locations that do not satisfy any case explicitly in the decision trees are not automatically assigned a project and are separately considered for manual project assignment.

Figure 6-1. Rural Segment Safety Project Decision Tree

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NOTES

Edge Risk Rating 2C: Usable shoulder, roadside with fixed objects
Edge Risk Rating 3: No usable shoulder, roadside with fixed objects

Clear Zone Enhancements: The project includes flattening of slopes, clearing, grubbing, right-of-way, entrance approaches and perhaps utility poles relocated. It does not include clear zone maintenance.

TT Intersection Configuration: A closely spaced intersection to a curve with skewed approaches to the major road creating conflicting movements, with both vehicles turning at the intersections and vehicles maneuvering through the curve.

Speed Differential: Difference between the speed limit and the advisory speed.
Manual Project Assignment: Locations that do not satisfy any case explicitly in the decision trees are not automatically assigned a project and are separately considered for manual project assignment.

Figure 6-2. Rural Curve Safety Project Decision Tree

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6.4 Rural Intersections

In Minnesota, a right-angle collision is the most common type of severe crash at rural intersections. County-selected strategies for this collision type have been very effective at mitigating these crashes. Strategies have included enhancing intersection related traffic signs and pavement markings, adding street lights, providing a dynamic warning system, and geometric upgrades (turning lanes, J-Turn intersections, and roundabouts). Implementing these strategies range from a few thousand dollars for upgraded traffic signs and pavement markings to around \$1 million for J-Turn intersections and roundabouts. The volume of traffic through the intersection and the roadway geometry were key factors considered when assigning a particular strategy to a specific intersection.

The crash analysis indicated that rural intersections with lower traffic volumes have fewer severe crashes than comparable intersections with higher volumes. Therefore, projects with lower costs were focused on for at-risk intersections with a variety of traffic volumes while projects of medium to higher costs were focused on for at-risk intersections with higher traffic volumes.

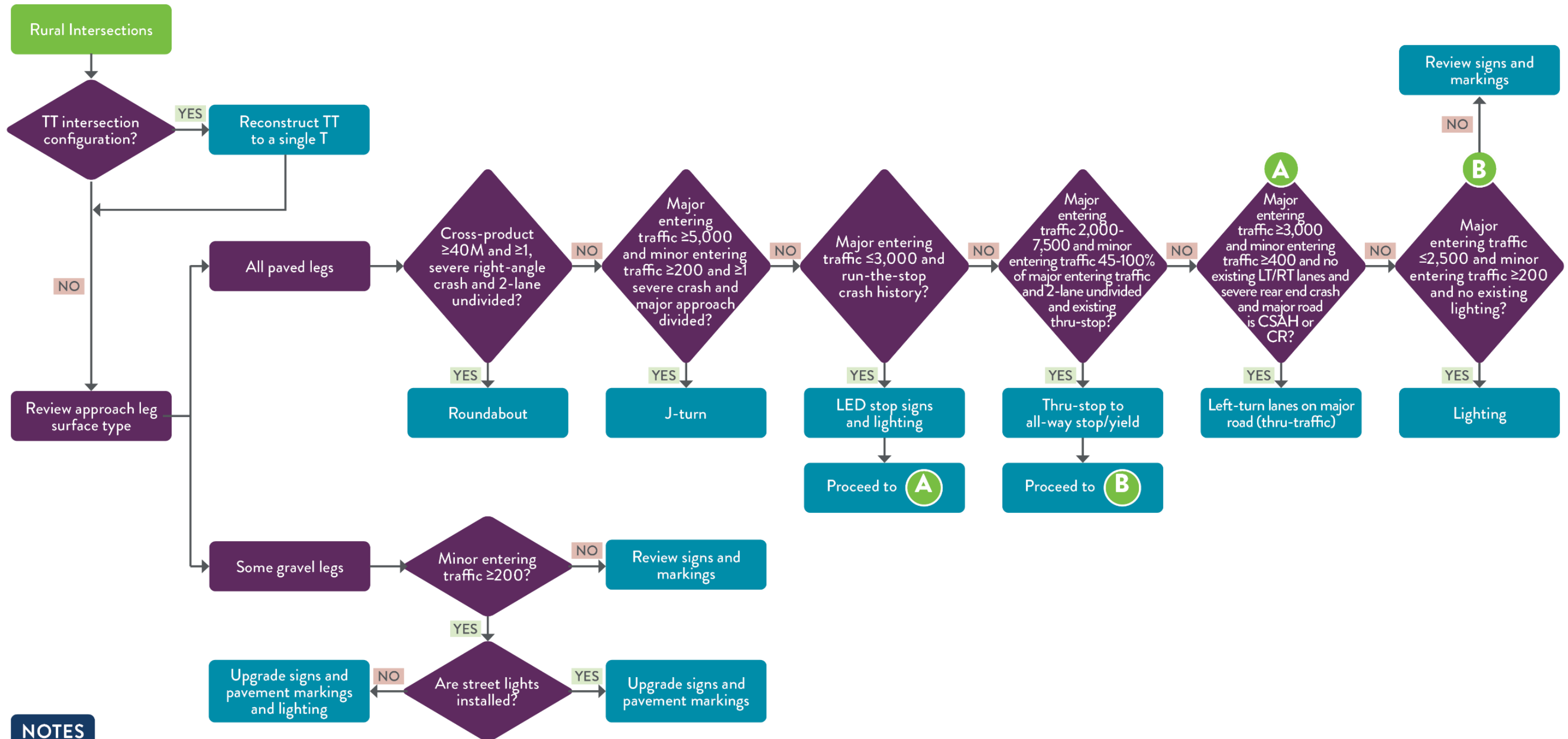
The cross section and geometry of the major roadway were also considered during project development. Since J-Turn intersections are most appropriately applied at intersections where the mainline has a divided cross section, they were only considered at locations where county roadways intersect with four-lane divided state highways. Application of rural roundabouts were only considered at intersections where the volume cross product (multiplication of major approaching volume with minor approaching volume) was equal to or exceeded 40 million. In other words, if an existing STOP controlled intersection met or exceeded the traffic volume that warrants a traffic signal, the project team recommended implementing a roundabout.

The occurrence of a prior severe crash was a prerequisite for suggesting higher cost strategies as a way of limiting the number of candidate locations consistent with the limitations in available safety funding. Additionally, to recommend a feasible number of projects with an appropriate associated cost, higher cost strategies were reserved for unique situations due to the limited amount of transportation safety funding available.

6.5 Urban Segments

The most common type of severe crashes along urban roadway segments are two-vehicle, rear-end and head-on crashes. The most commonly recommended project involves separating opposing traffic lanes and using this space to accommodate left-turning vehicles by converting wide two-lane or four-lane undivided roadways to either three-lane or five-lane cross sections. Key factors that were developed through the analysis that were considered during project development included roadway cross section, the volume of traffic, and access density.

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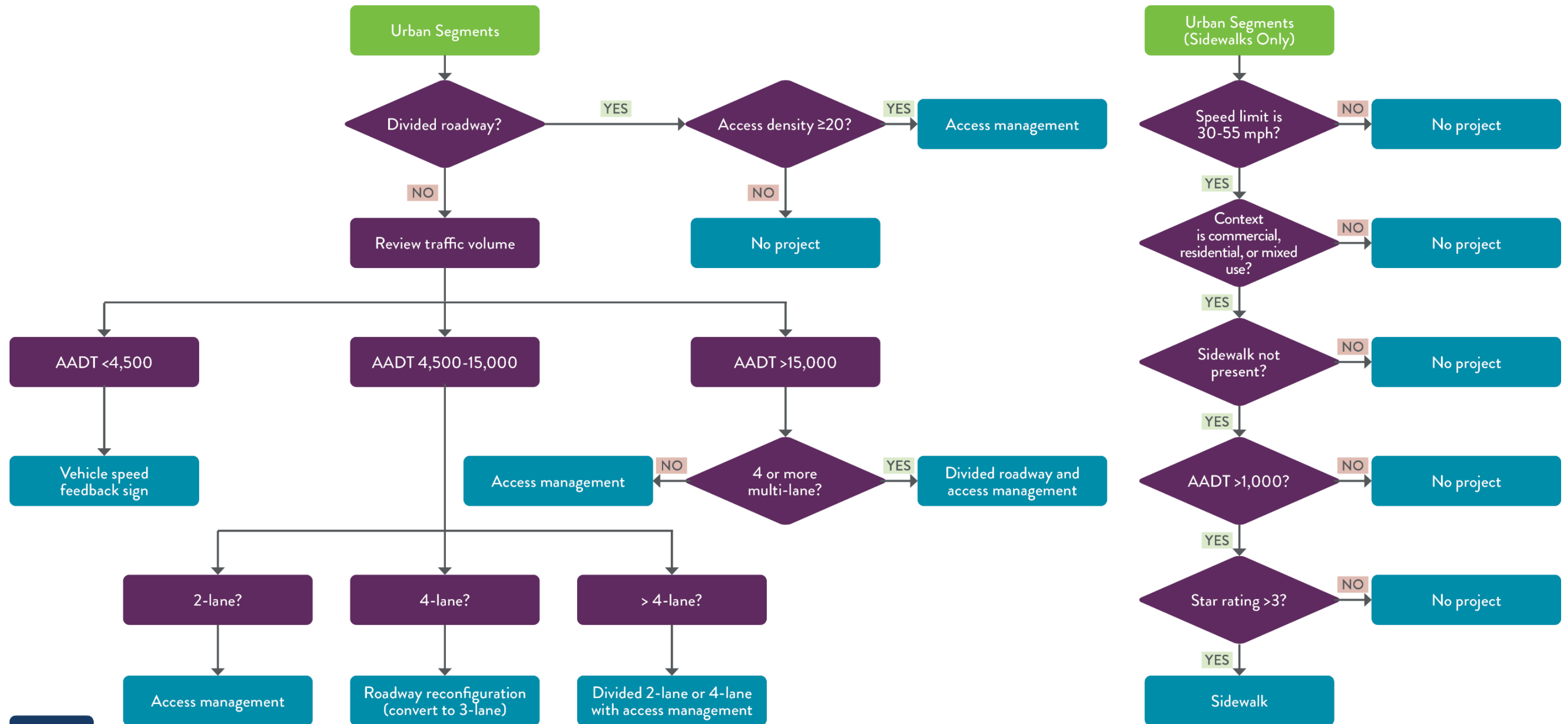
Cross-Product: The product of the major entering traffic and minor entering traffic.
Entering Traffic:
 • *Total Entering Traffic.* The sum of AADT on all approaches divided by 2.
 • *Major or Minor Entering Traffic.* The sum of AADT for the Major or Minor approaches divided by 2. If a 5-leg intersection, the sum of three Major or Minor approaches is divided by 2.

Manual Project Assignment: Locations that do not satisfy any case explicitly in the decision trees are not automatically assigned a project and are separately considered for manual project assignment.

TT Intersection Configuration: A closely spaced intersection to a curve with skewed approaches to the major road creating conflicting movements, with both vehicles turning at the intersections and vehicles maneuvering through the curve.

Figure 6-3. Rural Intersection Safety Project Decision Tree

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NOTES

Access Management: The planning, design, and implementation of land use and transportation strategies to maintain a safe flow of traffic while accommodating the access needs of adjacent development. Projects include limiting access points along the roadway and conflicts at driveways and intersections and increasing the distance between conflict points, so vehicles don't turn and cross in a chaotic way.

Manual Project Assignment: Locations that do not satisfy any case explicitly in the decision trees are not automatically assigned a project and are separately considered for manual project assignment.

Figure 6-4. Urban Segment Safety Project Decision Tree

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6.6 Urban Intersections - Vehicle Related Crashes

In Minnesota, a right-angle collision between two vehicles is the most common type of severe crash at urban intersections. County-selected safety strategies at urban intersections include improving intersection geometry at unsignalized locations since installing traffic signals is not a safety strategy, adding confirmation lights to assist law enforcement to more efficiently address red light running, upgrading signal hardware, and converting to signalized J-Turn intersections at locations already controlled by traffic signals.

Key considerations include the current type of intersection control, the volume of traffic through the intersection, the cross section of the major roadway, and the presence of a prior severe crash.

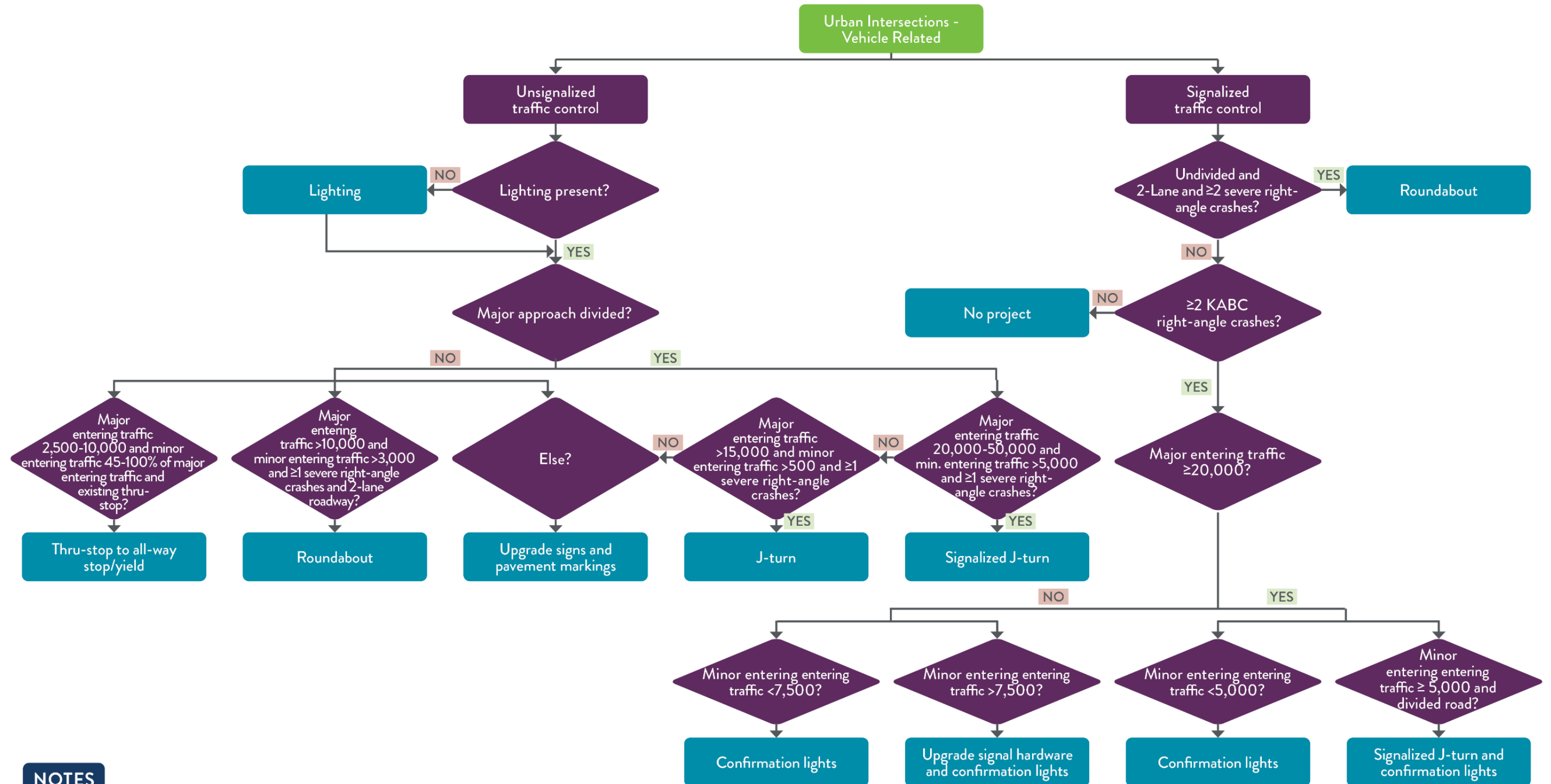
6.7 Urban Intersections - Pedestrian/Bike Related Crashes

In urban areas, the majority of severe pedestrian/bike related crashes occur at intersections and the majority of these occur at intersections controlled by traffic signals. This suggests that traffic signals by themselves are not a safety strategy for pedestrians and bicyclists. Primary objectives for this type of project development include:

- Avoiding the addition of traffic signals at unsignalized intersections and instead focusing on reducing the crossing distance that pedestrians and bicyclists must traverse by adding curb extensions or median refuge islands.
- Adding pedestrian activated devices such as rectangular rapid flash beacons and high intensity activated crosswalk beacons.
- Adding proven effective strategies at already signalized intersections, such as countdown timers and a leading pedestrian interval, which provides pedestrians with a 3 to 5 second head start before providing vehicles with a green light.

Key factors considered during the project development process include intersection control, the traffic volume, and the roadway cross section.

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Entering Traffic:

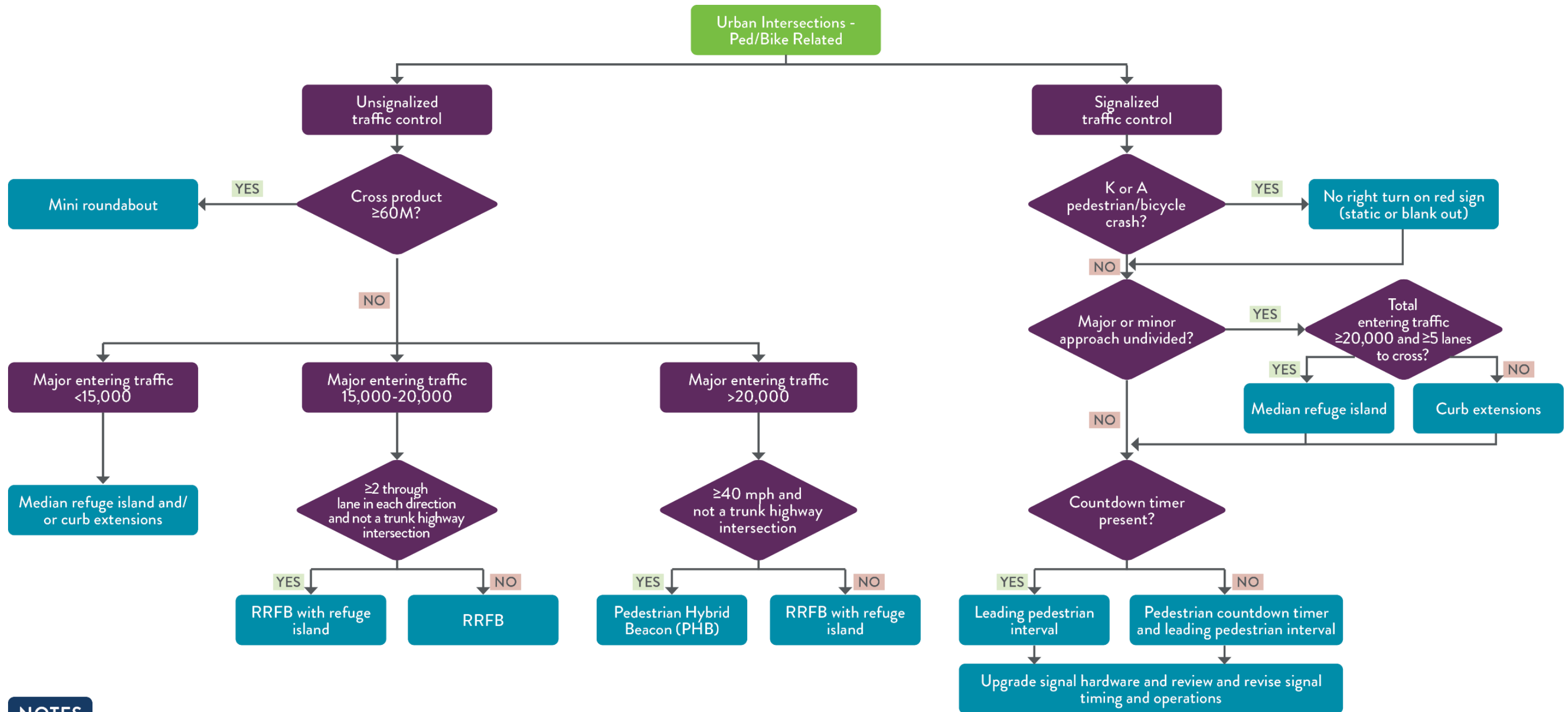
- *Total Entering Traffic.* The sum of AADT on all approaches divided by 2.
- *Major or Minor Entering Traffic.* The sum of AADT for the Major or Minor approaches divided by 2. If a 5-leg intersection, the sum of three Major or Minor approaches is divided by 2.

Manual Project Assignment: Locations that do not satisfy any case explicitly in the decision trees are not automatically assigned a project and are separately considered for manual project assignment.

Upgrade Signal Hardware: Includes projects such as pedestrian countdown timers, pedestrian push buttons, leading pedestrian intervals.

Figure 6-5. Urban Intersections – Vehicle Related Safety Project Decision Tree

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Cross-Product: The product of the major entering traffic and minor entering traffic.

Entering Traffic:

- *Total Entering Traffic.* The sum of AADT on all approaches divided by 2.
- *Major or Minor Entering Traffic.* The sum of AADT for the Major or Minor approaches divided by 2. If a 5-leg intersection, the sum of three Major or Minor approaches is divided by 2.

Manual Project Assignment: Locations that do not satisfy any case explicitly in the decision trees are not automatically assigned a project and are separately considered for manual project assignment.

RRFB: Rectangular Rapid Flashing Beacon

Review and Revise Signal Timing and Operations: Includes recommendations to slow the walk phase to 3 ft/sec, eliminate flashing yellow on pedestrian push-button activation, etc.

Upgrade Signal Hardware: Includes projects such as pedestrian countdown timers, pedestrian push buttons, leading pedestrian intervals.

Figure 6-6. Urban Intersections – Pedestrian/Bike-Related Safety Project Decision Tree

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6.8 Recommended Safety Project Overview

The systemic risk assessment process identified at-risk locations that were considered priorities for safety project development and decision trees document the process that considered roadway features, traffic volumes, and the presence of prior crashes. This resulted in identification of a recommended safety project(s). An overview of the recommended projects is provided in the following paragraphs and summarized in Table 6-1. The full list of recommended projects can be found in Appendix F and the corresponding maps with project locations can be found in Appendix G.

- Rural Segments: 46 projects/\$2,194,000
 - Shoulder Paving and Safety Edge
 - Centerline Rumble Strip
 - Edgeline Rumble Strip
 - Shoulder Rumble Strip
 - Enhanced Edgeline
- Rural Curves: 15 projects/\$522,000
 - Clear Zone Enhancements
 - Reconstruct TT to single T
 - Curve Warning Sign
 - Speed Advisory Signs
 - Chevrons or Arrow Board
- Rural Intersections: 50 projects/\$624,000
 - Review Signs and Markings
 - Thru-stop to all way stop/yield
 - Lighting
 - LED Stop Signs
 - Reconstruct TT to single T
- Urban Segments: 1 project/\$30,000
 - Vehicle Speed Feedback Sign
- Urban Intersections (Vehicle Related): 4 projects/\$12,000
 - Confirmation Lights
 - Upgrade Signs and Pavement Markings

- Urban Intersections (pedestrian/bike related): 9 projects/\$121,000
 - Median Refuge Island
 - Curb Extensions
 - Leading Pedestrian Interval
 - Upgrade Signal Hardware and review and revise signal timing and operations

Table 6-1. Summary of Redwood County Recommended Safety Projects

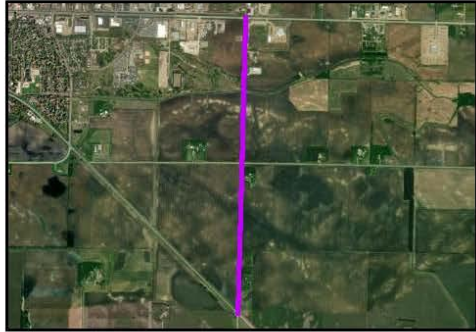
Project Type Category	Number of Projects	Estimated Cost
Rural		
Segments	46	\$2,194,000
Curves	15	\$522,000
Intersections	50	\$624,000
<i>Total Rural</i>	<i>111</i>	<i>\$3.3 million</i>
Urban		
Segments	1	\$30,000
Intersections (Vehicle)	4	\$12,000
Intersections (Ped/Bike)	9	\$121,000
<i>Total Urban</i>	<i>14</i>	<i>\$163,000</i>
Total	125	\$3.5 million

One additional task that was completed as part of the overall safety project development process for Redwood County was compiling project information in a single sheet in order to streamline the process for counties applying for HSIP funding. The HSIP submission form (Figure 6-7) includes; a description of the location, crash history, a summary of the systemic risk factors, a list of alternative strategies considered, identification of the recommended project, and estimated project cost. HSIP Submission forms for every recommended project can be found in Appendix H.

Rural Segment Project on CSAH 1

Roadway Information

Segment Start: Intersection of CSAH1 and MN 67
 Segment End: Intersection of CSAH 1 and US 71
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 1
 Facility Type: 2-Lane
 Segment Length (mile): 1.72
 Traffic Volume (vpd): 1975
 Lane Width (ft): 11
 Shoulder Type: Gravel
 Shoulder Width (ft): 5



[Click to View in Google Maps](#)

Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	8	0	2	0
Density (per mile per yr):	0.93	0	0.23	0
Rate (per MVM):	1.29	0	0.32	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	1975	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	1975	xx ≥ 1,250	★
Curve Density (cur per mile):	0	xx ≥ 0.6	-
Access Density (access per mile):	14.56	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-
Total Stars:			★★★★

Priority Location

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	1	\$85,838.28
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	1	\$5,150.3
Enhanced Edgeline:	Proactive	\$2,700	per mile	0	\$0
Total Estimated Project Cost					\$90,988.57

Systemic Project

Project Page #: 2
 Segment ID: 1.004
 Date: 3/29/2023

Figure 6-7. Sample Highway Safety Improvement Program Submission Form

6.9 County Nominated Projects

Redwood County staff maintain a list of locations that have been identified as high priority for safety concerns in the county, based on experiences with observations of near miss crashes, skid marks on the road, observed poor driving behavior, crash history, input from law enforcement and maintenance issues. The following is a list of locations that the county has nominated for safety projects.

1. CSAH 13/MN 68 - Safety improvements for ensure people stop at this intersection (1 fatality in last few years)
2. CSAH 1 / MN 68 - Safety improvements to ensure people stop at this intersection.
3. CSAH 7 / MN 68 - Safety improvements to ensure people stop at this intersection.
4. TH 19 / CSAH 7 - Safety improvements to ensure people stop at this intersection and verify safe to pull out (sightline issues to west on TH 19).
5. CSAH 1/TH 19 - Challenging for drivers to pull out due to TH 19 speed transition from 60 mph to 45 mph near this intersection. There have been many serious crashes here. Potential improvements include a roundabout and/or proper left turn lanes on all approaches.
6. CSAH 1 between CSAH 24 and MN 67 - Snow fills up the road due to the unnecessary guardrail. The guardrail is unnecessary if proper right-of-way is obtained, and embankments improved. Safety improvement is to obtain right-of-way, remove guardrail, clear trees out to 50', and improve embankments to 4:1
7. MN 67/CSAH 101-Dekalb Street - Skewed and offset intersection that is challenging to navigate safely. Potential improvement includes a five- legged roundabout which would include CSAH 24 just to the SE.
8. CSAH 1 (south leg) / MN 67 - Improve sightlines on TH 67 looking east where there is currently limited visibility.
9. CSAH 45/CSAH 10 and 100th Street - Convert this intersection from a double T intersection to a single T with sightline improvements.
10. CSAH 1, south of MN 67 - Ditch embankment improvements throughout, 1:1 inslope and 2:1 inslope exist throughout the corridor.
11. CSAH 8 from CSAH 46 to S. County Line - Ditch embankment improvements throughout, 1:1 inslope and 2:1 inslopes exist throughout the corridor.
12. CSAH 10 from CSAH 30 to S. County line - Ditch embankment improvements throughout, 1:1 inslope and 2:1 inslopes exist throughout the corridor.
13. CSAH 2 from CSAH 13 to 0.4 miles to the east to lower Sioux historic site - Install a bike path.
14. CSAH 24 at CSAH 13 and main entrance into Jackpot Junction just west of CSAH 2 - Pedestrian crossing improvements.

15. CSAH 13 at intersection with Res Highway 4 - Pedestrian crossing improvements.
16. CSAH 6 from 0.1 mile north of Cottonwood River to 150th street - Pave shoulders. Shoulders wash out regularly due to grade and we frequently have 6" drop offs.
17. CSAH 4 / CSAH 8 - Improvements to ensure folks stop at this intersection.
18. CSAH 4 / CSAH 5 - Safety improvements for ensure people stop at this intersection.
19. CSAH 4 / CSAH 10 - Safety improvements for ensure people stop at this intersection.
20. CSAH 4 / CSAH 7 - Safety improvements for ensure people stop at this intersection.
21. CSAH 4 / CSAH 6 - Safety improvements for ensure people stop at this intersection.
22. CSAH 4 / CSAH 13 - Safety improvements for ensure people stop at this intersection.
23. CSAH 8 / CSAH 46 - Poor sightlines to west on CSAH 46 making a dangerous intersection to pull out into traffic.
24. CSAH 7 in the City of Seaforth - Install Street lighting for local traffic connectors and pedestrian movement visibility.
25. CSAH 9 in the City of Delhi - Install Street lighting for local traffic connectors and pedestrian movement visibility
26. CSAH 4 / CSAH 2 - Intersection sightline issues (particularly southbound on CSAH 2 – just south of CSAH 4, and northbound on CSAH 2, just north of CSAH 4).
27. CSAH 2 from 305th Street to CSAH 11 - Straighten vertical and horizontal curves.
28. CSAH 11 from MN River to 200th Street - Curve signage improvements.
29. CSAH 15 / CR 61 - Intersection sightline improvements (acquire additional ROW to clear trees blocking sightlines).
30. CSAH 8 / MN 68 - Convert this intersection from a double T to single T with sightline improvements.

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7.0 References

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Appendix A – List of Analyzed Locations

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Rural Segment List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No	CRSP 2 ID	Route System	Route No.	Start Description	End Description	Length [Miles]	Context Zone	Edge Risk	ADT [vpd]	Lane Width [Feet]	Access Density [access per mile]	Total Lane Departure Crashes	Fatal Lane Departure Crashes	Total HO+SSO Crashes	Severe HO+SSO Crashes
1	1.001	CSAH	1	Intersection of CSAH1 and 220th St	542 ft North of Intersection of CSAH 1 and of Noble St	6.63	Agriculture	25	290	11	6.3	0	0	0	0
2	1.002	CSAH	1	542 ft NorthWest of Intersection of CSAH1 and Noble St	Intersection of CSAH 1 and CSAH 16	0.58	Industrial	1	378	12	56.8	0	0	0	0
3	1.003	CSAH	1	Intersection of CSAH1 and CSAH 16	Intersection of CSAH 1 and MN 67	8.90	Agriculture	1	375	11	8.4	1	0	0	0
4	1.004	CSAH	1	Intersection of CSAH1 and MN 67	Intersection of CSAH 1 and US 71	1.72	Agriculture	1	1,975	11	14.6	2	0	1	0
5	10.001	CSAH	10	Intersection of CSAH10 and Evergreen Ave	389 ft South of Intersection of CSAH 10 and of 4th St	14.42	Agriculture	1	248	11	6.1	1	0	0	0
6	10.002	CSAH	10	389 ft South of Intersection of CSAH10/Main St and 4th St	Intersection of CSAH 10 and 250th St	0.50	Residential	1	610	11	61.5	1	0	1	0
7	10.003	CSAH	10	Intersection of CSAH10 and 250th St	Intersection of CSAH 10 and E High St	6.26	Agriculture	1	430	11	4.3	0	0	0	0
8	10.004	CSAH	10	Intersection of CSAH10/Center St and E High St	Intersection of CSAH 10 and CSAH 30	0.25	Residential	1	355	12	59.1	0	0	0	0
9	101.001	CSAH	101	Intersection of CSAH101/Normand le Rd and US 71	Intersection of CSAH 101 and Magnolia Ave	0.57	Residential	1	1,250	12	36.7	1	0	0	0
10	101.004	CSAH	101	Intersection of CSAH101 and US 71	400 ft South of Intersection of CSAH 101 and of Burr Oak Rd	0.81	Industrial	1	2,850	12	9.9	1	0	0	0
11	101.005	CSAH	101	400 ft South of Intersection of CSAH101 and Burr Oak RD	Intersection of CSAH 101 and 2415 North of Burr Oak Rd	0.53	Residential	1	2,850	12	3.8	2	0	0	0
12	101.006	CSAH	101	2415 north of Intersection of CSAH101/Main St andBurr Oak Rd	56 ft South of Intersection of CSAH 101 and of Front St	0.29	Natural	1	2,850	12	10.4	1	0	0	0
13	101.007	CSAH	101	56ft south of Intersection of CSAH101/River Rd and Front St	116 ft South of Intersection of CSAH 101 and of Cedar Cliff Rd	0.39	Residential	1	2,250	12	10.2	6	0	2	0
14	102.001	CSAH	102	Intersection of CSAH102/3rd St and Carleton Ave	Intersection of CSAH 102 and CSAH 3	0.60	Residential	1	405	12	88.8	0	0	0	0
15	105.001	CSAH	105	Intersection of CSAH105 and US 14	Intersection of CSAH 105 and 8th St	0.28	Commercial	1	647	12	28.2	1	0	0	0
16	106.001	CSAH	106	Intersection of CSAH106/S Birch St and 9th Ave E	Intersection of CSAH 106 and 1st Ave E	0.57	Residential	1	890	12	83.0	0	0	0	0
17	106.002	CSAH	106	Intersection of CSAH106/1st Ave W and S Birch St	Intersection of CSAH 106 and llex St	0.36	Industrial	1	950	12	47.3	0	0	0	0
18	107.001	CSAH	107	Intersection of CSAH107/Oak St and Main St	Intersection of CSAH 107 and CSAH 7	0.21	Residential	1	130	12	53.4	0	0	0	0
19	109.001	CSAH	109	200 ft South of Intersection of CSAH109/3rd St and Franklin Ave	Intersection of CSAH 109 and North Ave	0.18	Residential	1	180	12	56.6	0	0	0	0
20	11.001	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St	5.44	Agriculture	1	485	12	6.6	2	0	1	0
21	11.002	CSAH	11	3982 ft North of Intersection of CSAH11 and 350th St	1.53 Miles North of Intersection of CSAH 11 and 350th St	0.80	Natural	1	480	11	1.3	0	0	0	0
22	115.001	CSAH	115	Intersection of CSAH115/Main St and E Central St	606 ft North of Intersection of CSAH 115 and of E Johns St	0.38	Industrial	1	910	12	39.3	0	0	0	0
23	115.002	CSAH	115	606 ft North of Intersection of CSAH115/Main St and E Johns St	Intersection of CSAH 115 and US 71	0.49	Agriculture	1	870	12	2.0	1	0	0	0
24	117.001	CSAH	117	Intersection of CSAH117/Main St and Oak St	65 ft East of Intersection of CSAH 117 and of N Railroad St	0.09	Commercial	1	275	12	43.9	0	0	0	0
25	12.001	CSAH	12	Intersection of CSAH12/208th St and MN 19	Intersection of CSAH 12 and CSAH 7	7.24	Agriculture	1	242	11	6.1	0	0	0	0
26	127.001	CSAH	127	Intersection of CSAH127/CSAH 127 and Frontier Ave	Intersection of CSAH 127 and US 14	0.36	Industrial	1	162	12	27.4	0	0	0	0
27	13.001	CSAH	13	Intersection of CSAH13 and 160 St	Intersection of CSAH 13 and MN 67	11.87	Agriculture	1	890	11	7.5	4	0	0	0
28	13.002	CSAH	13	Intersection of CSAH13 and MN 67	Intersection of CSAH 13 and CSAH 2	5.15	Agriculture	1	1,500	11	8.2	1	0	0	0
29	133.001	CSAH	133	Intersection of CSAH133/245th St and Ideal Ave	537 ft West of Intersection of CSAH 133 and of Perry St	0.25	Agriculture	1	560	11	8.0	0	0	0	0
30	133.002	CSAH	133	537 ft West of Intersection of CSAH133/Main St and Perry St	Intersection of CSAH 133 and CSAH 6	0.76	Residential	1	608	12	75.4	0	0	0	0
31	15.001	CSAH	15	Intersection of CSAH15/9th Ave W and S llex St	404 ft East of Intersection of CSAH 15 and of S Birch St	0.51	Residential	1	528	12	58.3	0	0	0	0
32	15.002	CSAH	15	404 ftEast of Intersection of CSAH15 andS Birch St	187 ft West of Intersection of CSAH 15 and S Yeager St	7.09	Agriculture	1	412	11	7.8	3	0	0	0
33	15.003	CSAH	15	187 ft West Intersection of E Central St and S Yeager St of CSAH15/0	66 ft East of Intersection of CSAH 15 and of Public St	0.53	Residential	1	470	12	86.2	0	0	0	0
34	15.004	CSAH	15	66 ft East of Intersection of CSAH15/E Central St and Public St	Intersection of CSAH 15 and US 71	0.17	Agriculture	1	520	12	11.5	1	1	0	0
35	16.001	CSAH	16	Intersection of CSAH16 and US 71	Intersection of CSAH 16 and Center St	3.48	Agriculture	1	390	11	7.2	0	0	0	0
36	16.002	CSAH	16	Intersection of CSAH16 and Center St	Intersection of CSAH 16 and Elm St	0.29	Agriculture	1	620	11	38.1	0	0	0	0
37	16.003	CSAH	16	Intersection of CSAH16 and Elm St	Intersection of CSAH 16 and CSAH 2	6.17	Agriculture	1	240	12	8.8	2	0	0	0
38	17.001	CSAH	17	Intersection of CSAH17/Justice Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	5.60	Agriculture	1	245	11	6.8	0	0	0	0
39	17.002	CSAH	17	118 ft North of Intersection of CSAH17 and 180th St	812 ft North of Intersection of CSAH 17 and of S Railroad St	0.32	Industrial	1	245	11	31.6	0	0	0	0
40	17.003	CSAH	17	812 ft North East of Intersection of CSAH17 and S Railroad St	Intersection of CSAH 17 and MN 68	6.59	Agriculture	1	250	12	8.2	0	0	0	0
41	17.005	CSAH	17	Intersection of CSAH17/Laser Ave and MN 67	Intersection of CSAH 17 and CSAH 9	5.41	Agriculture	1	745	12	9.2	1	0	0	0
42	18.001	CSAH	18	Intersection of CSAH18/CSAH 18 and MN 68	Intersection of CSAH 18 and CSAH 7	4.99	Agriculture	1	277	12	5.8	1	0	0	0
43	2.001	CSAH	2	Intersection of CSAH2 and 160 St	Intersection of CSAH 2 and CSAH 4	4.01	Agriculture	1	375	12	6.2	2	0	0	0
44	2.002	CSAH	2	Intersection of CSAH2 and CSAH 4	Intersection of CSAH 2 and Tempel Dr	4.79	Agriculture	1	325	12	7.3	1	0	0	0
45	2.003	CSAH	2	Intersection of CSAH2/S Somerville St and Tempel Dr	Intersection of CSAH 2 and MN 68	0.27	Residential	1	1,150	12	52.7	0	0	0	0
46	2.004	CSAH	2	Intersection of CSAH2/Carleton Ave and Front St	45 ft North of Intersection of CSAH 2 and of Reetz St	0.45	Residential	1	1,175	12	85.9	1	0	1	0
47	2.005	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	11.01	Agriculture	1	1,338	12	9.2	8	0	2	0
48	20.001	CSAH	20	Intersection of CSAH20 and Lyon Redwood Rd	Intersection of CSAH 20 and 8th St	6.00	Agriculture	1	502	12	5.7	0	0	0	0
49	24.001	CSAH	24	Intersection of CSAH24 and MN 67	1823 ft West of Intersection of CSAH 24 and of CSAH 2	4.66	Agriculture	1	2,350	11	7.5	1	0	0	0
50	24.002	CSAH	24	1823 ft West of Intersection of CSAH24 and CSAH 2	Intersection of CSAH 24 and CSAH 2	0.34	Recreational	1	2,350	12	17.5	0	0	0	0
51	25.002	CSAH	25	Intersection of CSAH25/River Rd W and Laser Ave	Intersection of CSAH 25 and CSAH 101	2.33	Agriculture	1	755	12	7.3	0	0	0	0
52	27.001	CSAH	27	Intersection of CSAH27 and Frontier Ave	Intersection of CSAH 27 and CSAH 7	1.02	Agriculture	1	160	12	7.8	0	0	0	0
53	3.001	CSAH	3	Intersection of CSAH3 and MN 68	1108 ft East of Intersection of CSAH 3 and of CSAH 102	0.49	Residential	1	870	12	10.1	0	0	0	0
54	3.002	CSAH	3	1108 ft East of Intersection of CSAH3 and CSAH 102	Intersection of CSAH 3 and 340th Ave	2.44	Agriculture	1	870	12	6.2	0	0	0	0
55	30.002	CSAH	30	Intersection of CSAH30/Center St and CSAH 8	Intersection of CSAH 30 and MN 19	5.53	Agriculture	1	230	11	4.0	0	0	0	0
56	30.003	CSAH	30	Intersection of CSAH30/E Centre St and MN 19	Intersection of CSAH 30 and CSAH 10	0.50	Residential	1	570	12	76.5	0	0	0	0
57	30.004	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	4.42	Agriculture	1	240	11	10.9	0	0	0	0
58	32.001	CSAH	32	2.0 Miles West of Intersection of CSAH32 and MN 68	Intersection of CSAH 32 and MN 68	2.00	Agriculture	1	1,350	12	11.0	2	0	0	0
59	4.001	CSAH	4	Intersection of CSAH4/190th St and Acorn Ave	Intersection of CSAH 4 and CSAH 1	27.11	Agriculture	1	220	11	6.5	0	0	0	0
60	4.002	CSAH	4	Intersection of CSAH4 and CSAH 1	Intersection of CSAH 4 and 340th Ave	8.95	Agriculture	1	185	11	8.15	0	0	0	0
61	45.001	CSAH	45	.46 Miles West of Intersection of CSAH45/310th Ave and 241st St	Intersection of CSAH 45 and 310th Ave	0.47	Agriculture	1	580	11	12.9	0	0	0	0
62	45.002	CSAH	45	1262 ft West of Intersection of CSAH45/200th St and Eagle Ave	Intersection of CSAH 45 and Evergreen Ave	1.30	Agriculture	1	120	12	6.9	0	0	0	0
63	46.001	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	4.59	Agriculture	1	560	11	7.2	2	0	1	1
64	5.001	CSAH	5	Intersection of CSAH55 and CSAH 7	Intersection of CSAH 5 and Clark St	1.50	Agriculture	1	790	12	12.7	2	0	0	0
65	5.002	CSAH	5	Intersection of CSAH5/8th St and Clark St	Intersection of CSAH 5 and N Boundary St	0.63	Residential	1	1,200	12	62.3	0	0	0	0
66	5.003	CSAH	5	Intersection of CSAH5/8th St and N Boundary St	Intersection of CSAH 5 and MN 19	16.04	Agriculture	1	429	12	8.2	2	0	1	0
67	6.001	CSAH	6	Intersection of CSAH 6 and 100th St	Intersection of CSAH 6 and 120th St	2.02	Agriculture	1	790	12	12.4	1	0	0	0
68	6.002	CSAH	6	Intersection of CSAH6/S llex St and 120th St	Intersection of CSAH 6 and US 14	0.54	Residential	1	1,450	12	67.1	0	0	0	0
69	6.003	CSAH	6	Intersection of CSAH6/llex St and US 14	2790 ft North of Intersection of CSAH 6 and of 130th St	1.00	Agriculture	1	1,300	12	15.0	2	0	0	0
70	6.004	CSAH	6	2790 ft North of Intersection of CSAH6 and 130th St	Intersection of CSAH 6 and MN 68	10.52	Agriculture	1	960	12	10.3	0	0	0	0
71	6.005	CSAH	6	Intersection of CSAH6 and MN 68	Intersection of CSAH 6 and North St	0.28	Residential	1	1,100	12	63.6	0	0	0	0
72	6.006	CSAH	6	Intersection of CSAH6 and North St	575 ft North of Intersection of CSAH 6 and of CSAH 12	3.79	Agriculture	1	1,100	12	10.6	2	0	2	0
73	6.007	CSAH	6	575 ft North East of Intersection of CSAH6/280th St and CSAH 12	Intersection of CSAH 6 and MN 67	6.68	Agriculture	1	860	12	9.9	2	0	0	0
74	6.008	CSAH	6	Intersection of CSAH6/West St and MN 67	3497 ft North of Intersection of CSAH 6 and of 400th St	6.69	Agriculture	1	880	11	9.9	6	0	0	0

Rural Segment List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No	CRSP 2 ID	Route System	Route No.	Start Description	End Description	Length [Miles]	Context Zone	Edge Risk	ADT [vpd]	Lane Width [Feet]	Access Density [access per mile]	Total Lane Departure Crashes	Fatal Lane Departure Crashes	Total HO+SSO Crashes	Severe HO+SSO Crashes
75	6.009	CSAH	6	3497 ft North of Intersection of CSAH6 and 400th St	.16 Miles North of Intersection of 410th St and CSAH 6	1.04	Agriculture	2C	760	11	7.7	1	0	0	0
76	63.002	CR	63	Intersection of CR63/Center St and South St	Intersection of CR 63 and CSAH 16	0.34	Residential	2S	122	11	53.1	0	0	0	0
77	7.001	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	21.25	Agriculture	1	152	12	8.2	2	0	0	0
78	7.002	CSAH	7	513 ft South of Intersection of CSAH 7 and Elm St	200 ft North of Intersection of CSAH 7 and of 295th Ave	0.39	Residential	1	445	12	25.9	0	0	0	0
79	7.003	CSAH	7	200 ft North of Intersection of CSAH 7 and 295th Ave	Intersection of CSAH 7 and MN 19	4.22	Agriculture	1	470	11	10.9	0	0	0	0
80	7.004	CSAH	7	Intersection of CSAH7 and MN 19	Intersection of CSAH 7 and Marion Ave	4.16	Agriculture	1	1,075	11	8.9	0	0	0	0
81	7.005	CSAH	7	Intersection of CSAH7/S Main St and Marrion Ave	747 ft North of Intersection of CSAH 7 and of Elevator Ave	0.47	Industrial	1	1,250	12	46.6	0	0	0	0
82	7.006	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	6.41	Agriculture	1	610	11	6.6	4	0	0	0
83	78.001	CR	78	Intersection of CR78 and CSAH 20	Intersection of CR 78 and CSAH 5	2.31	Agriculture	1	115	12	11.3	0	0	0	0
84	8.001	CSAH	8	Intersection of CSAH8 and US 14	Intersection of CSAH 8 and MN 68	11.25	Agriculture	1	360	11	4.3	4	0	1	0
85	8.002	CSAH	8	Intersection of CSAH8 and MN 19	Intersection of CSAH 8 and CSAH 46	5.78	Agriculture	1	158	12	8.7	0	0	0	0
86	80.001	CR	80	1589 ft South of Intersection of CR80/Duncan Ave and US 14	Intersection of CR 80 and US 14	2.01	Industrial	1	198	12	4.5	0	0	0	0
87	9.001	CSAH	9	Intersection of CSAH9 and Frontier Ave	Intersection of CSAH 9 and CSAH 7	1.52	Agriculture	1	450	11	8.5	0	0	0	0
88	9.002	CSAH	9	Intersection of CSAH9/380th St and CSAH 7	1297 ft East of Intersection of CSAH 9 and of CSAH 7	0.25	Residential	1	455	12	16.2	0	0	0	0
89	9.003	CSAH	9	1297 ft East of Intersection of CSAH9/380th St and CSAH 7	127 ft West of Intersection of CSAH 9 and of CSAH 6	5.21	Agriculture	1	455	12	6.5	0	0	0	0
90	9.004	CSAH	9	127 ft West of Intersection of CSAH9/North Ave and CSAH 6	75 ft East of Intersection of CSAH 9 and of St	0.54	Agriculture	1	540	12	20.5	0	0	0	0
91	9.005	CSAH	9	75 ft East of Intersection of CSAH9/North Ave and East St	Intersection of CSAH 9 and CSAH 17	1.49	Agriculture	1	540	12	8.0	0	0	0	0
Total						329.05						78	1	13	1

Curve List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	CRSP 2 ID	Route System	Route No.	Start Description	End Description	Speed Limit [mph]	Radius [feet]	Area Type	ADT [vpd]	Lane Width [feet]	Shoulder Type	Outside Shoulder Width [feet]	Total Cross Section Width [feet]	Adjacent Intersection	Visual Trap	Lighting	Outside Edge Risk
1	1.001	CSAH	1	Intersection of CSAH1/Lesueur and 100th St W	Intersection of Independence Ave and 100th St W	55	379	Rural	290	12	Paved	4	24	None	None	None	25
2	1.002	CSAH	1	Intersection of CSAH1 and CSAH 16	Intersection of CSAH 1 and MN 67	55	1436	Rural	420	11	Paved	4	26	None	None	None	25
3	1.003	CSAH	1	Intersection of CSAH1 and CSAH 16	Intersection of CSAH 1 and MN 67	55	1353	Rural	420	11	Paved	4	22	None	None	None	25
4	1.004	CSAH	1	Intersection of CSAH1 and CSAH 16	Intersection of CSAH 1 and MN 67	55	1465	Rural	420	11	Paved	4	26	Intersection	None	None	25
5	101.001	CSAH	101	Intersection of CSAH101 and Magnolia Ave	42 ft South of Intersection of CSAH 101 and of E 2nd St	30	437	Rural	1250	12	Gravel	10	40	Intersection	None	None	1
6	101.002	CSAH	101	Intersection of CSAH101 and Magnolia Ave	42 ft South of Intersection of CSAH 101 and of E 2nd St	30	1421	Suburban	2550	12	Gravel	7	40	Intersection	None	Present	2C
7	101.003	CSAH	101	Intersection of CSAH101 and Magnolia Ave	42 ft South of Intersection of CSAH 101 and of E 2nd St	30	1021	Suburban	3600	12	None	0	40	Intersection	None	Present	3
8	101.004	CSAH	101	Intersection of CSAH101 and US 71	400 ft South of Intersection of CSAH 101 and of Burr Oak Rd	30	2101	Suburban	2850	12	Gravel	10	48	Intersection	None	None	1
9	101.005	CSAH	101	400 ft South of Intersection of CSAH101 and Burr Oak RD	Intersection of CSAH 101 and 2415 North of Burr Oak Rd	30	2396	Suburban	2850	12	Gravel	14	44	Intersection	None	None	1
10	101.006	CSAH	101	400 ft South of Intersection of CSAH101 and Burr Oak RD	Intersection of CSAH 101 and 2415 North of Burr Oak Rd	30	1160	Suburban	2850	12	Gravel	12	44	None	None	None	2C
11	101.007	CSAH	101	2415 north of Intersection of CSAH101/Main St and Burr Oak Rd	56 ft South of Intersection of CSAH 101 and of Front St	30	583	Suburban	2850	12	Gravel	10	54	Railroad	None	None	2C
12	101.010	CSAH	101	116 ft South of Intersection of CSAH101 and Cedar Cliff Rd	.35 Miles North of Intersection of River Rd W and CSAH 101	30	977	Suburban	2250	12	Gravel	14	42	Intersection	None	None	1
13	11.001	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St	55	690	Rural	490	11	Paved	4	26	Intersection	None	None	25
14	11.002	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St	55	2858	Rural	480	12	Gravel	4	28	None	None	None	3
15	11.003	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St	55	4525	Rural	480	12	Paved	4	28	Intersection	None	None	3
16	11.004	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St	55	937	Rural	480	12	Composite	5	28	None	None	None	2C
17	11.005	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St	55	1413	Rural	480	12	Composite	3	28	None	None	None	3
18	11.006	CSAH	11	3982 ft North of Intersection of CSAH11 and 350th St	1.53 Miles North of Intersection of CSAH 11 and 350th St	55	974	Rural	480	12	Composite	3	32	None	None	None	25
19	15.001	CSAH	15	404 ft East of Intersection of CSAH15 and S Birch St	187 ft West of Intersection of CSAH 15 and S Yeager St	55	481	Rural	405	12	Composite	0	30	Intersection	None	None	1
20	15.002	CSAH	15	404 ft East of Intersection of CSAH15 and S Birch St	187 ft West of Intersection of CSAH 15 and S Yeager St	55	1131	Rural	405	12	Gravel	0	30	Intersection	Present	None	1
21	15.004	CSAH	15	66 ft East of Intersection of CSAH15/E Central St and Public St	Intersection of CSAH 15 and US 71	55	744	Rural	520	13	Paved	2	30	Intersection	Present	None	25
22	17.001	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	55	724	Rural	245	10	None	0	24	Intersection	Present	None	25
23	17.002	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	55	740	Rural	245	11	None	0	26	Intersection	Present	None	25
24	17.003	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	55	1000	Rural	245	11	None	0	26	None	None	None	25
25	17.004	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	55	356	Rural	315	11	None	0	26	None	None	None	25
26	17.005	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	55	544	Rural	185	11	Gravel	4	26	Intersection	None	None	25
27	17.006	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	55	537	Rural	185	12	Gravel	2	28	Intersection	None	None	25
28	18.001	CSAH	18	Intersection of CSAH18/CSAH 18 and MN 68	Intersection of CSAH 18 and CSAH 7	55	861	Rural	310	12	Gravel	5	32	Intersection	None	None	1
29	2.002	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	55	1661	Rural	750	11	Gravel	2	28	None	None	None	25
30	2.003	CSAH	2	Intersection of CSAH2/S Somerville St and Tempel Dr	Intersection of CSAH 2 and MN 68	55	1999	Rural	750	11	None	0	28	None	None	None	3
31	2.004	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	55	688	Rural	750	12	Gravel	12	30	None	None	None	1
32	2.005	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	55	4448	Rural	1250	11	Gravel	10	28	None	None	None	1
33	2.006	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	55	1736	Rural	1250	11	Gravel	10	28	Intersection	None	None	1
34	2.007	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	55	1692	Rural	1250	11	Gravel	2	28	None	None	None	25
35	2.008	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	55	548	Rural	2450	12	Paved	8	30	None	None	Present	2C
36	2.009	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	55	601	Rural	2450	12	Paved	8	30	None	None	Present	2C
37	2.010	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	55	983	Rural	2450	12	Paved	8	30	None	None	Present	2C
38	2.011	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	55	247	Rural	2450	12	Paved	8	30	None	None	Present	1
39	30.002	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	55	726	Rural	240	11	Unknown	0	28	Intersection	Present	Unknown	Unknown
40	30.003	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	55	715	Rural	240	11	Unknown	0	28	None	Present	Unknown	Unknown
41	30.004	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	55	1432	Rural	60	11	Unknown	0	28	Intersection	None	Unknown	Unknown
42	30.005	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	55	1322	Rural	240	11	Unknown	0	28	None	None	Unknown	Unknown
43	45.001	CSAH	45	.46 Miles West of Intersection of CSAH45/310th Ave and 241st St	Intersection of CSAH 45 and 310th Ave	55	815	Rural	155	12	None	0	28	Intersection	Present	None	3
44	46.001	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	55	1485	Rural	470	12	Gravel	3	28	Intersection	None	None	25
45	46.002	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	55	1222	Rural	560	12	Gravel	3	28	None	None	None	25
46	46.003	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	55	1291	Rural	560	12	Gravel	4	28	Intersection	None	None	25
47	5.001	CSAH	5	Intersection of CSAH55 and CSAH 7	Intersection of CSAH 5 and Clark St	55	799	Rural	580	12	Gravel	3	32	Intersection	None	None	25
48	6.001	CSAH	6	Intersection of CSAH6 and North St	575 ft North of Intersection of CSAH 6 and of CSAH 12	55	837	Rural	860	12	Gravel	8	38	Intersection	None	None	1
49	6.002	CSAH	6	575 ft North East of Intersection of CSAH6/280th St and CSAH 12	Intersection of CSAH 6 and MN 67	55	903	Rural	860	12	Gravel	5	38	Intersection	None	None	1
50	6.003	CSAH	6	3497 ft North of Intersection of CSAH6 and 400th St	.16 Miles North of Intersection of 410th St and CSAH 6	55	2995	Rural	760	12	Paved	6	42	None	None	None	2C
51	6.004	CSAH	6	3497 ft North of Intersection of CSAH6 and 400th St	.16 Miles North of Intersection of 410th St and CSAH 6	55	1726	Rural	760	12	Composite	6	42	Intersection	None	None	2C
52	7.001	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	55	797	Rural	195	11	None	0	36	Intersection	None	None	25
53	7.002	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	55	784	Rural	105	12	None	0	38	Intersection	Present	None	25
54	7.003	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	55	867	Rural	105	12	None	0	38	Intersection	None	None	25
55	7.004	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	55	808	Rural	105	12	None	0	38	Intersection	None	None	25
56	7.005	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	55	824	Rural	105	12	Gravel	3	38	Intersection	None	None	25
57	7.006	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	55	866	Rural	670	12	Gravel	10	36	Intersection	None	None	1
58	7.007	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	55	846	Rural	670	12	Gravel	8	36	Intersection	None	None	1
59	7.008	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	55	1516	Rural	670	12	Gravel	9	36	None	None	None	1
60	7.009	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	55	2360	Rural	550	12	Gravel	8	36	Intersection	None	None	2C
61	7.010	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	55	1432	Rural	550	12	Gravel	7	36	None	None	None	1
62	7.011	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	55	778	Rural	550	12	Gravel	3	36	None	None	None	3
63	7.012	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	55	1116	Rural	550	12	Gravel	7	36	None	None	None	2C
64	8.001	CSAH	8	Intersection of CSAH8 and MN 19	Intersection of CSAH 8 and CSAH 46	55	551	Rural	170	13	Gravel	2	32	Intersection	None	None	25
65	78.001	CR	78	Intersection of CR78 and CSAH 20	Intersection of CR 78 and CSAH 5	55	536	Rural	115	12	Paved	2	34	None	None	None	25
66	78.002	CR	78	Intersection of CR78 and CSAH 20	Intersection of CR 78 and CSAH 5	55	1378	Rural	115	12	Paved	2	34	None	None	None	3
67	78.003	CR	78	Intersection of CR78 and CSAH 20	Intersection of CR 78 and CSAH 5	55	421	Rural	115	12	None	0	34	None	None	None	3
68	78.004	CR	78	Intersection of CR78 and CSAH 20	Intersection of CR 78 and CSAH 5	55	425	Rural	115	11	None	0	32	None	None	None	3

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Rural Intersection List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.2	CRSP 2 ID	Route System	Route No.	Major Approach	Minor Approach	Area Type	Context Zone	Total Entering ADT [vpd]	Volume Cross Product [vpd*2]	Leg Configuration	Alignment Skew [Degrees]	Adjacent RR Crossing	Adjacent Curve	Adjacent Development	Previous STOP (>5 mi)	Major Approach Speed Limit	Major Approach Turn Lane Configuration	K	A	B	C	PDO	Crash Cost
1	1.001	CSAH	1	CSAH 1	CR 60 (180th St)	Rural	Agriculture	355	18850	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
2	1.002	CSAH	1	CSAH 1	CSAH 4	Rural	Agriculture	395	30450	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
3	1.003	CSAH	1	CSAH 1	CSAH 4	Rural	Agriculture	395	30450	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
4	1.004	CSAH	1	CSAH 16	CSAH 1 (Pine St)	Small Town	Agriculture	825	127100	T	0	None	None	None	>5	30	T	0	0	0	0	1	\$13,000
5	1.005	CSAH	1	CSAH 1	CSAH 16	Small Town	Mixed Use	822	149875	X	0	None	None	None	<5	30	T	0	0	0	0	0	\$0
6	1.006	CSAH	1	MN 68	CSAH 1	Rural	Agriculture	855	180000	X	0	None	None	None	>5	55	TR	0	0	0	0	0	\$0
7	1.007	CSAH	1	CSAH 1	CSAH 12 (300th St)	Rural	Agriculture	530	46200	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
8	1.008	CSAH	1	MN 67	CSAH 1	Rural	Agriculture	2360	451500	T	45	None	None	None	>5	55	TR	0	0	0	0	0	\$0
9	10.001	CSAH	10	CSAH 10	CSAH 77 (Evergreen Ave)	Rural	Agriculture	150	3600	Y	25	None	Horizontal	None	<5	55	T	0	0	0	0	0	\$0
10	10.002	CSAH	10	US 14	CSAH 10	Rural	Agriculture	2125	427500	X	0	Present	None	None	>5	55	TR	0	0	0	1	0	\$120,000
11	10.003	CSAH	10	CSAH 10	T 140 (140th St)	Rural	Agriculture	338	12538	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
12	10.004	CSAH	10	CSAH 10	CR 57 (160th St)	Rural	Agriculture	335	11800	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
13	10.005	CSAH	10	CSAH 10	CR 66 (220th St)	Rural	Agriculture	315	5900	X	0	None	None	None	<5	55	T	0	0	0	0	1	\$13,000
14	10.006	CSAH	10	MN 68	CSAH 10	Rural	Agriculture	1602	520375	X	0	None	None	None	>5	60	TR	0	0	0	0	0	\$0
15	10.007	CSAH	10	CSAH 10 (Main St)	CR 74 (250th St)	Small Town	Residential	590	36400	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
16	10.008	CSAH	10	CSAH 10	CSAH 12 (280th St)	Rural	Agriculture	635	95181	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
17	10.009	CSAH	10	CSAH 10	CSAH 30	Small Town	Residential	605	88750	T	0	None	None	None	<5	30	T	0	0	0	0	0	\$0
18	101.001	CSAH	101	US 71 (Mill St)	CSAH 101 (Normandale Rd)	Small Town	Residential	3675	1906250	T	0	None	None	None	<5	40	T	0	0	0	2	0	\$240,000
19	101.002	CSAH	101	CSAH 101 (Normandale Rd)	MSAS 107 (Halverson St)	Small Town	Residential	1452	253125	X	0	None	None	None	<5	40	T	0	0	0	0	0	\$0
20	101.003	CSAH	101	CSAH 101 (Normandale Rd)	MSAS 105 (S Gould St)	Small Town	Agriculture	1452	253125	X	0	None	None	None	<5	40	T	0	0	0	0	0	\$0
21	102.001	CSAH	102	CSAH 2 (Carleton Ave)	CSAH 102 (3rd St W)	Small Town	Residential	1408	273188	X	0	None	None	None	>5	30	T	0	0	0	0	0	\$0
22	105.001	CSAH	105	US 14	CSAH 105 (6th St)	Small Town	Commercial	2225	617500	X	0	Present	None	None	>5	55	T	0	0	0	0	0	\$0
23	11.001	CSAH	11	CSAH 2	CSAH 11 (280th St)	Rural	Agriculture	1100	226875	X	0	None	None	None	>5	55	T	0	0	0	0	0	\$0
24	115.001	CSAH	115	US 71	CSAH 155 (Main St)	Rural	Agriculture	3185	1196250	Y	30	None	Horizontal	None	>5	60	T	0	0	0	0	0	\$0
25	12.001	CSAH	12	MN 19	CSAH 12 (280th St)	Rural	Agriculture	1760	181500	T	40	None	Horizontal	None	<5	60	T	0	0	0	0	0	\$0
26	12.003	CSAH	12	CSAH 6	CSAH 12 (280th St)	Rural	Agriculture	992	113950	T	0	None	Horizontal	None	<5	55	TR	0	0	0	0	0	\$0
27	12.004	CSAH	12	CSAH 6	CSAH 12 (300th St)	Rural	Agriculture	932	62350	X	0	None	None	None	>5	55	TR	0	0	0	0	0	\$0
28	127.001	CSAH	127	CSAH 127 (1st St)	CR 50 (Main St)	Small Town	Mixed Use	255	15856	X	15	Present	None	None	>5	30	T	0	0	0	0	0	\$0
29	127.002	CSAH	127	US 14	CSAH 127	Small Town	Mixed Use	2018	223250	T	5	Present	None	None	<5	30	TR	0	0	0	0	0	\$0
30	13.001	CSAH	13	CSAH 13	CR 60 (180th St)	Rural	Agriculture	1070	70000	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
31	13.002	CSAH	13	CSAH 13	CR 68 (215th St)	Rural	Agriculture	1018	17500	T	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
32	13.003	CSAH	13	CSAH 13	CSAH 16	Rural	Agriculture	1385	385000	X	0	None	None	None	>5	55	T	0	0	1	0	0	\$230,000
33	13.004	CSAH	13	MN 68	CSAH 13	Rural	Agriculture	1755	769850	X	0	None	None	None	>5	55	TR	1	0	1	1	0	\$13,950,000
34	13.005	CSAH	13	MN 67	CSAH 13	Rural	Agriculture	3440	2622000	X	45	None	None	None	>5	55	TR	0	0	0	0	0	\$0
35	13.006	CSAH	13	CSAH 2	CSAH 13	Rural	Agriculture	2600	1387500	T	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
36	133.001	CSAH	133	CSAH 6	CSAH 133 (Main St)	Small Town	Residential	1308	228250	T	0	None	None	None	>5	30	T	0	0	0	0	0	\$0
37	15.001	CSAH	15	CSAH 15 (9th Ave E)	CSAH 106 (Birch St)	Small Town	Residential	972	234738	T	15	None	None	None	<5	55	T	0	0	0	0	0	\$0
38	15.002	CSAH	15	CSAH 15	CR 61	Rural	Agriculture	428	9112	T	0	None	Horizontal	None	>5	55	T	0	0	1	0	0	\$230,000
39	15.003	CSAH	15	CSAH 15 (Main St)	CSAH 15 (W Central St)	Small Town	Mixed Use	1470	494000	X	0	None	None	None	>5	30	T	0	0	1	0	0	\$230,000
40	15.004	CSAH	15	US 71	CSAH 15 (Central St)	Small Town	Agriculture	3055	838750	X	5	None	Horizontal	None	<5	60	T	0	0	1	0	1	\$243,000
41	16.001	CSAH	16	US 71	CSAH 16	Rural	Agriculture	2695	487500	T	10	None	None	None	>5	60	TR	0	0	0	0	1	\$13,000
42	17.001	CSAH	17	US 14	CSAH 17	Rural	Agriculture	2138	275000	T	0	None	None	None	>5	60	TR	0	0	1	0	0	\$230,000
43	17.002	CSAH	17	CSAH 17	CSAH 26 (150th St)	Rural	Agriculture	312	16538	TT	45	None	Horizontal	None	>5	55	T	0	0	0	0	0	\$0
44	17.003	CSAH	17	CSAH 17 (Railroad St)	CSAH 117 (Main St)	Small Town	Mixed Use	448	44988	X	20	None	Horizontal	None	>5	30	T	0	0	0	0	0	\$0
45	17.004	CSAH	17	Justice Ave	CSAH 17 (210th St)	Rural	Agriculture	215	5550	T	0	None	Horizontal	None	>5	55	T	0	0	0	0	0	\$0
46	17.005	CSAH	17	CSAH 17 (Kenwood Ave)	CR 67 (220th St)	Rural	Agriculture	235	9250	X	0	None	None	None	>5	55	T	0	0	0	0	0	\$0
47	17.006	CSAH	17	CSAH 17 (Kenwood Ave)	CR 70 (230th St)	Rural	Agriculture	228	7862	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
48	17.007	CSAH	17	MN 68	CSAH 17 (Kenwood Ave)	Rural	Agriculture	1612	168750	X	45	None	Horizontal	None	>5	60	TR	0	0	1	0	0	\$230,000
49	18.001	CSAH	18	CSAH 18 (Ideal Ave)	CSAH 133 (245th St)	Rural	Agriculture	588	86100	T	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
50	2.001	CSAH	2	CSAH 2	CR 60 (180th St)	Rural	Agriculture	440	24375	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
51	2.002	CSAH	2	CSAH 2	CSAH 2	Rural	Agriculture	408	41250	T	0	None	None	None	>5	55	T	0	0	0	0	0	\$0
52	2.003	CSAH	2	CSAH 4	CSAH 2	Rural	Agriculture	382	35750	T	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
53	2.004	CSAH	2	CSAH 2	CR 68 (220th St)	Rural	Agriculture	372	15438	T	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
54	2.005	CSAH	2	CSAH 2	CSAH 16	Rural	Agriculture	528	65812	X	0	None	None	None	<5	55	T	0	0	1	0	1	\$243,000
55	2.006	CSAH	2	MN 68 (Front St)	CSAH 2 (Sommerville St)	Small Town	Mixed Use	4155	2147750	X	45	None	None	None	>5	30	T	0	0	0	0	0	\$0
56	2.007	CSAH	2	MN 67 (Front St)	CSAH 2 (Carleton Ave)	Small Town	Mixed Use	3500	1740000	T	0	None	None	None	>5	30	T	0	0	0	0	0	\$0
57	2.008	CSAH	2	US 71	CSAH 2	Rural	Recreational	7375	7533750	T	0	None	Horizontal	None	>5	60	TR	0	0	2	1	0	\$580,000
58	20.001	CSAH	20	CSAH 20	CR 75 (Camp Ave)	Rural	Agriculture	525	14850	X	0	Present	None	None	<5	55	T	0	0	0	0	0	\$0
59	20.002	CSAH	20	CSAH 20	CR 78 (Crown Ave)	Rural	Agriculture	590	43969	X	0	Present	None	None	<5	55	T	0	0	0	0	0	\$0
60	24.001	CSAH	24	MN 67	CSAH 24	Rural	Agriculture	3175	2350000	T	45	None	None	None	<5	55	TB	0	0	0	0	1	\$13,000
61	24.002	CSAH	24	CSAH 1	CSAH 24	Rural	Agriculture	4325	4641250	X	0	None	None	None	>5	55	T	0	0	0	1	1	\$133,000
62	24.003	CSAH	24	CSAH 24	CSAH 2	Small Town	Residential	3655	3012000	X	0	None	None	None	<5	55	LT	0	0	0	0	0	\$0
63	25.001	CSAH	25	CSAH 6	CSAH 25 (360th St)	Rural	Agriculture	938	50600	X	0	None	None	None	<5	55	T	0	0	0	0	1	\$13,000
64	25.002	CSAH	25	CSAH 17 (Laser Ave)	CSAH 25 (360th St)	Rural	Agriculture	1058	232812	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
65	3.001	CSAH	3	MN 68 (Front St)	CSAH 3	Small Town	Recreational	3360	1272375	T	45	None	None	None	>5	30	T	0	0	0	0	0	\$0
66	3.002	CSAH	3	CSAH 3	CSAH 102 (3rd St E)	Small Town	Recreational	1072	176175	T	45	None	None	None	<5	30	T	0	0	0	0	0	\$0
67	30.002	CSAH	30	CSAH 30	CR 59 (Dayton Ave)	Rural	Agriculture	305	17250	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0

Rural Intersection List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.2	CRSP 2 ID	Route System	Route No.	Major Approach	Minor Approach	Area Type	Context Zone	Total Entering ADT [vpd]	Volume Cross Product [vpd^2]	Leg Configuration	Alignment Skew [Degrees]	Adjacent RR Crossing	Adjacent Curve	Adjacent Development	Previous STOP (>5 mi)	Major Approach Speed Limit	Major Approach Turn Lane Configuration	K	A	B	C	PDO	Crash Cost
77	4.007	CSAH	4	CSAH 4	CSAH 17 (Justice Ave)	Rural	Agriculture	610	90000	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
78	4.008	CSAH	4	CSAH 4	CR 67 (Knox Ave)	Rural	Agriculture	390	10800	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
79	4.009	CSAH	4	US 71	CSAH 4	Rural	Agriculture	2755	637500	X	0	None	None	None	>5	60	TR	0	0	0	0	1	\$13,000
80	4.010	CSAH	4	CSAH 4	CSAH 23	Rural	Agriculture	212	9375	X	0	None	None	None	>5	55	T	0	0	0	0	0	\$0
81	4.011	CSAH	4	CSAH 4	CR 63 (Nature Ave)	Rural	Agriculture	192	6375	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
82	4.012	CSAH	4	CSAH 4	CSAH 13	Rural	Agriculture	1185	185000	X	0	None	None	None	<5	55	T	0	0	0	1	0	\$120,000
83	5.001	CSAH	5	CSAH 5	CR 78 (110th St)	Rural	Agriculture	1082	87062	X	0	None	None	None	<5	55	T	0	0	0	1	0	\$120,000
84	5.002	CSAH	5	CSAH 5 (8th St)	CSAH 105 (Main St)	Small Town	Residential	1600	480000	X	0	None	None	None	<5	30	T	0	0	0	1	0	\$120,000
85	5.003	CSAH	5	CSAH 5 (8th St)	CSAH 20	Small Town	Mixed Use	1485	342000	X	0	Present	None	None	>5	30	T	0	0	0	0	0	\$0
86	5.004	CSAH	5	US 14	CSAH 5 (8th St)	Small Town	Mixed Use	2765	1692750	X	0	Present	None	None	>5	35	T	0	0	0	0	1	\$13,000
87	5.005	CSAH	5	CSAH 5	CR 52 (140th St)	Rural	Agriculture	592	16875	X	0	None	None	None	<5	55	TR	0	0	0	0	0	\$0
88	5.006	CSAH	5	CSAH 5	CR 57 (160th St)	Rural	Agriculture	515	9900	X	0	None	None	None	<5	55	TR	0	0	0	0	0	\$0
89	5.007	CSAH	5	CSAH 5	CR 55 (210th St)	Rural	Agriculture	388	14662	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
90	5.008	CSAH	5	CSAH 5	CR 66 (220th St)	Rural	Agriculture	388	14662	X	0	None	None	None	>5	55	T	0	0	0	0	0	\$0
91	5.009	CSAH	5	MN 68	CSAH 5	Rural	Agriculture	1445	339250	X	0	None	None	None	>5	60	TR	0	0	0	0	0	\$0
92	5.010	CSAH	5	CSAH 5	CR 74 (250th St)	Rural	Agriculture	315	17150	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
93	5.011	0	0	CSAH 5	CSAH 12 (280th St)	Rural	Agriculture	465	53900	X	5	None	None	None	>5	55	T	0	0	0	0	0	\$0
94	5.012	CSAH	5	MN 19	CSAH 5	Rural	Agriculture	1815	272250	X	0	None	None	None	<5	60	T	0	0	0	0	0	\$0
95	6.001	CSAH	6	CSAH 5	CSAH 6	Rural	Agriculture	805	41250	X	15	None	None	None	>5	55	T	0	0	0	0	0	\$0
96	6.002	CSAH	6	CSAH 6	CSAH 15 (9th Ave W)	Small Town	Residential	1470	392000	X	0	None	None	None	>5	30	T	0	0	0	0	0	\$0
97	6.003	CSAH	6	CSAH 6 (Ilex St)	CSAH 106 (1st Ave W)	Small Town	Residential	1860	594500	X	15	Present	None	None	<5	30	T	0	0	0	0	0	\$0
98	6.004	CSAH	6	US 14	CSAH 6 (Ilex St)	Small Town	Industrial	3375	2750000	X	15	Present	None	None	>5	55	TR	0	1	0	0	2	\$776,000
99	6.005	CSAH	6	CSAH 6	CSAH 26 (150th St)	Rural	Agriculture	1435	175500	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
100	6.006	CSAH	6	CSAH 6	CR 64 (170th St)	Rural	Agriculture	1335	45500	T	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
101	6.007	CSAH	6	CSAH 6	CR 66 (210th St)	Rural	Agriculture	1010	48000	X	0	None	None	None	<5	55	TR	0	0	0	0	0	\$0
102	6.008	CSAH	6	MN 68	CSAH 6	Rural	Agriculture	2932	1454750	X	0	None	None	None	>5	60	TR	0	0	1	1	1	\$363,000
103	6.009	CSAH	6	MN 19	CSAH 6	Rural	Agriculture	3555	1343750	T	0	None	None	None	>5	60	TR	0	0	0	0	0	\$0
104	6.010	CSAH	6	MN 19	CSAH 6	Rural	Agriculture	4050	1775000	T	0	None	None	None	>5	60	TR	0	0	0	0	4	\$52,000
105	7.001	CSAH	7	CSAH 7	CR 77	Rural	Agriculture	208	2438	T	0	None	Horizontal	None	<5	55	T	0	0	0	0	0	\$0
106	7.002	CSAH	7	CSAH 7 (Frontier Ave)	CSAH 127 (1st St)	Small Town	Agriculture	240	8775	T	5	Present	None	None	<5	55	T	0	0	0	0	0	\$0
107	7.003	CSAH	7	US 14	CSAH 7 (Frontier Ave)	Rural	Agriculture	1335	203000	X	0	Present	None	None	>5	55	TR	0	0	0	0	0	\$0
108	7.004	CSAH	7	CSAH 7	CSAH 26 (150th St)	Rural	Agriculture	172	7088	T	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
109	7.005	CSAH	7	CSAH 7	CR 64 (170th St)	Rural	Agriculture	170	6825	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
110	7.006	CSAH	7	CSAH 7	CR 66 (210th St)	Rural	Agriculture	160	5775	X	5	None	None	None	<5	55	T	0	0	0	0	0	\$0
111	7.007	CSAH	7	CSAH 7	CR 66 (220th St)	Rural	Agriculture	112	788	T	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
112	7.008	CSAH	7	MN 68	CSAH 7	Rural	Agriculture	1838	413438	X	0	None	None	None	>5	60	TR	0	0	0	0	0	\$0
113	7.009	CSAH	7	CSAH 7	CSAH 18 (260th St)	Rural	Agriculture	558	57750	X	5	None	None	None	<5	55	T	0	0	0	0	0	\$0
114	7.010	CSAH	7	CSAH 7	CSAH 12 (280th St)	Rural	Agriculture	685	111300	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
115	7.011	CSAH	7	CSAH 7	CSAH 107 (Oak St)	Small Town	Residential	485	27300	T	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
116	7.012	CSAH	7	CSAH 7	CR 56 (295th St)	Small Town	Agriculture	528	27025	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
117	7.013	CSAH	7	CSAH 7	CSAH 30	Rural	Agriculture	622	71675	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
118	7.014	CSAH	7	MN 19	CSAH 7	Rural	Agriculture	3210	1862000	X	0	None	None	None	>5	60	TR	0	0	0	0	1	\$13,000
119	7.015	CSAH	7	CSAH 7	CR 81 (370th St)	Rural	Agriculture	1098	49875	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
120	7.016	CSAH	7	CSAH 7	CSAH 9 (380th St)	Small Town	Residential	1302	244562	T	0	None	None	None	>5	30	T	0	0	0	0	0	\$0
121	7.017	CSAH	7	CSAH 7 (Main St)	CSAH 9 (150th Ave)	Rural	Agriculture	1225	254400	X	0	None	None	None	>5	55	T	1	0	0	0	0	\$13,600,000
122	7.018	CSAH	7	CSAH 7	CSAH 29 (400th St)	Rural	Agriculture	728	38525	T	0	None	Horizontal	None	<5	55	TR	0	0	0	0	0	\$0
123	7.019	CSAH	7	CSAH 7	CR 58 (420th St)	Rural	Agriculture	640	18300	T	15	None	None	None	<5	55	T	0	0	0	0	0	\$0
124	7.020	CSAH	7	CSAH 7	CSAH 27	Rural	Agriculture	660	60500	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
125	8.001	CSAH	8	US 14	CSAH 8	Rural	Agriculture	2005	369000	X	0	None	None	None	>5	60	TR	0	0	0	0	0	\$0
126	8.002	CSAH	8	CSAH 8	CR 52 (140th St)	Rural	Agriculture	398	16625	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
127	8.003	CSAH	8	CSAH 8	CR 71 (160th St)	Rural	Agriculture	385	12250	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
128	8.004	CSAH	8	CSAH 8	CR 55 (210th St)	Rural	Agriculture	418	17575	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
129	8.005	CSAH	8	MN 68	CSAH 8	Rural	Agriculture	1585	259000	T	40	None	Horizontal	None	>5	60	T	0	0	0	0	0	\$0
130	8.006	CSAH	8	MN 68 (Euclid Ave)	CSAH 32	Small Town	Recreational	2105	987000	X	0	None	None	None	>5	60	TR	0	0	0	0	0	\$0
131	8.007	CSAH	8	MN 19	T 159 (Balsa Ave)	Rural	Agriculture	2475	830000	X	5	None	None	None	>5	60	TR	0	0	0	0	1	\$13,000
132	8.008	CSAH	8	MN 19	CSAH 8	Rural	Agriculture	1722	119625	T	0	None	None	None	>5	60	TR	0	0	0	0	0	\$0
133	8.009	CSAH	8	CSAH 8	CSAH 30 (315th ST)	Rural	Agriculture	235	12206	X	0	None	None	None	>5	55	T	0	0	0	0	0	\$0
134	8.010	CSAH	8	CSAH 46	CSAH 8	Rural	Agriculture	645	47600	T	0	None	Horizontal	None	>5	55	TR	0	0	0	0	0	\$0
135	9.001	CSAH	9	CSAH 9 (380th St)	CSAH 19 (Hunter Ave)	Rural	Agriculture	532	17412	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
136	9.002	CSAH	9	CSAH 6 (West St)	CSAH 9 (North Ave)	Small Town	Agriculture	1300	410400	X	0	None	None	None	>5	55	T	0	0	0	0	0	\$0
137	9.003	CSAH	9	CSAH 9 (North Ave)	CSAH 109 (3rd St)	Small Town	Residential	635	51300	T	0	None	None	None	<5	30	T	0	0	0	0	0	\$0
138	9.004	CSAH	9	CSAH 17 (Kenwood Ave)	CSAH 9	Rural	Agriculture	800	150000	X	0	None	None	None	<5	55	T	0	0	0	0	0	\$0
139	76.001	CR	76	MN 68	CSAH 6	Small Town	Commercial	2672	1276125	X	0	None	None	None	>5	30	TR	0	0	0	0	0	\$0
140	79.001	CR	79	CSAH 6	CR 79 (325th St)	Rural	Agriculture	915	47300	X	0	None	None	None	>5	55	TR	0	0	0	0	0	\$0
Crash Summary																		3	1	14	12	19	\$46,457,000

Urban Segment List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.2	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Length [miles]	ADT [vpd]	Context Zone	Cross Section	Design	Speed Limit [mph]	Sidewalk	Access Density [access per mile]	Total Crashes	Severe Crashes	Total HO+SSO Crashes	Severe HO+SSO Crashes
1	101.002	CSAH	101	Intersection of CSAH101 and Magnolia Ave	42 ft South of Intersection of CSAH 101 and of E 2nd St	1.24	2550	Residential	2-Lane	Undivided	30	None	11.25	6	1	0	0
2	101.003	CSAH	101	42 ft South of Intersection of CSAH101/S Dekalb St and E 2nd St	Intersection of CSAH 101 and US 71	0.09	3600	Commercial	4-Lane	Undivided	30	None	45.24	11	0	0	0
3	101.008	CSAH	101	116 ft South of Intersection of CSAH101 and Cedar Cliff Rd	.35 Miles North of Intersection of River Rd W and CSAH 101	0.46	1800	Natural	2-Lane	Undivided	30	None	6.58	3	0	0	0

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Urban Intersection List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.2	CRSP 2 ID	Route System	Route No.	Major Approach	Minor Approach	Area Type	Context Zone	Traffic Control Device	Total Entering ADT [vpd]	Volume Cross Product [vpd ²]	Leg Configuration	Major Division Type	Alignment Skew (degrees)	Adjacent Development	Major Approach Speed Limit [mph]	Minor Approach Speed Limit [mph]	Major Approach Left Turn Phasing	Major Approach Turn Lane Configuration	Max Number of Lanes Crossed	Presence of Sidewalk	Pedestrian Crossing Type	K	A	B	C	PDO	Crash Cost
1	25.003	CSAH	25	CSAH 25 (River Rd)	CSAH 101	Suburban	Agriculture	Thru-Stop	2495	951750	T	Painted	5	None	55	55	NA	LT	3	None	None	0	0	0	0	0	\$0
2	101.004	CSAH	101	MN 67	CSAH 101 (Normandale Rd)	Suburban	Agriculture	Thru-Stop	4375	4702500	X	Undivided	45	None	50	45	NA	TR	3	None	None	0	1	0	0	1	\$763,000
3	101.005	CSAH	101	CSAH 101 (DeKalb St)	MSAS 108 (Cook St)	Suburban	Agriculture	Thru-Stop	4800	5304375	X	Undivided	35	None	30	30	NA	T	2	Some	Marking	0	0	1	0	1	\$243,000
4	101.006	CSAH	101	MN 19 (Bridge St)	CSAH 101 (DeKalb St)	Suburban	Commercial	Signal	13500	31500000	X	Undivided	0	Present	50	30	Permitted	TR	4	Some	Marking	0	0	1	3	12	\$746,000
5	101.007	CSAH	101	MN 19 (Bridge St)	CSAH 101	Suburban	Commercial	Thru-Stop	12550	21525000	X	Undivided	0	None	50	30	NA	TR	4	Some	None	0	0	2	3	8	\$924,000
6	101.008	CSAH	101	CSAH 101	MSAS 116 (Industrial Dr)	Suburban	Commercial	Thru-Stop	3335	1382250	T	Undivided	0	None	50	30	NA	TR	3	None	None	0	0	0	1	1	\$133,000
7	101.009	CSAH	101	CSAH 101	MSAS 104 (Northwood Dr)	Suburban	Commercial	Thru-Stop	3345	1410750	X	Undivided	0	None	50	30	NA	TR	3	None	None	0	0	0	0	1	\$13,000
8	101.010	CSAH	101	CSAH 101	MSAS 109 (Activaide Rd)	Suburban	Agriculture	Thru-Stop	2958	306375	X	Undivided	0	None	50	30	NA	TR	4	None	None	0	0	0	0	1	\$13,000
																					Crash Summary	0	1	4	7	25	\$2,835,000

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Appendix B – Meeting Minutes/Summaries

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MEETING SUMMARY

County Road Safety Plan Updates

Phase 2 Kickoff Meeting

PREPARED BY: Renae Kuehl/SRF
COUNTY: All
MEETING DATE: April 12, 2018
MEETING TIME: 11:00 AM – 2:00 PM
LOCATION: St. Cloud Training Center, Lewis North Conference Room – 3725 12th St. N St. Cloud, MN 56303

ATTENDEES:

Ryan Thilges, Blue Earth County	Daryle Dahl, Roseau County
Dan McCormick, Carver	Craig Jenson, Scott County
David Overbo, Clay County	Andrew Witter, Sherburne County
Guy Kohlhofer, Dodge County	Dan Knapek, Sherburne County
Karin Grandia, Itasca County	Ryan Odden, Wadena County
Jeremy Pfeifer, Kandiyohi County	Joe Gustafson, Washington County
Sam Muntean, Lac qui Parle County	
Aaron Vanmoer, Lyon County	Mark Vizecky, MnDOT
Rich Sanders, Polk County	Derek Leuer, MnDOT
Keith Berndt, Redwood County	Howard Preston, Jacobs
Dennis Luebbe, Rice County	Cheri Marti, Jacobs
Brian Ketring, Roseau County	Renae Kuehl, SRF

County Follow-up Action Items

- Review segmented maps and provide feedback – Due Thursday, April 26th.
 - See PPT slides 39, 40, and 41 for requested confirmation for segments, intersections and curves.
- Consider county-specific safety workshop goals/needs and plan to participate in up-coming All-Counties Webinar on alternative safety workshop formats and audiences. *Note: One-hour webinar dates are Tues., May 8 from 2-3 pm and Thurs., May 10th from 1-2 pm.*
- Begin planning for county safety workshop date and location. (T, W, or Th during Sept/Oct/early Nov)
- Provide feedback on preferred crash data set to use for crash analysis to Mark Vizecky @ mark.vizecky@state.mn.us or Derek Leuer @ derek.leuer@state.mn.us. Phase 2 counties will need to determine this as a whole.
- Provide contact information for county staff to be involved to Renae Kuehl at rkuehl@srfconsulting.com

Discussion Items

- First phase – Many projects had suggested 2-foot shoulder paving, but there is no room for it. We shouldn't suggest projects that are not possible. A lot of high priority projects were

MEETING SUMMARY

completed. Required to justify why the county was asking for lower priority project funding that were lower on the priority list.

- Sometimes the countermeasure might seem like a quick fix, but there is additional work that is needed to install the strategy (i.e. grading to pave shoulders)
- Do any of the Phase 1 agencies have policies that we are developing? Response: No, county policy development are not part of the project.
- Is there data on how to maintain the buffer lane with the plastic bollards? Response: The state maintenance staff thought it would be challenging, but it wasn't as bad as they anticipated. They plowed the lanes' right of way and used a skid steer to clean out around the bollards on the weekend. Also, note that bollards are NOT required.
- The phase 1 counties reviewed the list of strategies and most included the majority of the strategies in their Big Book of Ideas. However, some were removed due to specific strategies that won't work for their agency.
- Would like to see emphasis on corridor projects rather than individual locations because it's easier to plan for and build a corridor project rather than spot location projects. Response: CRSP update will recommend projects at locations, but the county is certainly free to coordinate locations to create a corridor project.
- Community members want to see reductions in fatal/crashes to justify the effort. Would like something that shows:
 - This is what our county has done.
 - This is what has been done statewide.
 - This is the impact its had.

Response: CRSP update provides results of Phase 1 & 2 county-implemented projects for segments, intersections and curves including known crash reduction factors and the pool of applicable severe crashes by county, District and Greater MN Crashes.

- Everyone's board/community will have different needs and questions to answer.
 - Example: One county had a project canceled at the last minute after HSIP funding was secured because local farmers were not on board with the change. They ended up canceling the project and losing HSIP funds. It would have been helpful to educate the board members to help support the engineer's decisions.
- How much out-of-the-box thinking will we be doing? Is there new technology that we can implement? Response: New strategies have been implemented since the original CRSP. We will welcome any ideas. MN is a leader in safety and has done a lot of the proven strategies, we need to consider what can be done in addition to what has already been done.
- Will the plans be addressing ped/bike crashes? Response: Yes, if there is a concern in the county.
- Coordinate better to get more buy-in from MnDOT district staff for their recommendations and projects in the plan. Response: MnDOT District Staff is encouraged to participate in the Safety Workshop.
- SA design needs and integrating funding sources so that HSIP funds can be used on state aid projects. MnDOT Metro only allowed a 2-foot shoulder and rumbles.

MEETING SUMMARY

- An active TZD group in Sherburne county, would like to see this group integrated into the plan development as well. Response: Depending on County workshop goals/objectives, Phase 2 counties are encouraged to invite TZD stakeholder groups to the county safety workshop. A number of Phase 1 CRSP Update counties invited their TZD coalitions.

Research Syntheses one pagers – Potential topics

- Access management
- Lighting rural intersections
- How to address requests for dynamic speed signs. What is a good system wide approach for deploying dynamic speed signs? Speed control? Curve warning?
- Intersection safety – treatment options to improve intersections. What is the biggest bang for your buck between options such as lighting, RICWS, etc.

2016-2017 crash data

- CRSP Update Phase 1 counties used 2011-2015 crash data. The 2016-2017 data set has only been available for three weeks. MnDOT is still working on trying to understand the data.
- The group needs to decide what crash data set to use as a whole. Either use 2011-2015 crash data or incorporate the 2016-2017 data set.
- Counties are to share feedback on what to want to move forward with, with Mark V and/or Derek at mark.vizecky@state.mn.us or Derek Leuer @ derek.leuer@state.mn.us.

Crash Data Overview

- Why is FHWA so slow to go to the systemic/data driven approach?
- Project implementation at the local level is not easy, challenging for other states and at the national level. MN has a large state aid staff and each county has an engineer and supporting staff. Many other states do not have this.
- Stronger data is needed to prove that a traffic signal is not a safety device. Refer to pages A-18, 19, 20 & 21 in the Traffic Safety Fundamentals Handbook.
- Do we have data on pedestrian crashes at roundabouts? Response: There are not enough crashes to document anything. The features in roundabouts are often the same characteristics of strategies used for pedestrian safety (one-way roads, median islands, lower speeds, etc). MnDOT looked at 140 roundabouts before/after study, which showed 3-4 crashes before and the same after, and all were at the same location.
- If an intersection with a signal isn't working, would you convert to a roundabout? Response: Yes, it would be a good option.
- The existing crash data system is not good at locating crashes at roundabouts due to issues with mapping the location of the crashes.

Roadway Network Assessment

- We are not reviewing crashes on gravel roads because Minnesota data shows that 95% of severe crashes along the county stem occur on paved roads – safety investments along paved roads represent the greatest opportunity for crash reduction. NACE has an initiative right now to review crashes and safety on gravel roads. There is a safety committee that is focusing on



MEETING SUMMARY

gravel and paved road safety. Good geometry is the number one characteristic of safer gravel roads.

- Simple and spiral curves with different superelevations. Does that matter? Do we need to know where they are? If you know, let us know.

CRSP Phase 2 – Individual County Meeting #1

COUNTY: Redwood County
MEETING DATE: June 5, 2018
MEETING TIME: 1:00 pm – 3:00 pm CST
LOCATION: 635 W. Bridge Street, Redwood Falls, MN 56283
ATTENDEES: Keith Berndt – Redwood County
Jeff Bommersbach – Redwood County
Bo Hagert – Redwood County,
Larry Hubert – Redwood County
Mike Panitzke – Redwood County
Howard Preston – Jacobs
Derek Leuer – MnDOT
Rena Kuehl - SRF

Summary of County Action Items:

Please submit all action items listed below to Rena Kuehl, SRF Consulting @ rkuehl@srfconsulting.com If questions, contact either Rena Kuehl or Cheri Marti, Jacobs @ cheri.f.marti@gmail.com

- Identify/confirm county safety workshop location. Current date is Tuesday, November 6th, 2018. (Target: ASAP)
- Determine workshop needs, confirm preferred format (A. featured safety strategies presentation only, B) site discussion only, C) featured safety strategies + site discussion, D) Board presentation only, or E) Board + abbreviated stakeholder workshop) and key audience(s). (Target: August 1st)
- From the Master Big Book of Ideas, select all safety strategies to be considered for County's CRSP Update (Target Date: August 1, 2015).
- If including a featured strategy discussion during workshop, from the Master Big Book of Ideas, select featured safety strategies to present/discuss during the safety workshop. (Target Date: 4 weeks prior to County Safety Workshop).
- Review current list of CRSP Research Syntheses one-pagers and MnDOT District topic summaries and submit input for up to two potential new research syntheses topics. (Target: July 9, 2018)
- Provide contact information for additional key staff you would include in CRSP Update emails/correspondence.

Meeting Agenda

1. CRSP Update Project Progress
 - Kick-off meeting recap
 - Phase 2 Schedule and Outreach Calendar
2. County Roadway Network Assessment
 - Discuss any outstanding network questions
3. County Highway Safety Improvement Program (HSIP) Project Implementation
 - Discuss evaluation process for previous CRSP
 - County safety workshop opportunity to highlight safety projects/safety approach
4. County Crash History (2011-2015)
 - Data is showing lane departure is the area with the biggest concern. Redwood is interested in addressing these types of crashes.
5. What will the CRSP Updated Plans Include?
 - a) Inventory of all county road segments, rural paved horizontal curves, and major intersections
 - b) Crash Facts: Data-driven review of crashes on county roads over the last five years and summary of safety focus areas and crash types (e.g., lane departure)
 - c) List of recommended high priority safety strategies
 - d) Prioritized list of locations that are most at risk for severe crashes
 - e) Prioritized list of location-specific safety strategies to consider for county implementation
6. What do you hope happens/doesn't happen as part of your CRSP Update?
 - The county struggles with the safety edge, seems too steep on the edge of the roadway. The county ended up installing rumble stripes at these locations to make the edge more apparent, so drivers don't go off the edge.
 - What's the plan to reflect safety projects that they actually want to do?
 - Can small projects such as stop ahead signs with flashing beacons be included? Yes
7. County Safety Workshop:
 - Goals/Workshop Needs
 - Keith will present safety work completed to date. Installing 6" ground in edgeline.
 - Expected audience: TBD

- Format preference
 - Keith will review the Big Book of Ideas and pick any strategies to consider
 - Leaning toward OtterTail County format – host the workshop on a Tuesday to attend a Board meeting and then host a small stakeholder meeting.
 - Keith will think about their preferred format
- **County Action: Identify/confirm county safety workshop location. Current date is Tuesday, November 6th, 2018. (Target: ASAP)**
- **County Action: Determine workshop needs, confirm preferred format (A. featured safety strategies presentation only, B) site discussion only, C) featured safety strategies + site discussion, D) Board presentation only, or E) Board + abbreviated stakeholder workshop) and key audience(s). (Target: August 1st)**

8. Big Book of Ideas

- Opportunity to tailor strategies
- Safety strategies to be considered in CRSP Update
 - Redwood County is interested to learn more about Intersection conflict warning systems.
 - Most of the county roads have chevrons on curves
 - There are a few TT intersections in Redwood County that could be address with the “TT to T Intersection Reconstruction”
 - There are no 4-lane roadways in Redwood Falls – No opportunity for a RCI
- Safety strategies to feature in the safety workshop
- **County Action: From the Master Big Book of Ideas, select all safety strategies to be considered for County’s CRSP Update (Target Date: August 1, 2015).**
- **County Action: If including a featured strategy discussion during workshop, from the Master Big Book of Ideas, select featured safety strategies to present/discuss during the safety workshop. (Target Date: 4 weeks prior to County Safety Workshop).**

9. County Input: Phase 2 Research Synthesis Topic

- **County Action: Review current list of CRSP Research Syntheses one-pagers and MnDOT District topic summaries and submit input for up to two potential new research syntheses topics. (Target: July 9, 2018)**

10. Next steps – County to provide/confirm

- Confirm Network (if needed)
- Identify workshop date and location (T,W,Th during Sept/Oct/early Nov.)
- Start thinking about strategies for your Big Book of Ideas



- Provide contact information for staff you would like involved to Renae Kuehl at rkuehl@srfconsulting.com
- **County Action: Provide contact information for additional key staff you would to include in CRSP Update emails/correspondence.**

Phase 2: MN County Road Safety Plan Updates

KICK-OFF WEBINAR MEETING

MARCH 9, 2018



Agenda

- ▶ Welcome & Introductions
- ▶ CRSP Update Goals
- ▶ Phase 1 & Phase 2 Counties
- ▶ MnDOT and Consultant Team
- ▶ What is different from original CRSP?
- ▶ CRSP Phase 2 - Process Schedule/Overview
- ▶ Roadway Network Development
- ▶ Questions?
- ▶ Next Steps

Questions? Please ask at any time.

Introductions

▶ MnDOT

▶ Counties – Phase 2

- Blue Earth
- Carver
- Clay
- Dodge
- Itasca
- Kandiyohi
- Lac Qui Parle
- Lyon
- Polk
- Redwood
- Rice
- Roseau
- Scott
- Sherburne
- Wadena
- Washington

▶ CH2M Team

CRSP Update Goals

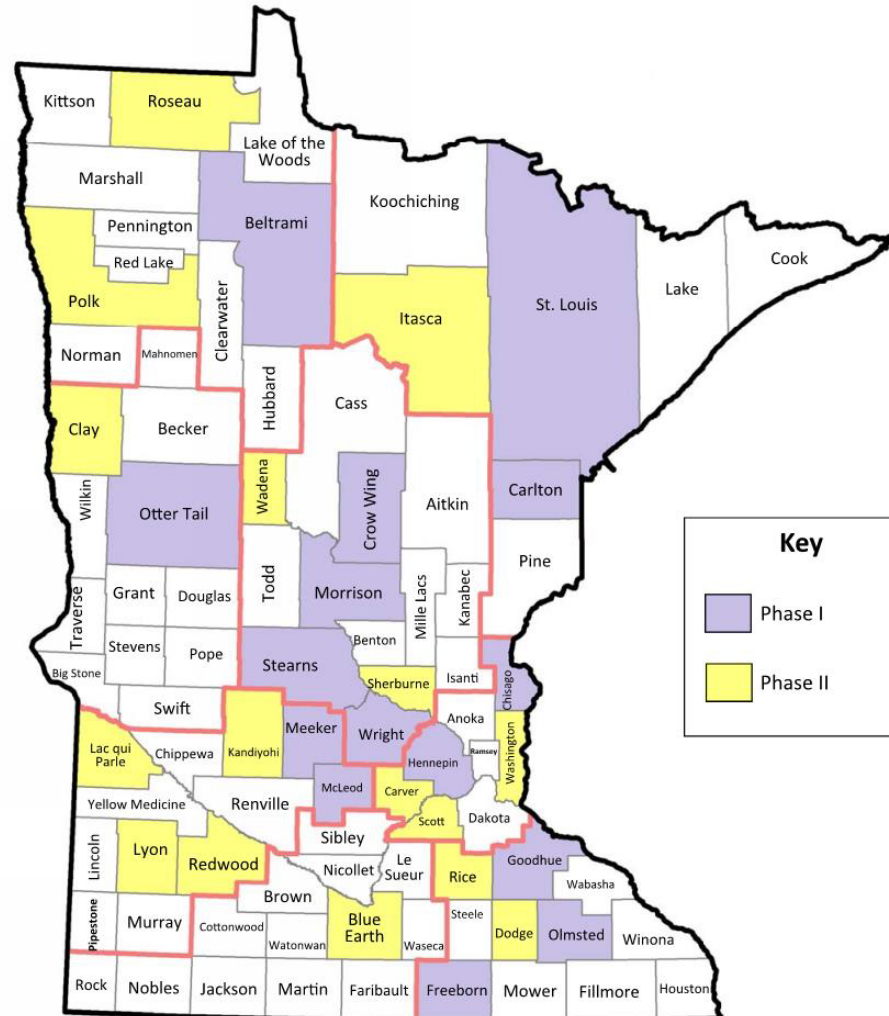
- ▶ Produce Updated County Road Safety Plans:
 - ▶ Customized approach
 - ▶ Updated crash data
 - ▶ Individual outreach and engagement plans
 - ▶ Additional safety practices
- ▶ Provide technical support for county implementation of HSIP-funded safety projects
- ▶ Focus on reducing Fatal and Incapacitating Injury crashes – build on prior results and continue to bend the trendline

Counties included in Phase 2

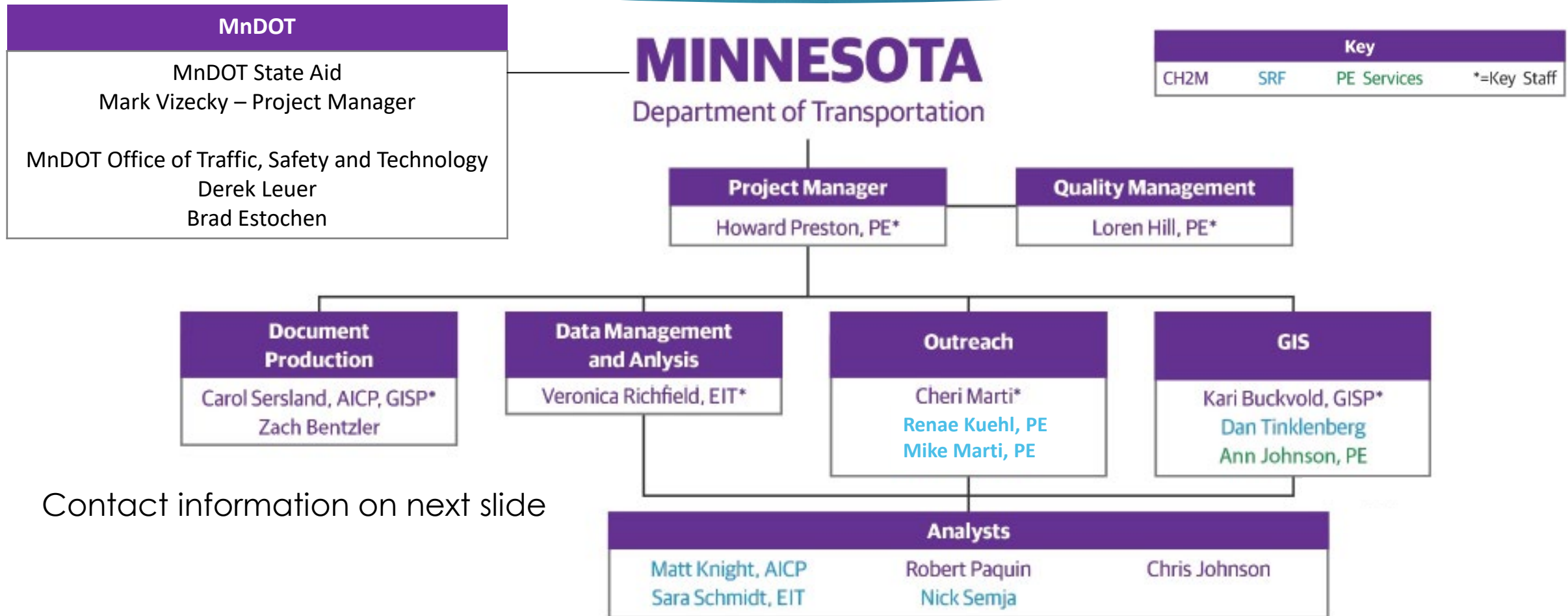
- Blue Earth – Ryan Thilges
- Carver- Lyndon Robjent/Dan McCormick
- Clay- David Overbo
- Dodge- Guy Kohlnhofer
- Itasca- Karin Grandia
- Kandiyohi- Mel Odens
- Lac qui Parle- Sam Muntean
- Lyon- Aaron Vanmoer
- Polk- Rich Sanders
- Redwood- Keith Berndt
- Rice- Dennis Luebbe
- Roseau- Brian Ketring
- Scott- Tony Winiiecki/Craig Jenson
- Sherburne- Andrew Witter
- Wadena- Ryan Odden
- Washington- Wayne Sandberg/Joe Gustafson

County Road Safety Plan Update

Phase I and Phase II



The Team



CH2M Team Contact Information

Role	Name	Phone	Email
Project Manager	Howard Preston	(651) 365-8514	howard.preston@ch2m.com
Outreach	Cheri Marti	(612) 616-4280	cheri.f.marti@gmail.com
	Renae Kuehl	(763) 249-6783	rkuehl@srfconsulting.com
Data Collection	Ann Johnson	(612) 275-8190	ann.johnson@peservicesmn.com
Data Management & Analysis	Veronica Richfield	(651) 365-8523	veronica.richfield@ch2m.com
	Robert Paquin	(651) 365-8542	robert.paquin@ch2m.com
	Matt Knight	(763) 452-4729	mknight@srfconsulting.com
Document Production	Carol Sersland	(651) 365-8545	carol.sersland@ch2m.com
GIS	Kari Buckvold	(773) 458-2895	kariann.buckvold@ch2m.com
	Dan Tinklenberg	(763) 452-4749	dtinklenberg@srfconsulting.com

What is different from the original CRSP?

- ▶ Customized plans based on County's needs
- ▶ Individual outreach/engagement plans: individual meetings, group meetings, county specific workshop
- ▶ Expanded list of safety strategies: additional strategies, medium and higher cost countermeasures, maintain focus on effectiveness (crash reduction)
- ▶ Added emphasis on electronic deliverables: map showing all K + A crashes in each county (all systems), .kmz maps of all suggested safety projects
- ▶ Long timeframe for each Phase (18 months versus 9 months in original effort)
- ▶ Comprehensive analytical approach: High Crash + High Risk (Systemic)
- ▶ Preparation of a comprehensive database
- ▶ Research One-Pagers

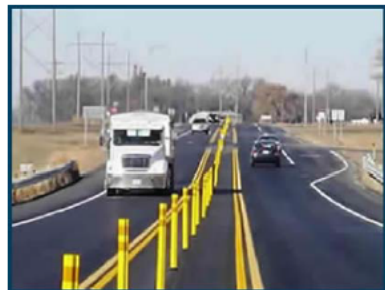
Safety Countermeasures: Big Book of Ideas

Rural Segments

Strategy	Crash Reduction Factor [*]	Typical Installation Costs
Centerline Rumble Strip	40% head-on/sideswipe crashes	\$3,600 per mile
Buffers Between Opposing Lanes	50% for all crashes & 100% for head-on crashes [based on TH 5 in Lake Elmo, MN]	\$150,000 to \$500,000 per mile
Shoulder/Edgeline Rumble Strip	20% run off road crashes	\$5,850 per mile
Safety Edge	5% to 10% [§] ; 8% to 16% ^{**}	
Enhanced Edgeline (6" & 8")	10% to 45% all rural serious crashes (6")	\$1,980 per mile
Shoulder Paving (2', 4', 6')	20% to 30% run-off-the-road crashes (with shoulder rumble) (2' only)	\$54,000 per mile +\$5,850 per mile (for Edge Rumble)
Clear Zone Maintenance/Enhancements		
Ditch/Embankment Improvements		\$500,000 to \$1M per mile
Notes: [*] - Crash reduction factors based on review of CMF Clearinghouse and other published research [§] - For all crashes ^{**} - ISU – SPR RBI 3-014, August 2016		



Centerline Rumble Strips
Source: Mitigation Strategies for Design Exceptions (FHWA, FHWA-SA-07-011)



Buffers Between Opposing Lanes
TH 14 in District 7
Source: MnDOT Presentation @ 2014 TZD Conference

Urban Intersections

Strategy	Crash Reduction Factor [*]	Typical Installation Costs
Echelon		
Continuous Flow Intersection (CFI)		
Signalized RCUT		
Confirmation Lights	25% to 84% reduction in violations	\$1,200 per two approaches
Traffic Enforcement Cameras (D3 Example)		
Pedestrian Countdown Times	25% vehicle/pedestrian crashes	\$12,000 per intersection
Leading Pedestrian Intervals	Up to 60% pedestrian/vehicle crashes	\$600 per intersection
Curb Extensions	Increase in vehicles yielding to pedestrians	\$36,000 per corner
Center Island Medians	46% in vehicle/pedestrian crashes	\$24,000 per approach
Roundabout (including Mini Roundabout)	20% to 50% all crashes/ 60% to 90% right-angle crashes	\$4,200,000 per intersection
Urbanization (make it feel urban)		
Rectangular Rapid Flash Beacon (RRFB)	75% of drivers yield to pedestrians	\$15,000
High-Intensity Activated crossWalk Beacon (HAWK)	69% Vehicle/Pedestrian	\$50,000 to \$120,000
Flashing Yellow Arrow (FYA) --> Note: Permitted to FYA	19.4% left turn crashes	
Turn Lanes (Offset, Channelized)	27%	\$150,000 to \$500,000
Notes: [*] - Crash reduction factors based on review of CMF Clearinghouse and other published research		

Google Earth Maps

KMZ Maps of Roadway Facilities and Crashes with Popup Information

6.058.002

Intersection ID	6.058.002
RouteSystem	MNTH
RouteSys_1	MN
RouteNo_Sh	58
RouteName	MN58
ReferenceP	001+00.313
Intersec_1	CSAH 6 LT/GOODHUE CO
Interchang	
DistrictMN	6
RouteNo_Lo	058
TIS_Code	0300000058
TruMile	1.4
GeneralEnv	Urban
Segment_ID	6.058.002
CityName	
District2	6
District	6
DateModified	1/21/2016
IntersectionID	6.058.002
SegmentID	6.058.002
RouteSystem	MN
RouteNo	58
MajorTISCodeNumber	0300000058
MinorTISCodeNumber	
IntersectionDescription	CSAH 6 LT/GOODHUE CO
TruMile	1.4
District1	6
ControlSectionMajorNumber1	
ControlSectionMajorNumber2	
ControlSectionMinorNumber1	
ControlSectionMinorNumber2	
City	
Config	T
DesignType	Traditional
TrafficControl	Thru-Stop
StreetLights	Yes
RampTerminal	No
MajorApproachSpeedLimit	40
Notes	
MajorApproach_Leg1ApproachLanes	TB
MajorApproach_Leg2ApproachLanes	TR
MajorApproach_Leg1Median	Undivided
MajorApproach_Leg2Median	Undivided
MajorApproach_Leg1LeftTurnLaneType	Bypass
MajorApproach_Leg2LeftTurnLaneType	None
MajorApproach_MajorApproachSignalPhase	None

Imagery Date: 4/26/2015 44°18'03.51" N 92°40'06.42" W elev 0 ft eye alt 1175 ft

Research One-Pagers

Enhanced Edge Lines

What are enhanced edge lines?

Enhanced edge lines refer to pavement markings that are either wider than typical or provide other enhancements such as recessing the marking or using an alternative material.

Along roadways with edge lines installed, most agencies have traditionally used a 4-inch-wide latex (water-based paint) line placed on the surface of the road, consistent with the guidelines in the Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD), Section 3A.6 (functions, widths and patterns of longitudinal pavement markings) of the MN MUTCD states that "the width of the line indicates the degree of emphasis."¹ The chosen width, or degree of emphasis, can be based on a combination of agency judgment and practice, economic benefit, and safety need.

The three most common techniques for providing enhanced edge lines include:

- Using a wider 6-inch line for heightened visibility of the line and road edge
- Using a special paint that provides benefits such as higher levels of retroreflectivity (a wet-reflective material that contains larger glass beads) or increased durability
- Recessing the markings in a shallow trough to protect from snow plow damage



What is the purpose of enhanced edge lines?

Both nationally and in Minnesota, road departure crashes account for more fatalities and serious injuries than any other type of crash. A first step in efforts to mitigate these crashes is attempting to keep vehicles on the roadway by focusing on improvements to the road edge. This further suggests that if the reduction of these kinds of crashes is desired, agencies should improve road edge delineation by using enhanced edge lines along key roadway segments that are identified as being the most at-risk for road departure crashes.



How effective are enhanced edge lines?

Two studies^{2,4} documented the effects of providing non-recessed enhanced edge lines along approximately 3,800 miles of two-lane rural roads in Michigan and Minnesota. Both studies found that replacing 4-inch edge lines with 6-inch edge lines was an effective countermeasure for reducing run-off-road crashes. Crash reduction factors include:

- Total crashes were reduced by 16 to 18 percent (statistically significant).
- Severe crashes were reduced by 10 to 18 percent (not statistically significant).
- Total run-off-road right crashes were reduced by 34 percent (statistically significant).
- Severe run-off-road right crashes were reduced by around 85 percent (not statistically significant).

Pavement Markings on Challenging Surfaces

What is the issue?

Seal coating and micro surfacing present a challenge for the performance and maintenance of pavement markings. Seal coating is a widely used pavement resurfacing technique that consists of applying a thin layer of liquid asphalt, followed by a cover layer of stone chips. Micro surface treatments involve a machine laid combination of crushed aggregate, asphalt emulsion, mineral filler (such as Portland cement), and water that is spread as a relatively thin layer over an existing pavement surface. Seal coats and micro surfaces provide excellent traction for drivers, even under wet pavement conditions. However, both treatments produce a coarse pavement surface with relatively large gaps between the aggregate which provides a way for paint to sink below the surface where it is not visible to motorists. This problem is magnified during adverse conditions, such as low light and wet pavement. Even when the lane markings are new, they are seen as faded or non-existent.



Typical Seal Coat (Chip Seal)



Typical Micro Surface

What are potential solutions?

The two most common materials for marking edge and center lines in Minnesota include latex paint and epoxy.² There is a long history of agencies using latex paint because it is inexpensive, can be easily painted over, and provides reasonable levels of retro-reflectivity on roadways that have traditional, smoother surfaces. Pavement markings wear out due to the volume of roadway traffic, harsh weather, and loss of material from winter maintenance activities. These conditions result in a typical service life of 1 to 2 years for latex paint. Epoxy has a slightly longer service life, usually 3 to 5 years, but lower unit costs and ease of application result in most agencies opting to continue using latex paint.

In response to these issues, research was conducted that focused on identifying the performance of a variety of potential solutions, including latex paint, latex over a primer coat, epoxy, and a combination of a layer of latex applied immediately following the chip seal followed by epoxy the next year.¹

How effective are these solutions?

For chip seals, the research¹ found:

- A thick layer (high-build) of either latex or epoxy performed well.
- The combination of striping with latex over the seal coat immediately after resurfacing followed by applying epoxy the following year performed very well, with observed service lives of 2 to 3 years.

The research concluded that the most cost-effective and easy to implement solution was the combination of applying a thin coat of latex immediately after the chip seal followed by a layer of epoxy the following year. In contrast to applying thick layers of paint, using standard layers of latex and epoxy is consistent with MnDOT guidelines for all road surfaces². The material can be ordered using MnDOT's materials specification, requires no installation adjustments and performed well on the research test deck.

For micro surfaces, the research¹ found:

- Thin layers of latex markings by themselves, with and without primer coatings, performed poorly and needed repainting less than 1 year after installation.
- Thin layers of epoxy performed well, even after 2 years.

Enhanced Crosswalks

What are enhanced crosswalks?

Enhanced crosswalks are pedestrian crossing countermeasures used in addition to the pavement markings typically used at pedestrian crossings not controlled by a traffic signal or STOP sign. The most common examples of enhanced crosswalks include:

- Median refuge islands
- Curb extensions
- Street lights
- Rectangular Rapid Flashing Beacons (RRFBs)
- High-Intensity Activated CrossWalk beacon (HAWK beacon)



Curb Extensions



High-Intensity Activated Crosswalk Beacon



Rectangular Rapid Flashing Beacon

Why are enhanced crosswalks needed?

Research consistently conveys that marked crosswalks alone do NOT reduce the number or rate of pedestrian-vehicle crashes.⁵ Since only marking a crosswalk is unlikely to improve pedestrian safety, the use of enhanced crossing countermeasures is suggested to improve crosswalk safety.

Although definitive rationale is not available as to why marked crosswalks alone are ineffective, theories include:

- False sense of security on the part of the pedestrians and inconsistent driving behaviors
- Distracted drivers and pedestrians
- Reduced effectiveness as a result of either overuse or warning of conditions that drivers rarely encounter

How effective are enhanced crosswalks?

Curb Extensions and Median Refuge Islands are countermeasures that reduce crossing distances. In the case of median refuge islands, allow for pedestrians to cross one direction of travel at a time. These improvements are PROVEN effective with crash reductions in the range of 40 to 45 percent.² Street Lighting at isolated locations in rural areas is considered PROVEN effective, with a crash reduction in the range of 30 to 40 percent. Limited research is available on the effectiveness of pedestrian-related crashes in urban areas.

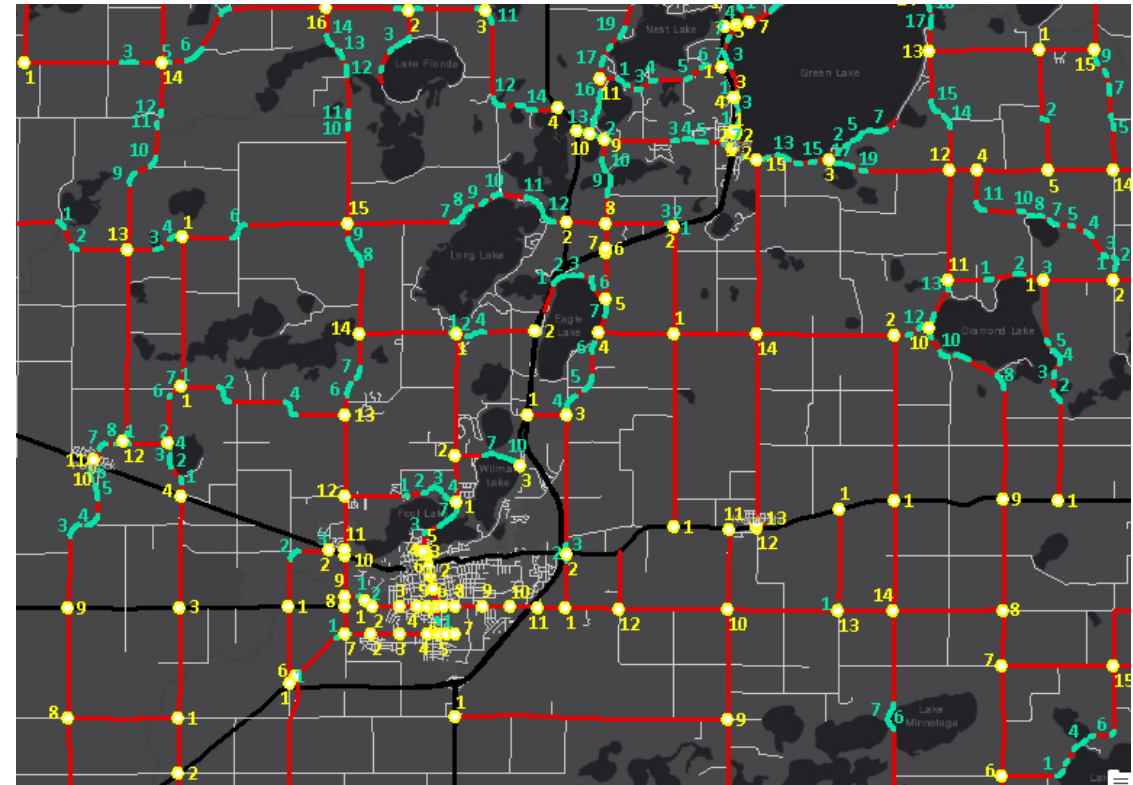
HAWK Beacons and RRFBs are relatively new technologies with promising initial research. HAWK beacons and RRFBs have crash reductions over 50 percent¹, and RRFBs have documented high yielding rates to pedestrians in excess of 80 percent.⁴

Roadway Network Development

Goal: Develop a map with identified segments, intersections and curves for each county by the April 12th meeting

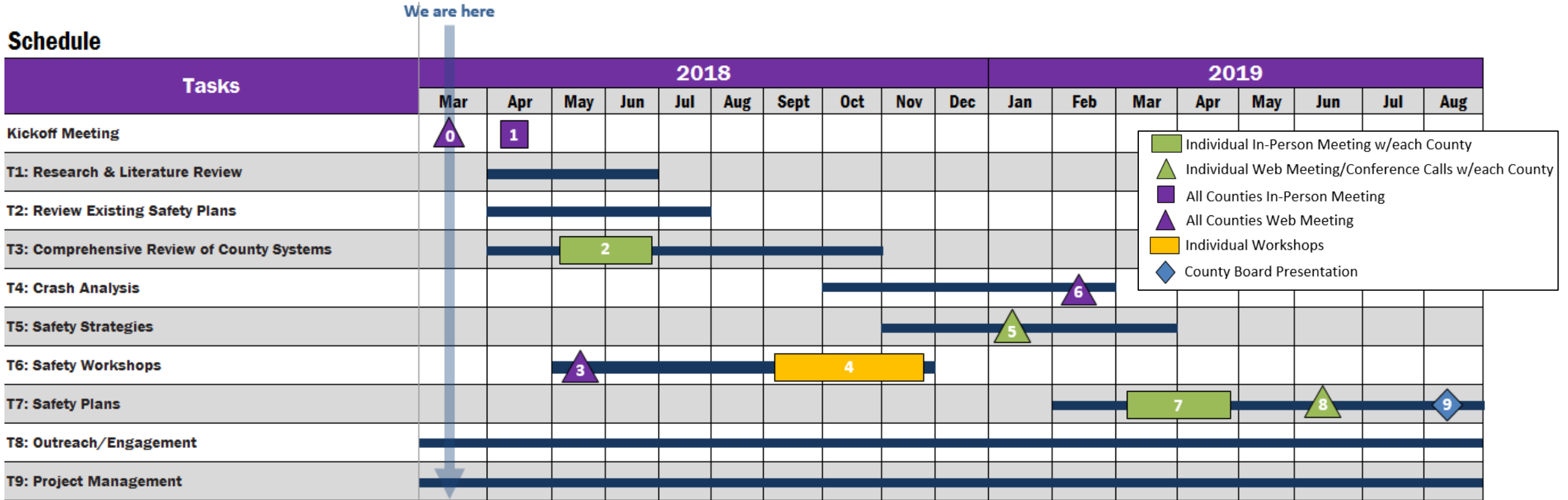
Approach:

- ▶ We will segment your roadway network for you
- ▶ You provide feedback on the completed segmentation



Example Map: Kandiyohi County

Schedule



Outreach and Engagement

Goal: To further reduce K+A's by fostering stronger collaboration through a more individualized approach with each county.

Meetings:

- ▶ All county meetings
 - ▶ One meeting in person
 - ▶ Three meetings via webinar
- ▶ Individual county meetings
 - ▶ Two meetings in person
 - ▶ One Workshop
 - ▶ Two meetings via webinar/conf call
 - ▶ One optional County Board Presentation



April 12th – Kick-Off Meeting

11am-2pm (lunch provided)

MnDOT St. Cloud Training Center

Additional Discussion Items:

- ▶ Facilitated Discussion: What you hope happens/doesn't happen in the CRSP update process?
- ▶ Highlights of Lessons Learned from Phase 1
- ▶ Results of Research Synthesis survey
- ▶ Crash Data Analytical Approach and Analyses of Results
- ▶ Summary of Phase 1 CRSP Safety Projects
- ▶ Discussion of Roadway Network Assessment

Next Steps

Next Meeting:

April 12, 2018 (11:00am-2:00pm) at the MnDOT Training Center in St. Cloud

We need from each county:

- ▶ Review segmented maps and provide feedback
- ▶ Begin planning for county Workshop date and location. (T,W,Th during Sept/Oct/early Nov.)
- ▶ Provide contact information for staff you would like involved to Renae Kuehl at rkuehl@srfconsulting.com

Questions?

- ▶ Mark Vizecky – MnDOT State Aid
Mark.vizecky@state.mn.us 651-366-3839
- ▶ Howard Preston – CH2M
howard.preston@ch2m.com 651-365-8514

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Phase 2 CRSP Updates

County Safety Workshop Overview

Webinar

May 8, 2018

Skype

County Roadway Safety Plan Updates

Outreach and Engagement

Goal:

To further reduce K+A's by fostering stronger county collaboration through a more individualized approach with each county.

- All county meetings
 - One in-person meeting
 - Three webinar meetings
- Individual county meetings
 - Two in-person meetings
 - One safety workshop
 - Two meetings via webinar or conf. call
 - One optional county board presentation

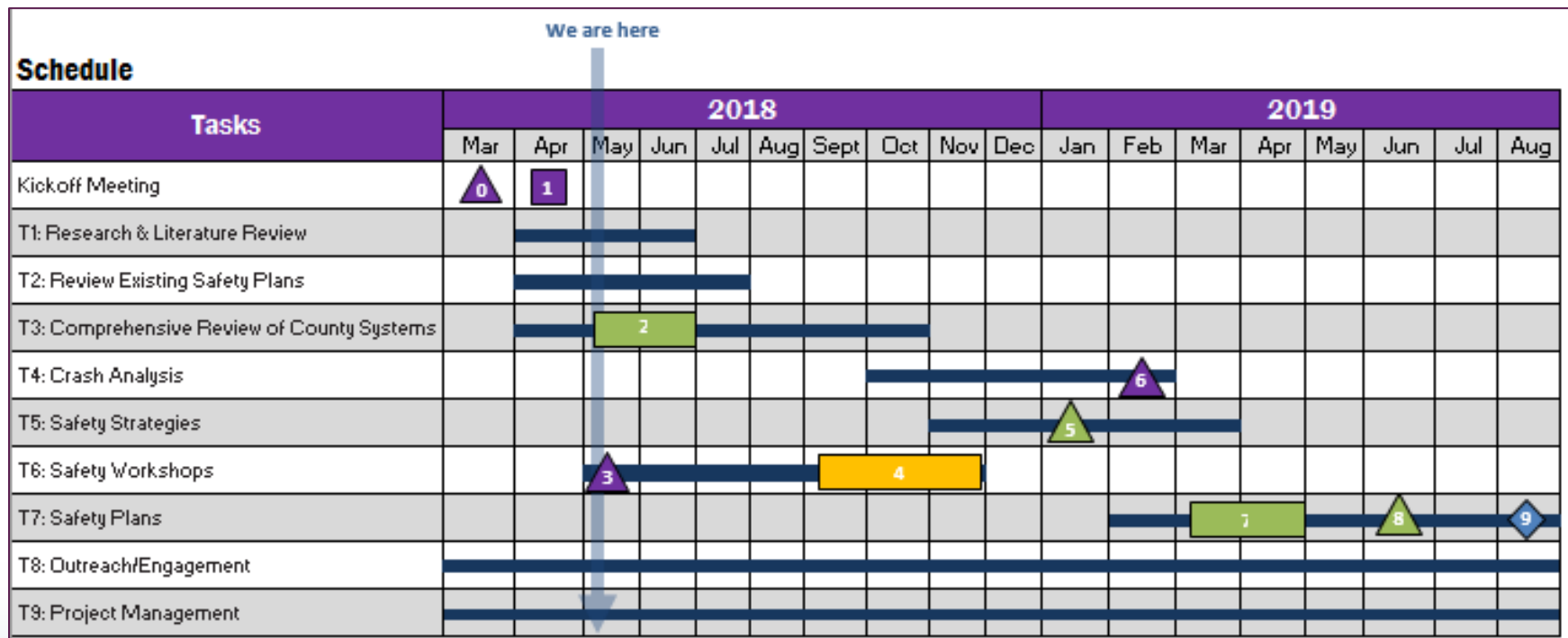


Outreach and Engagement

		Phase 2	
	MEETING TITLE	MEETING FORMAT	TOPICS
0	PRE-KICKOFF MEETING	▲ All Counties Web Meeting	<ul style="list-style-type: none"> Goals Process Schedule Needs
1	KICK-OFF MEETING	■ All Counties In-Person Meeting	<ul style="list-style-type: none"> CRSP update Review What are you looking for from project? P1 Lessons Learned, approach, results and projects P2 Roadway Network Assessment
2	ROADWAY NETWORK REVIEW	■ Individual County In-Person Meeting	<ul style="list-style-type: none"> Segments Intersections Curves Missing data needed from county
3	WORKSHOP OVERVIEW	▲ All Counties Web Meeting	<ul style="list-style-type: none"> Overview of workshop goals Phase 1 workshops review Workshop options Planning approach and schedule
4	WORKSHOP	● Individual County Workshop	<ul style="list-style-type: none"> Present crash analysis findings Present systematic and high crash location analysis process Review high priority locations identified Review safety strategies being considered
5	STRATEGIES REVIEW	▲ Individual County Web Meeting	<ul style="list-style-type: none"> Review preferred strategies to include, with each county
6	RISK FACTORS REVIEW	▲ All Counties Web Meeting	<ul style="list-style-type: none"> Present identified risk factors for systematic analysis
7	PROPOSED PROJECTS REVIEW	■ Individual County In-Person Meeting	<ul style="list-style-type: none"> Proposed projects for each segment, intersection and curve Desired changes to projects
8	DRAFT PLAN REVIEW	▲ Individual County Web Meeting	<ul style="list-style-type: none"> Review content for the draft County Road Safety Plan Discuss edits needed
9	COUNTY BOARD PRESENTATION (optional)	◆ Individual County (16) Board Meeting	<ul style="list-style-type: none"> Present CRSP approach and results to county board

Schedule

- Individual In-Person Meeting w/each County
- Individual Web Meeting/Conference Calls w/each County
- All Counties In-Person Meeting
- All Counties Web Meeting
- Individual Workshops
- County Board Presentation



County Road Safety Workshop: Alternative Formats and Audiences

Formats...choose one:

- a) Featured Safety Strategy Presentation/Discussion
- b) Site Locations Working Session
- c) Featured Safety Strategy Presentation/Discussion
+ Site Locations Working Session
- d) Board Presentation (pre- or post-CRSP Plan
Development)
- e) Board Presentation + safety stakeholders

General audiences:

- Safety stakeholders + county staff
- County staff only
- County board members

Potential Workshop Topics

- Workshop Goals and Introductions
- County Road Safety Plan Update and Safety Strategies Overview
 - Overview of CRSP, MN TZA, Statewide Performance Measures, Data Driven Safety Analysis
 - Proactive Systemic Safety Approach
 - Implemented Safety Projects and County Implementation Approach
 - County Crash Data Overview and Focus Areas
- Group Discussion: *What is important to advance road safety in the County?*
- Featured Infrastructure Safety Strategies Presentation & Discussion
- Priority Site Location Discussions
- Next Steps

Example Agenda: *McLeod County*

A) Featured Strategy Presentation/Discussion

9:00	Welcome, Introductions, and Workshop Goals
9:10	Intro to CRSP/MN TZD Goals
	Data Driven Safety Analysis
	Discussion: What is important to advance road safety in the county?
	Overview of Proactive Systemic Safety Approach
10:45	Implemented Safety Projects
11:00	County Crash Data Overview and Focus Areas
11:20	Featured Infrastructure Safety Strategies Discussion
2:00	Adjourn

(Excludes Site Locations Working Session)

Example Agenda: *Chisago County*

B) Site Locations Working Session

9:00	Welcome, Introductions, and Workshop Goals
9:10	Intro to CRSP/MN TZD Goals
	Data Driven Safety Analysis
	Discussion: What is important to advance road safety in the county?
	Overview of Proactive Systemic Safety Approach
10:00	Implemented Safety Projects
10:20	County Crash Data Overview and Focus Areas
10:50	Priority Site Locations (2 Intersections, 2 segments)
2:30	Adjourn

(Excludes featured presentation of safety strategies.)

Example Agenda: *Chisago County*

B) Site Locations Working Session

Priority Site Location Discussion Format:

- County Site Overview [10 min.]
- Site Crash Facts [5 min.]
- Alternative Safety Strategy Discussion [20 min.]
- Summary [5 min.]

Locations:

1. **Intersection** of *CSAH 25/292nd Ave, City of Lindstrom (at the High School)*
2. **Intersection** of *CSAH 1/CSAH 39, Rush City*
3. **Segment** of *CSAH 7 from CSAH 39 (Fairfield Ave) to CSAH 30 (Forest Blvd), Rush City*
4. **Segment** of *CSAH 30 from 360th St to 420th St, North Branch*

Example Agenda: *Wright County*

C) Featured Strategy Presentation/Discussion + Site Locations Working Session

9:00	Welcome, Introductions, and Workshop Goals
9:10	Intro to CRSP/MN TZD Goals
	Data Driven Safety Analysis
	Discussion: What is important to advance road safety in the county?
	Overview of Proactive Systemic Safety Approach
	County Crash Data Overview and Focus Areas
10:55	Featured Infrastructure Safety Strategies Discussion
12:30	Priority Site Locations ((1 segment, 2 intersections)
3:30	Adjourn

Example Agenda: Otter Tail County

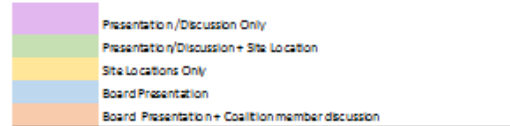
D and E) AM Board Meeting & Safety Stakeholder Workshop

Board Meeting	
9:35	Welcome, Introductions, and Workshop Goals
9:40	Intro to CRSP/MN TZD Goals
	Overview of Proactive Systemic Safety Approach
	County Crash Data Overview and Focus Areas
10:10	Featured Infrastructure Safety Strategies and Discussion
11:00	Adjourn
Safety Workshop	
1:00	Welcome, Introductions, and Workshop Goals
1:10	Intro to CRSP/MN TZD Goals
	Discussion: What is important to advance road safety in the county?
	Overview of Proactive Systemic Safety Approach
2:10	Implemented Safety Projects
2:55	Featured Infrastructure Safety Strategies and Discussion
4:00	Adjourn

Condenses Workshop agenda. Excludes the Site Location Discussion

Phase 1 Workshop Format Summary

Intro to CRSP/MN TZD Goals	Site-specific locations
Crash Data/Focus Areas	
Data Driven Safety Analysis	
Implemented Safety Projects	
Discussion: What is important to advance Proactive Systemic Analytical Process	
Infrastructure Safety Strategies	
Site Discussion and Alternative Strategies	



	Presentation Topics								# of Locations	Length	# of	Audience	Notes
Beltrami	X	X	X	X	X	X	X	X	None	6 hours	24	County Staff, County commissioners; MnDOT, Schools, State Patrol, TZD,	Included a voting exercise
Carlton	X	X	X	X	X	X	X	X	None	5 Hours	32	County; MnDOT; Health; City; Township; TZD; Tribal; Fire County Board, Dept. Heads,	
McLeod	X	X	X	X	X	X	X	X	None	5 Hours	28	School Superintendents, RDC planner, 4 E's, Community advocates, City engineers, City administrators, Twp	
Freeborn	X	X	X	X	X	X	X	X	1) CSAH 13 & 18 2.) CSAH 46 & 26 3.) I-35 & East Main Street (Truck Stop Region) 4.) I-90 & MN 13	6.5	29	AM: MnDOT, County, City, Driver Ed, Law Enforcement, Health, Commissioners, Administrator, TZD PM: elected officials from the county, city, townships County Staff and	
Goodhue	X	X	X	X	X	X	X	X	1) CR 7 from TH 61 to TH 19 2.) CR 18/ TH 61	6.5 Hours	26	Commissioners, School Districts, Transportation-related businesses, City Councils & staff, Township	Emphasis on Motorcycle safety strategies
Hennepin	X	X	X	X	X	X	X	X	1) CSAH 19 & CR 117 2.) Minnetonka Blvd & Dakota Ave 3.) CSAH 81 & Elm Creek Blvd	5.5	35	Hennepin County Public Works staff, Public Affairs, and County Administration, city staff,	
Morrison	X	X	X	X	X	X	X	X	1) TH 10/CSAH 14	5 Hours - AM Safety Stakeholders 2 Hours - PM County Staff	28	MnDOT; Commissioners; Township; Mayor; City Staff; County Staff; Law Enforcement	Site location discussion with county staff only
Olmsted	X	X	X	X	X	X	X	X	1) CSAH 36 (Marion Rd) 2.) CSAH 1 & TH 30	4.5	16	county engineer/staff, large and small city engineers/consultants, MnDOT D6 traffic staff, law	

Phase 1 Workshop Format Summary

Intro to CRSP/MN/TZD Goals	Crash Data/Focus Areas	Data Driven Safety Analysis	Implemented Safety Projects	Discussion: What is important to advance road	Proactive Systemic Analytical Process	Infrastructure Safety Strategies Discussion	Site Discussion and Alternative Strategies	Site-specific locations
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	Presentation /Discussion Only
	Presentation/Discussion + Site Location
	Site Locations Only
	Board Presentation
	Board Presentation + Coalition member discussion

	Presentation Topics								# of Locations	Length	# of Attendees	Audience	Notes
St. Louis	X	X		X	X	X		X	1.) CSAH 13 & CSAH 45 2.) CSAH 146 & US-53 3.) MNTH-37 & CSAH 7 4.) US 53 & MNTH 1/CSAH 115 5.) MNTH 37 & CSAH 25 East	6	13	Site specific reps ARDC MIC Safe Communities coalition State Patrol SLC Sheriff Major city police	Hosted a separate County Board Meeting Oct 17th 9:30-10:30
Stearns	X	X	X	X	X	X	X	X	1.) CSAH 2 & Minnesota Street	5.5	13	MnDOT, County, Law Enforcement, EMS,	
Wright	X	X	X	X	X	X	X	X	1. CSAH 39 Corridor 2. CSAH 39 & Gillard Avenue Intersection 3. CSAH 39 & CSAH 19 Intersection	6.5	18	County Commissioners; Law Enforcement; Emergency Responders; Media; Safe Communities BOD; County Staff; City Staff	
Chisago	X	X	X	X	X	X		X	1.) CSAH 25/292nd Ave 2.) CSAH 1/CSAH 39 3.) CSAH 7 from CSAH 39 to CSAH 30 4.) CSAH 30 form 360th ST to 420th St	5.5	24	MnDOT, County, City staff, TZD, FHWA, Schools, Law Enforcement, EMS,	
Meeker	X	X	X	X		X	X		None	2 Hours	13	County Board of Commissioner, TZD Meeker Safe Roads Coalition	
Crow Wing	X				X	X	X	X	1.) CSAH 3/CSAH 11	1 Hour - AM Board 1 Hour - PM Stakeholders	9 19	AM - County commissioners + press PM - Safety Coalition Committee	
Otter Tail	X	X	X	X	X	X	X		None.	1.5 Hour - AM Board 3 Hours - PM Stakeholders	12 20	AM - Board Meeting County commissioners PM - Safety Stakeholder Workshop	

Potential Workshop Objectives

1. Create a shared understanding of the County Road Safety Plan update process and its importance.
2. Create a shared understanding of the County's roadway safety approach.
3. Solicit and share safety stakeholder perspectives to reduce severe crashes in the County.
4. Develop a more comprehensive understanding of featured infrastructure safety strategies to reduce severe crashes in the County.
5. Collaboratively explore infrastructure safety strategies for priority site locations.

Workshop Audience: Example Invite List

- County engineers and maintenance staff
- County Administrator
- County Commissioners
- Safe Roads Coalition
- Regional TZD representative
- City reps including Consulting engineer acting as city engineer
- Law enforcement (MSP, Police, Sheriff)
- Emergency medical response
- Tribal governments (if applicable)
- MnDOT District staff, DSAE, traffic engineering and planning
- FHWA Safety Engineer Will Stein

Next Steps: County Safety Workshop Planning

- ✓ Determine workshop location and date
 - T, W, Th in September/October/November
- ✓ Identify County's preferred workshop objectives.
 - Key messages important to communicate?
- ✓ Determine workshop audience and invitees
 - County sends invitation and cc. Renae/Cheri
- ✓ Confirm featured infrastructure safety strategies:
 - For plan consideration
 - To feature in workshop

Your decisions are part of the critical path!

Questions?

- Mark Vizecky – MnDOT State Aid
Mark.vizecky@state.mn.us 651-366-3839
- Cheri Marti
Cheri.f.marti@gmail.com 612-616-4280
- Renae Kuehl
RKuehl@srfconsulting.com 763-249-6783

THANK YOU!

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Appendix C – Workshop Material

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Redwood County Board Discussion – County Roadway Safety Plan Update

DATE: Tuesday, December 11, 2018
MEETING TIME: 10:30 AM– 12:00 PM
LOCATION: Redwood County Government Center
 Commission Room
 403 S. Mill St.
 Redwood Falls, MN

Discussion Agenda

Introductions & Discussion Goals		
10:30	<ul style="list-style-type: none"> Create a shared understanding of the County Road Safety Plan update initiative, its importance, and the systemic application of roadway safety treatments. Develop a more comprehensive understanding of and discuss featured infrastructure safety strategies to reduce severe crashes in Redwood County. 	Keith Berndt County Engineer
10:35	Overview of County Road Safety Plan (CRSP) Update	MnDOT
10:50	Proactive Systemic Safety Approach	Howard Preston, Jacobs
11:15	Redwood County Crash Data Overview	
11:30	Infrastructure Safety Strategies: <i>“Big Book of Ideas”</i> and Featured Safety Strategies	Howard
11:55	CRSP Update Next Steps and Closing Comments	Howard /Keith
12:00	Adjourn (Lunch: 12:00 – 12:30 pm; Redwood County Road Safety Plan Workshop 12:30 – 4:00 pm)	

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Redwood County Board Discussion County Roadway Safety Plan

December 11, 2018

County Roadway Safety Plan Updates

Discussion Goals and Agenda Review

Goals:

- Create a shared understanding of the County Road Safety Plan update initiative, its importance, and the systemic application of roadway safety treatments.
- Develop a more comprehensive understanding of and discuss featured infrastructure safety strategies to reduce severe crashes in Redwood County.

Agenda Review

Handouts Review

Board Meeting Packet

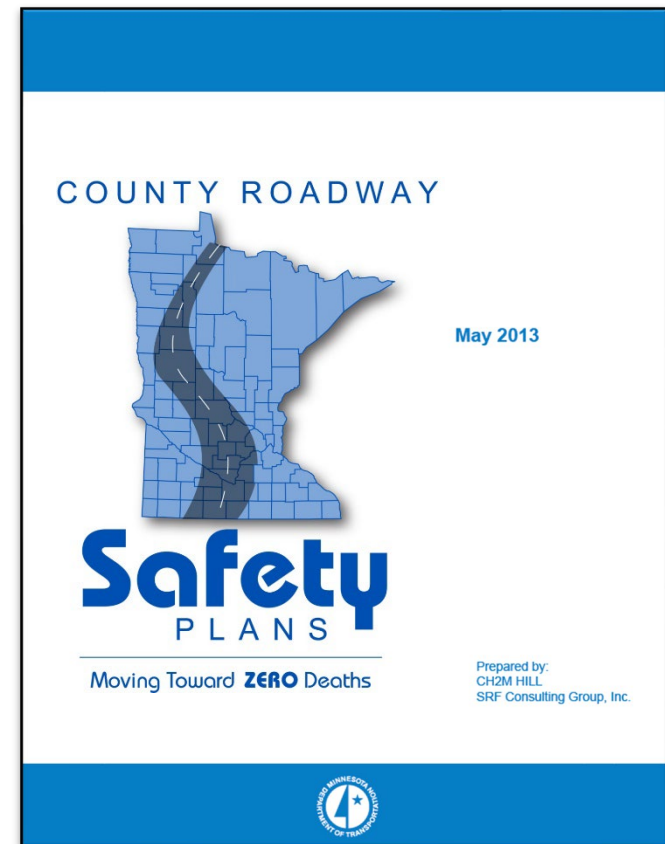
- Agenda
- PPT Slides

Workshop Folder

- Agenda
- PPT Slides
- County Rural Crash Tree
- Urban Crash Trees
- Statewide/County Focus Area Tables
- Big Book of Ideas
- Site Location Packets
- Evaluation Form
- CRSP One-pager
- TZD One-pager
- Data Driven Safety Analysis (DDSA) One-pager (FHWA)
- Research/Strategy One-pagers

What is a County Roadway Safety Plan or “CRSP?”

- **Switching from a reactive to a proactive approach**
- CRSP Identifies priority location-specific safety concerns and suggested priority infrastructure improvements.
 - County segments, curves, & intersections
 - Locations that are most at risk
 - Proven safety strategies
- In 2014, initial CRSP plan created for all 87 MN counties in partnership with MnDOT and the Federal Highway Administration.
- The “CRSP Update” is an effort to continue to advance safety on county roadways.



Data-Driven Safety Analysis: Minnesota Case Study Video



Why the need for County Roadway Safety Plans?

- 60% of severe crashes (fatality or serious injury) occur on local roadways; **most severe are on county roads.**
- Local agencies are responsible for more than 90% of the state's roadway miles.
- The majority of roadway safety investments have been made on the state system.

“It will be impossible to achieve Minnesota’s long-term goal of zero fatalities if minimal investment is made to address safety on local roadways”
Mitch Rasmussen, Assistant Commissioner State Aid Division



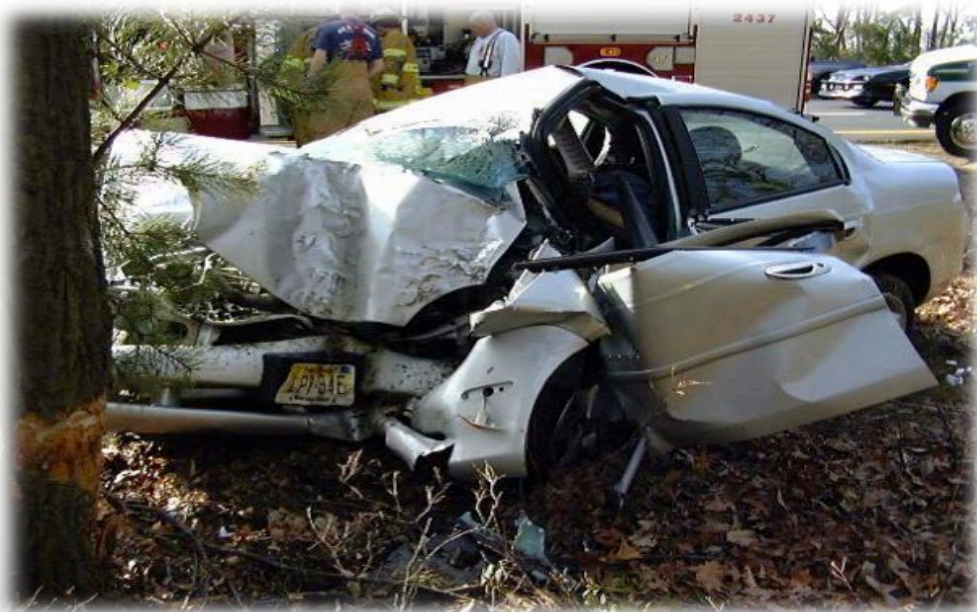
What is the goal of County Road Safety Plans or CRSP ?

To support the statewide initiative of moving **Minnesota Toward Zero Deaths Program** through **continued reduction of fatalities and serious injuries** on county roadways.

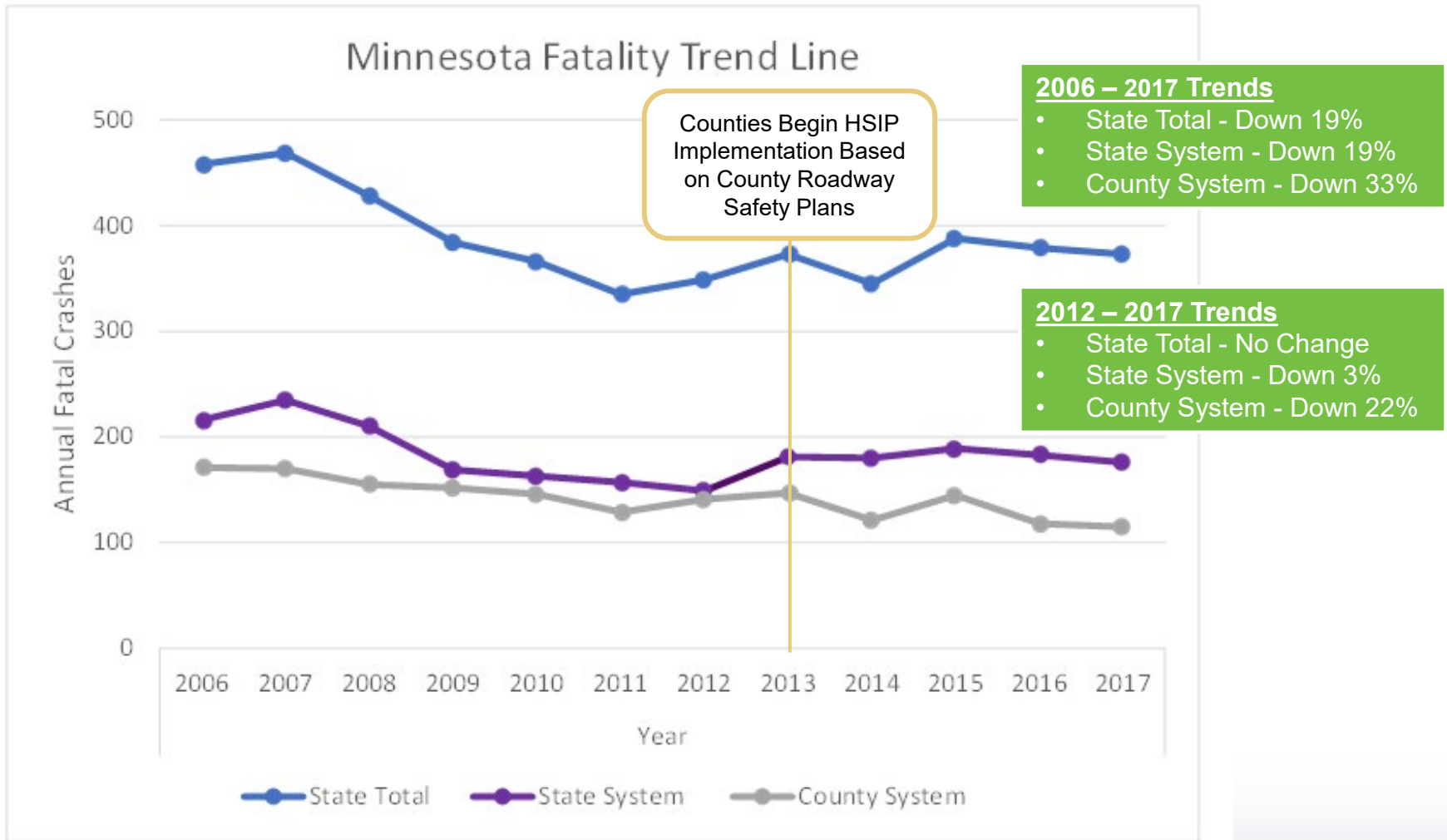
- Minnesota TZD Program:
 - Even one traffic death is unacceptable
 - Interdisciplinary approach: Engineering, Enforcement, Education, Emergency medical and trauma services
 - Partnership with community safety stakeholders
- CRSP aligns with the Minnesota Strategic Highway Safety Plan (SHSP)
- Support TZD Goal of fewer than 300 fatalities and 850 serious injuries by 2020

CRSP Funding

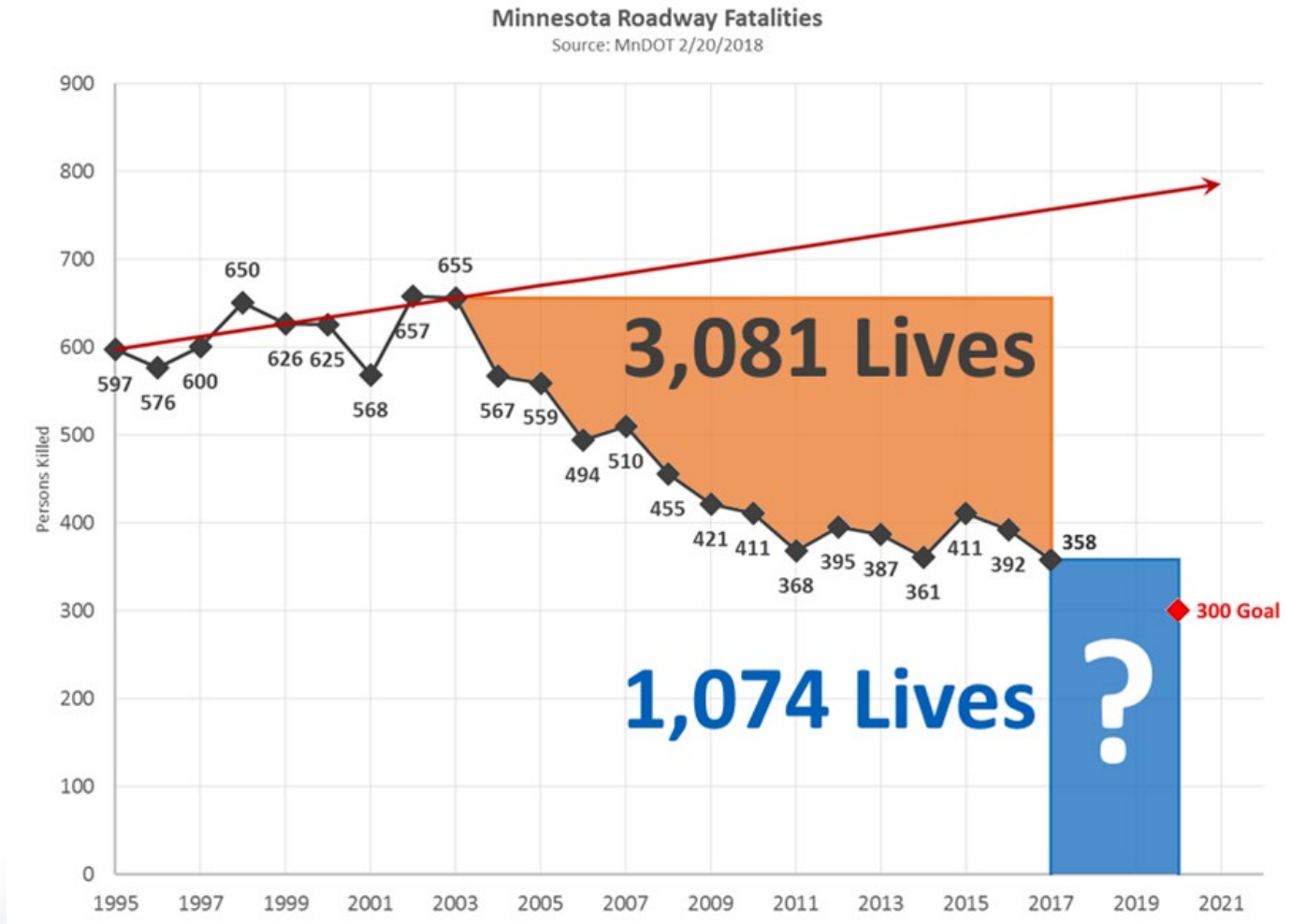
- Every Year, Minnesota receives ~\$30 Million Federal Highway safety funding
- Highway Safety Improvements Program (HSIP)
- Minnesota shares HSIP funding with the local governing agencies (about 50%)



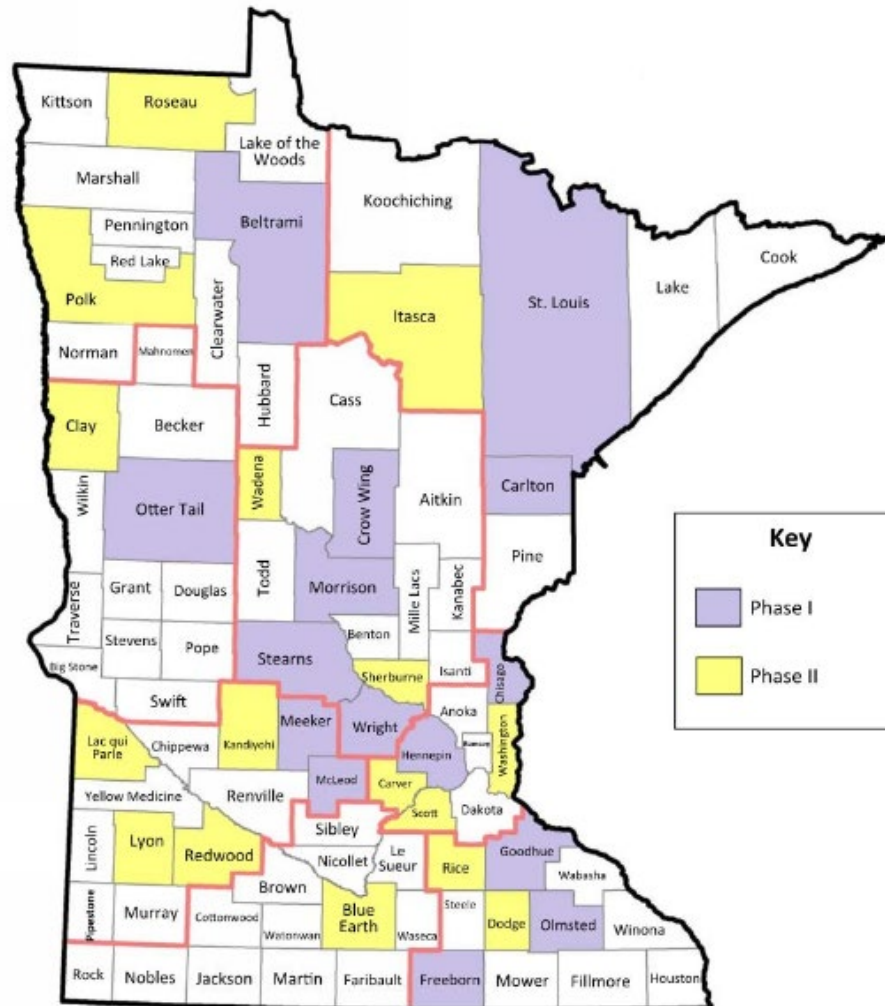
What are the initial results of county road safety improvements?



MN Roadway Fatalities

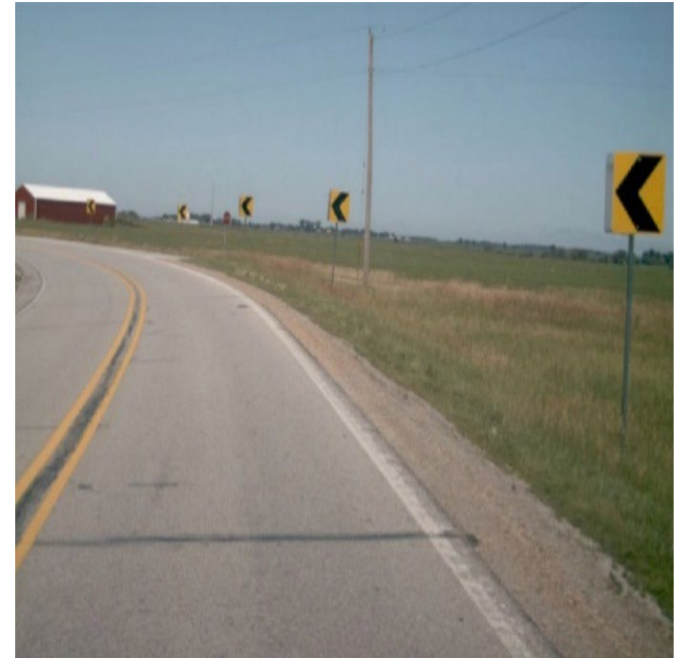


CRSP Update - Phase 2 (16 Counties)



Data Analysis Goals

- Conducting a **data-driven** safety analysis of the county roadway system
- Identifying and **prioritizing candidate locations** for safety investment
- Developing **safety projects** – specific strategies at specific locations





Overview of Proactive Systemic Safety Approach

County Roadway Safety Plan Updates

Why Proactive Systemic Safety Approach?

Traditional method: “**high crash**” locations

- Concern: no locations met the high crash designation

The solution for local system safety analyses =
Proactive Systemic Risk Analysis

What is a Systemic Risk Analysis?

- **Analytical approach** identifies and prioritizes safety deficiencies on roads based on risk of crash
- **Identifies risk factors** based on roadway and traffic characteristics
- **Prioritizes the road system for safety investment** by documenting the number of risk factors present at each location.

What is the benefit of a systemic process?

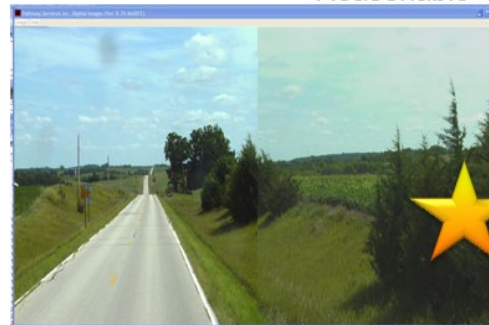
- It leads to more effective implementation and results.
- It allows agencies to proactively deploy safety projects on at-risk locations.

With the systemic process, the answer to “*How many people have to die before you do something?*” – is Zero!

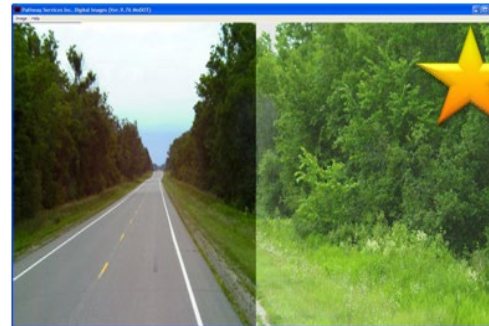
Risk Factor Identification

Segments:

- Density of Road Departure
- Traffic Volume
- Critical Curve Radius
- Access Density
- Edge Risk Assessment

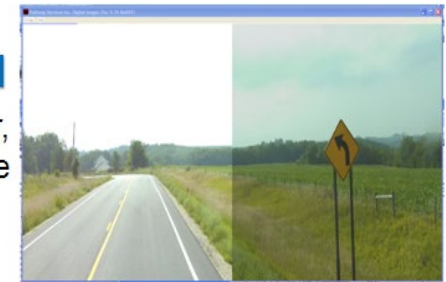


2 -No Usable Shoulder but Reasonable Clear Zone

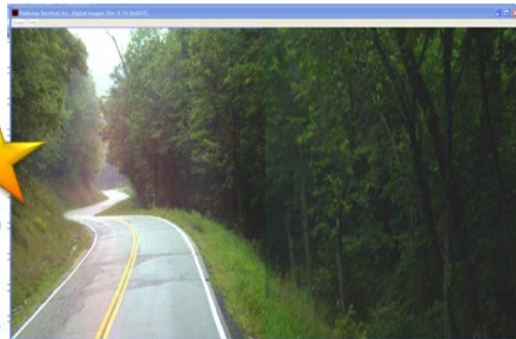


2 – Usable Shoulder but Roadside with Fixed Obstacles

No Usable Shoulder, Roadside with Fixed Obstacles



1 Usable Shoulder, Reasonable Clear Zone



3

Risk Factor Identification

Curves:

- ADT Range
- Radius Range
- Severe Crash on Curve
- Intersection on Curve
- Visual Trap on Curve



Risk Factor Identification

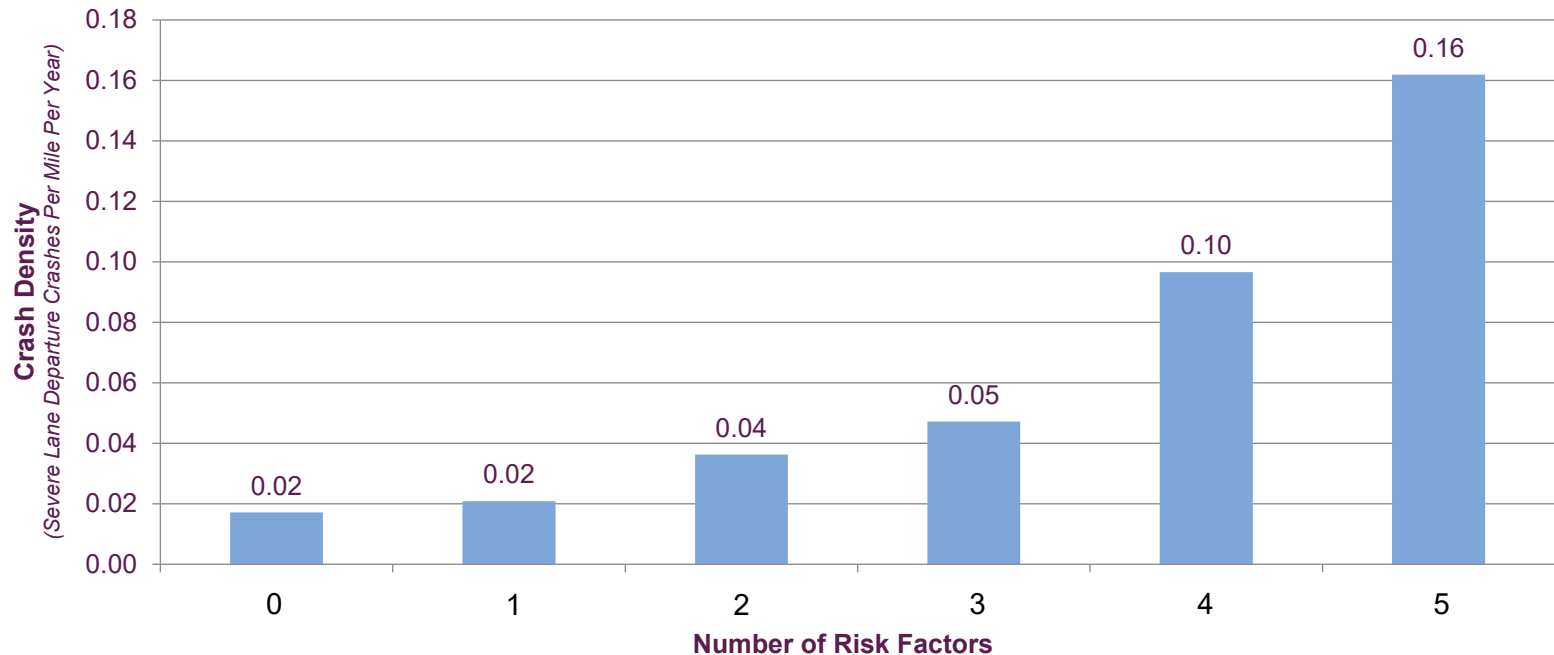
Intersections

- Skewed Approach
- On/near curve
- Volume
- Proximity to railroad crossing
- Proximity to last STOP sign
- Intersection related crashes
- Commercial Development in Quadrant



Systemic Safety Approach Works!

Higher priority segments have higher crash densities



**Low
Priority**



**High
Priority**

Project Form & Impact of Having a Safety Plan

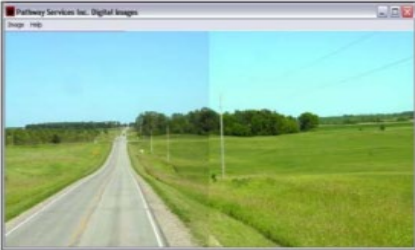
CSAH 34 from CSAH 35 to PERHAM CORP LMTS Project
Agency: Otter Tail County

Roadway Data

Type: CSAH
Number: 34 Verbal

Start: CSAH 35
End: PERHAM CORP LMTS

City/Rural: Rural
County: Otter Tail
ATP: 4
ADT: 1148
Facility Type: 2-Lane
Lane Width: 11'
Shoulder Width: 2'
Shoulder Type: gravel
Length (miles): 6.8
Rumble Installed: No



Crash Data
2005-2009 MnCMAT Crash Data 5 years

	Total	Road Dept	K+A
Crashes	15	11	1
Density (per mile per year)	0.44	0.32	0.03
Rate (per MVM)	1.05	0.77	0.07

Ranking Criteria

	Value	Critical	Risk Ranking
ADT Range	1148	600 to 1199	★
RD Density	0.32	0.08	★
Access Density	11.32	10.80	★
Curve Critical Radius Density	0.59	0.35	★
Edge Risk	3	2 or 3	★

★★★★★

Short List of Strategies Considered

Description	Type	Cost per mi	Mileage	Cost	Notes - 6" edgeline 2010
2' Shoulder Pave+RS+Safety Vwedge	Proactive	\$40,000	4.8	\$193,120	HSIP. Project selection adjusted for Little McDonald Lake, Paul Lake and Rusch Lake shoreline properties.
Rumble Strip	Proactive	\$3,000	0.0	\$0	
Rumble StripE	Proactive	\$3,500	0.0	\$0	
6" edgelines	Proactive	\$650	0.0	\$0	
Ground In Wet-Reflective Markings	Proactive	\$8,500	2.0	\$16,762	

Implementation Cost

Federal Funds	\$188,894
Local Match (10% of Total project cost)	\$20,988
Total Project Cost	\$209,882

Rank: 1
Segment ID: 34.01
Date: 4/27/2011

Over a 4-year period:

- **Over 85% of Minnesota counties** secured HSIP funding for at least one project.
- More than **\$60M of HSIP funds** were directed to supporting the implementation of safety projects on the county system.



Implemented Safety Projects and County Implementation Approach

County Roadway Safety Plan Updates

ATP 8 Implemented Safety Projects

Project Description	Number of projects	Suggested HSIP Award
Segments		
Total Edgeline striping	44	\$7,804,285.76
Total Narrow Shoulder	1	\$540,540.00
Total Rumble Strips	1	\$55,350.00
Total Sign Installation	1	\$88,875.00
Subtotal Lane Departure Projects	47	\$8,489,050.76
Curves		
Total Chevron Projects	3	\$98,487.00
Intersections		
Delineators	2	\$38,349.00
Rural intersection lighting and ITS Active Warning	1	\$157,500.00
Miscellaneous Intersection Improvements	1	\$316,368.00
Total Intersection Projects	4	\$512,217.00
Total projects	54	\$9,099,754.76



Redwood County Crash Data Overview

County Roadway Safety Plan Updates

Redwood County Crash Tree – Rural

Redwood County Crash Tree - County Rural System

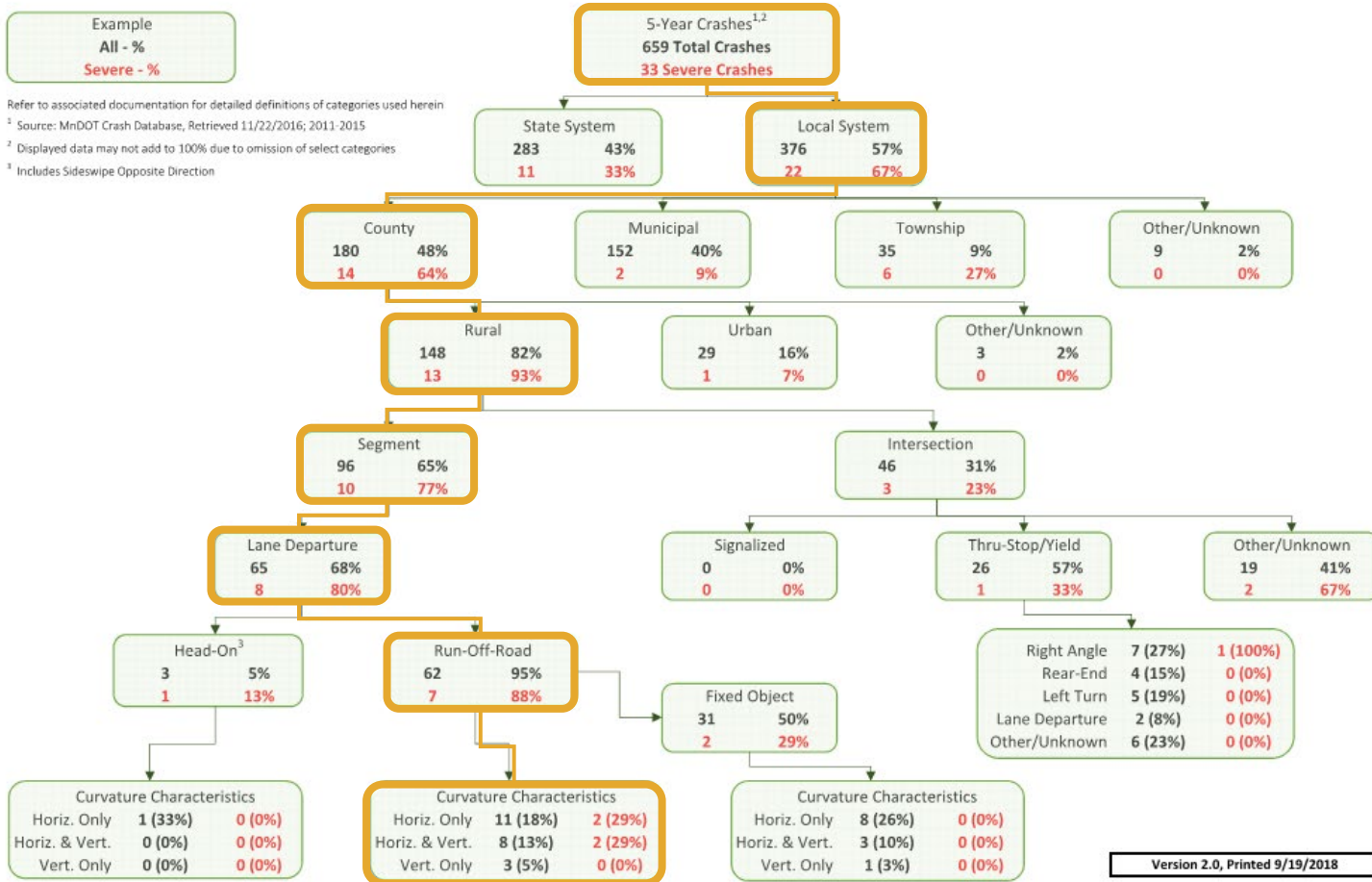
Example
All - %
Severe - %

Refer to associated documentation for detailed definitions of categories used herein

¹ Source: MnDOT Crash Database, Retrieved 11/22/2016; 2011-2015

² Displayed data may not add to 100% due to omission of select categories

³ Includes Sideswipe Opposite Direction



Version 2.0, Printed 9/19/2018

Redwood County Crash Tree – Rural

Redwood County Crash Tree - County Rural System

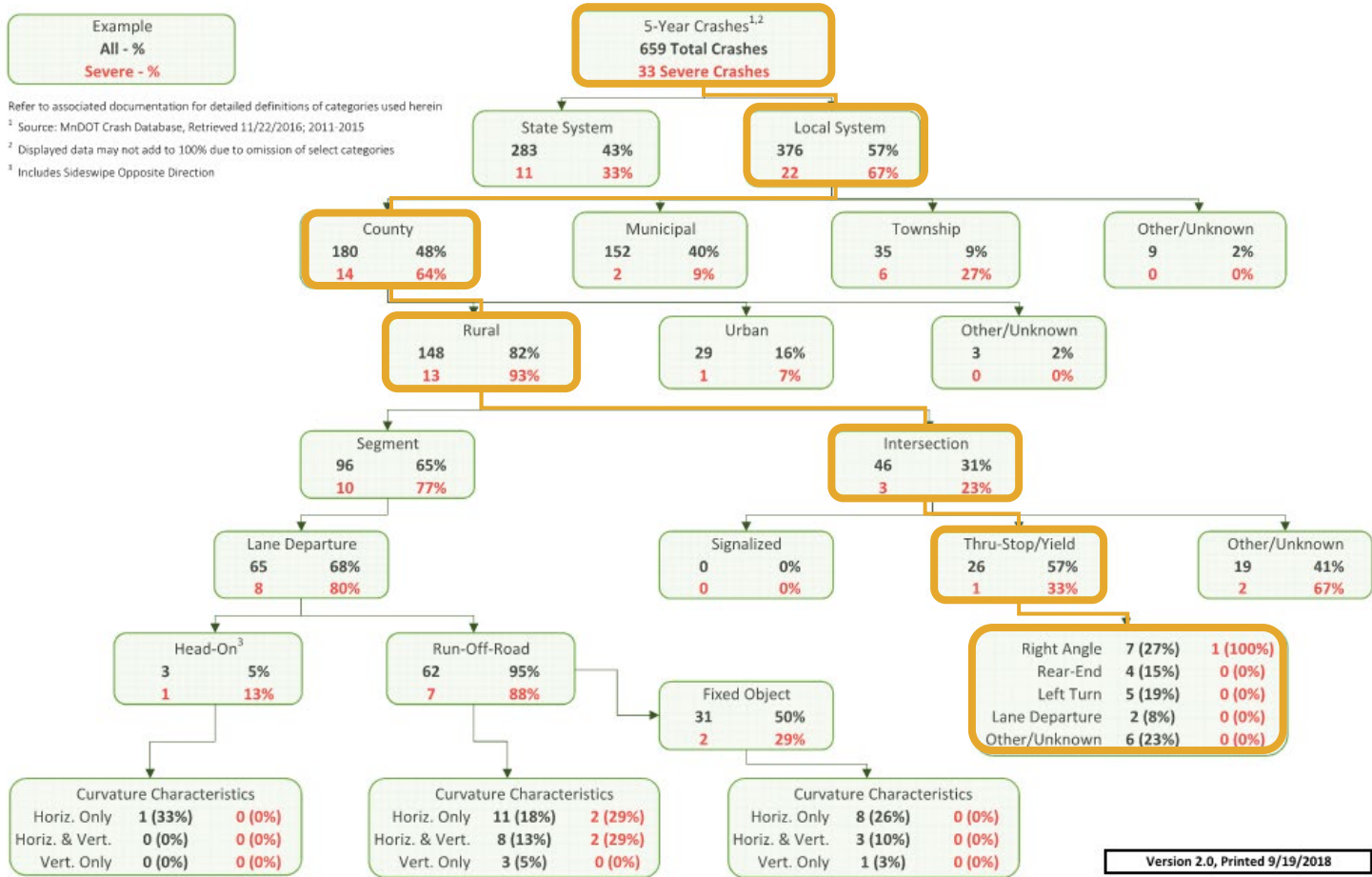
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Version 2.0, Printed 9/19/2018

County Versus State Crash Data - Rural

Redwood County Crash Summary - Rural

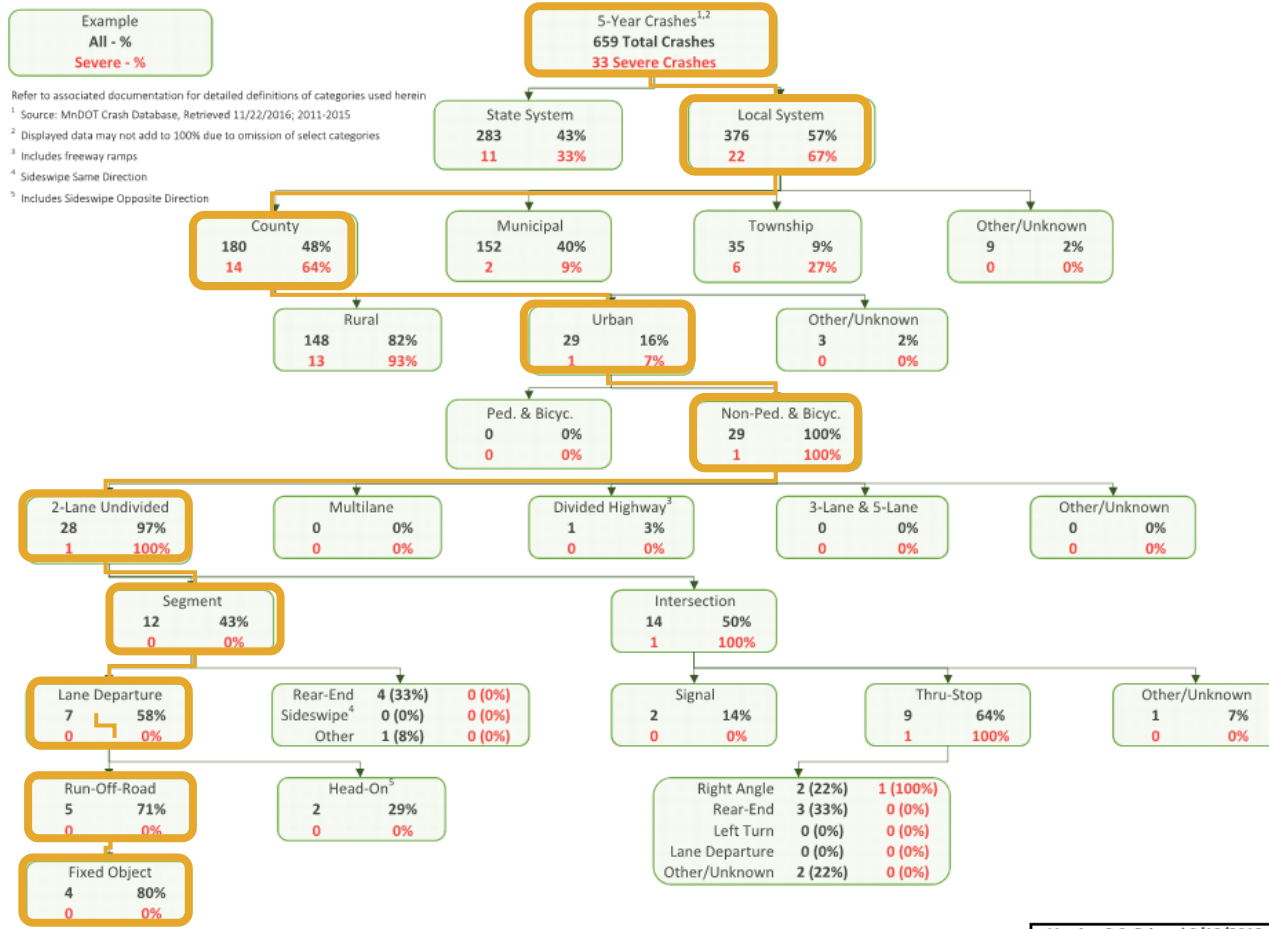
Crash Statistics (Severe Crashes)	Statewide Greater Minnesota	Redwood County
State vs. Local System	38% vs. 62%	33% vs. 67%
On County System	63%	64%
Rural vs. Urban	57% vs. 42%	93% vs. 7%
Segment Related	63%	77%
Lane Departure	71%	80%
Head - On	17%	13%
Run-off-Road	83%	88%
Curve Related	47%	57%
Intersection Related	31%	23%
Thru - STOP	54%	33%
Right Angle	43%	100%

Redwood County Crash Tree – Rural Key Takeaways

- Focus on supporting safety initiatives on local systems especially on county roadways
- Primary focus on Rural County Roadways
- Primary focus on Lane Departure Crashes along Rural Road segments and horizontal curves
- Secondary focus on Angle Crashes at Rural Thru-STOP controlled intersections

Redwood County Crash Tree - Urban

Redwood County Crash Tree - County System Urban 2-Lane Undivided



Refer to associated documentation for detailed definitions of categories used herein
¹ Source: MnDOT Crash Database, Retrieved 11/22/2016; 2011-2015
² Displayed data may not add to 100% due to omission of select categories
³ Includes freeway ramps
⁴ Sideswipe Same Direction
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Version 2.0, Printed 9/19/2018

County Versus State Crash Data - Urban

Redwood County Crash Summary - Urban

Crash Statistics (Severe Crashes)	Statewide Greater Minnesota	Redwood County
State vs. Local System	38% vs. 62%	33% vs. 67%
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Single vs. Multi Vehicle	33% vs. 57%	0% vs. 0%
Head-On vs. Rear End	33% vs 7%	0% vs. 0%
Multi-Lane & Divided	49%	0%
Intersection Related	75%	0%
Signal Control	66%	0%
Right Angle Collision	44%	0%
Pedestrian & Bicycle Crashes	25%	0%
2 - Lane Undivided	25%	0%
Segment vs. Intersection	48% vs. 46%	0%
Signal Control	33%	0%
Speed Limit - 30mph	45%	0%
Multi-Lane & Divided	63%	0%
Segment vs. Intersection	27% vs. 67%	0%
Signal Control	73%	0%
Speed Limit - 30mph	58%	0%

Redwood County Crash Tree— Urban Key Takeaways

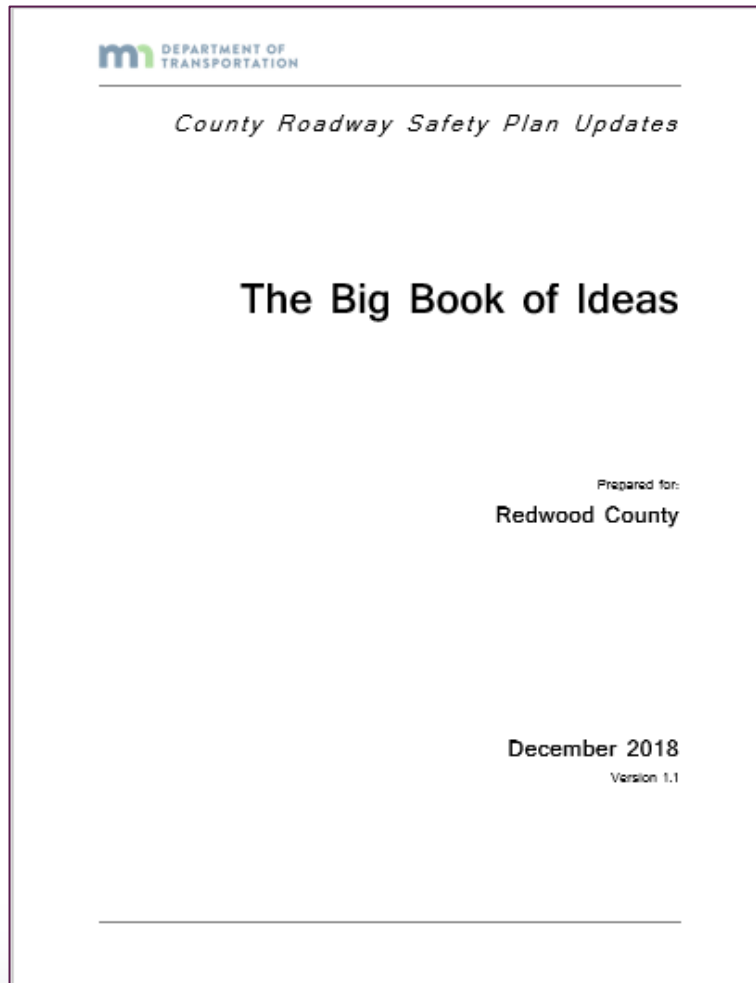
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- The majority of Pedestrian/Bicycle crashes occur on Multi-Lane/ Divided facilities at intersections with traffic signal control with a 30 MPH speed limit



Redwood County Infrastructure Safety Strategies

County Roadway Safety Plan Updates

Big Book of Ideas



Rural Segments



Shoulder/ Edgeline Rumble Strips

Crash Reduction Factor

- 20% run off road crashes

Typical Installation Costs

- \$5,850 per mile



Enhanced Edgeline (6" & 8")

Crash Reduction Factor

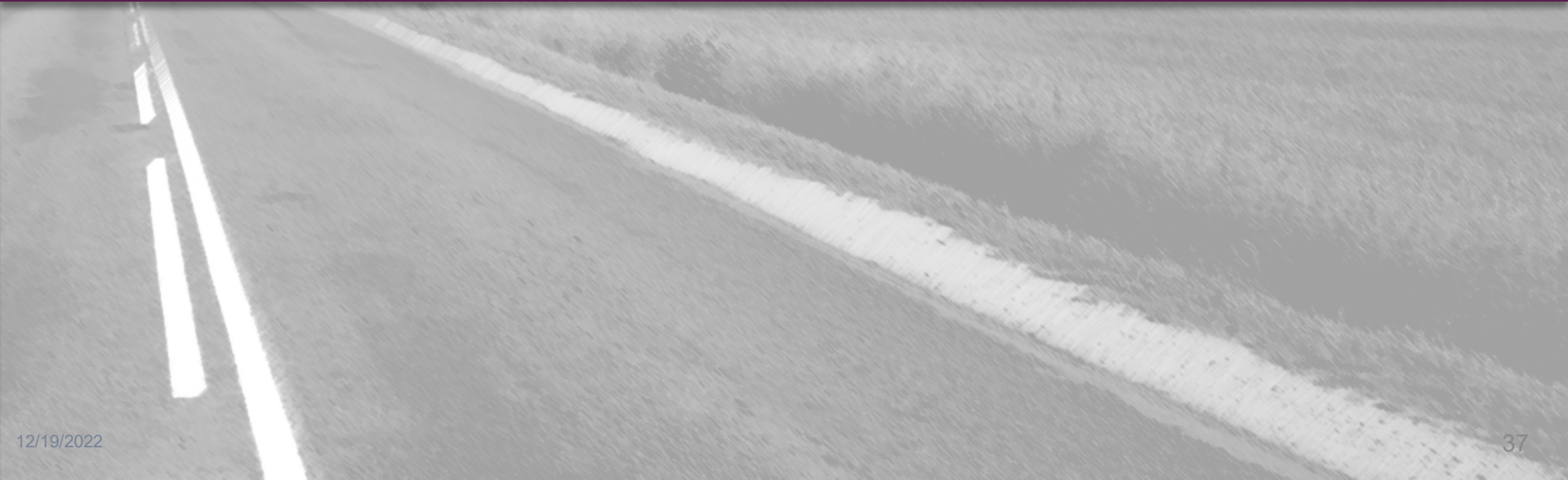
- 10% to 45% all rural serious crashes (6")

Typical Installation Costs

- \$2,000 per mile



Rural Curves



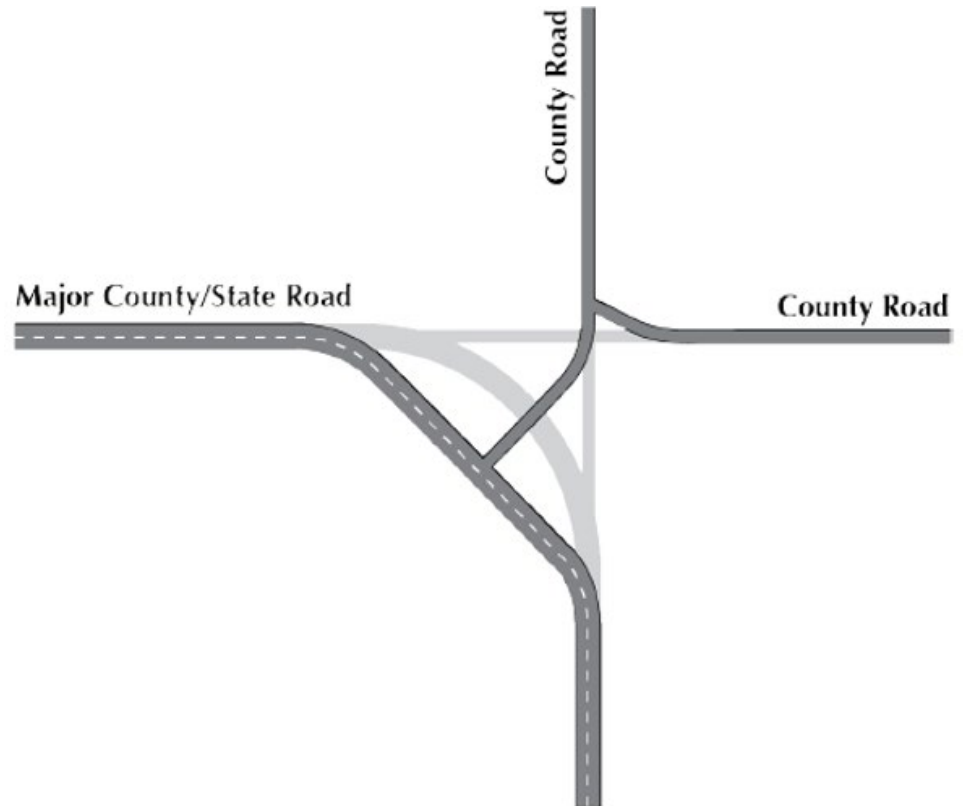
Reconstruct (TT to a Single T Intersection)

Crash Reduction Factor

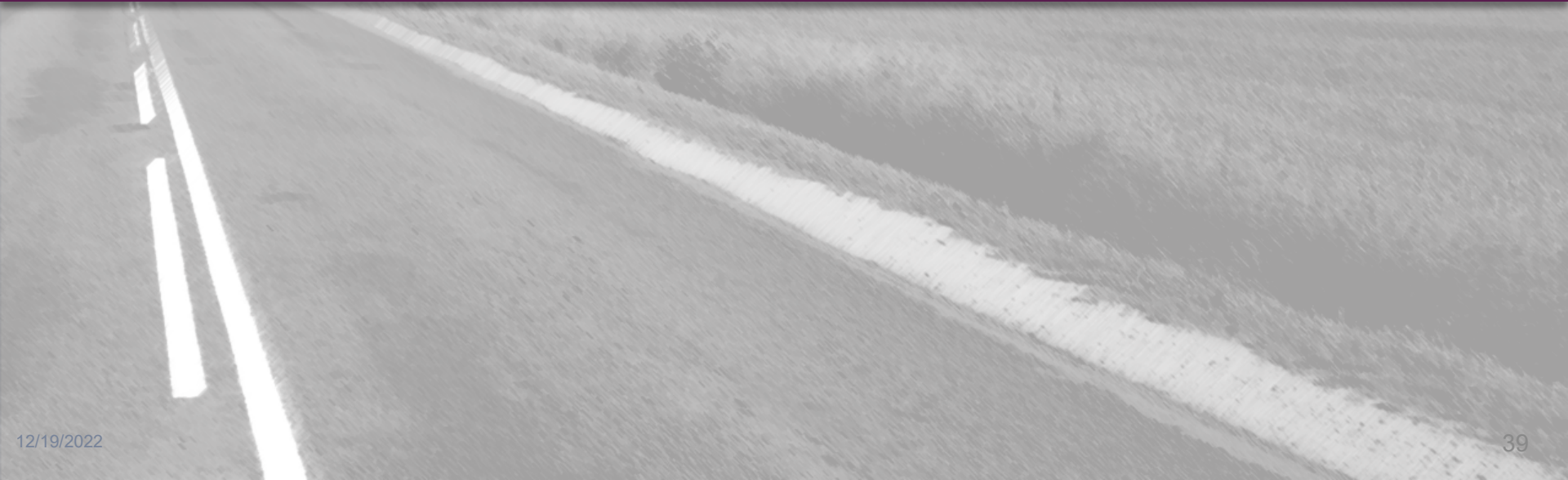
- Not Available

Typical Installation Costs

- \$150,000 to \$300,000 per curve



Rural Intersections



Streetlights (and Approaches)

Crash Reduction Factor

- 25% to 40% of nighttime crashes

Typical Installation Costs

- \$6,000 per light



LED Stop Signs

Crash Reduction Factor

- Angle crashes: 0% to 71%

Typical Installation Costs

- \$2,000 to \$6,000 per intersection





Redwood County Site Location Discussions

County Roadway Safety Plan Updates

Site Location Discussions

For each Site:

- County Overview
- Crash Facts
- Alternative Safety Strategies
- Summary

Wrap-Up

Next Steps:

- Complete systemic roadway risk-factors and high-crash data analyses
- Develop safety recommendations for priority crash locations
- Develop County Road Safety Plan draft report

Thank you for your participation and input!

Questions?

Keith Berndt– Redwood County Engineer

Keith_b@co.redwood.mn.us 507-637-4056

Tara Olds – MnDOT State Aid

tara.olds@state.mn.us 651-366-3830

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Redwood County Safety Workshop

WORKSHOP DATE: Tuesday, December 11, 2018
MEETING TIME: 10:30 AM-12:00PM (started late around 11:AM)
LOCATION: Redwood County Government Center
Commission Room
403 South Mill Street
Redwood Falls, MN

Attendees

- Keith Berndt, Redwood County
- Jenna Peterson, County Attorney
- Bob Van Hee, Commissioner, District 4
- Dave Forkrud, Commissioner, District 5
- Dennis Groebner, Commissioner District 3
- Jim Salfer, Commissioner District 2/Board Chair
- Lon Walling, Commissioner District 1
- Vicki Knobloch, County Administrator

Project Team

- Tara Olds, MnDOT
- Girma Feyissa, MnDOT
- Howard Preston, CH2M
- Cheri Marti, CH2M
- Nicole Buehne, SRF

Workshop Goals

Welcome, Introductions, and Workshop Goals

Keith Berndt – provided an intro to the County Road Safety Plan and Team

- Create a shared understanding of the County Road Safety Plan update initiative, its importance, and the systemic application of roadway safety treatments.
 - Develop a more comprehensive understanding of and discuss featured infrastructure safety strategies to reduce severe crashes in Redwood County.
-

County Roadway Safety Plan (CRSP) Updates

- **Overview of CRSP and Minnesota TZD Goals**
 - Girma presented the overview of CRSP
 - Girma showed the CRSP Video
- **Statewide Performance Measures and Data-Driven Safety Analysis**
 - Girma presented the overview of data drive
- **Overview of Proactive Systemic Safety Approach**
 - Howard reviewed the Proactive Systemic Approach and the Risk Factor Identifications.
- **Implemented Safety Projects and Redwood County Safety Approach**

- Keith listed safety projects implemented in the County.
 - Last CRSP completed in 2011
 - Projects included shoulder rumble strips
 - 55-mile ground-in
 - Went from 4-inche to 6-inch edgeline (wet reflective)
- **Redwood County Crash Data Overview and Focus Areas**
- **Infrastructure Safety Strategies Presentation & Discussion**
 - Shoulder/Edgeline Rumble Strips
 - County already implemented edgeline rumble strips in a few areas. They went with edgeline because the County has narrow shoulders.
 - Reconstruct TT to a single T Intersection
 - Keith estimated around 10 locations were reconstructed in the County.
 - Streetlights
 - The County has not installed any streetlights, yet.
 - LED Stop Signs
 - Commissioner asked how many people need to die at these intersections before the state/MnDOT will install one at TH 19 and CSAH 7.
 - The majority of right turn crashes occur because the driver picks a poor gap versus a run the light stop issue. Therefore, a LED Stop sign is not necessarily a solution.
- **Wrap Up: Next Steps and Staff Workshop Evaluation**
 - Keith thanked the commissioners and welcomed the Commissioners to join the workshop and discussion in the afternoon.



Redwood County Roadway Safety Workshop

DATE: Tuesday, December 11th, 2018
MEETING TIME: 12:00 – 4:00 PM
LOCATION: Redwood County Government Center
 Commission Room
 403 S. Mill St.
 Redwood Falls, MN

Workshop Agenda

12:00	Workshop Registration + Lunch	
	Welcome, Introductions, and Workshop Goals	
12:30	<ul style="list-style-type: none"> Create a shared understanding of CRSP and Redwood County's infrastructure roadway safety approach. Solicit and share safety stakeholder perspectives to reduce severe crashes. Develop understanding of and collaboratively explore proven infrastructure strategies for CRSP plan consideration. 	Cheri Marti, Jacobs/ Keith Berndt, County Engineer
	County Roadway Safety Plan (CRSP) Update	
12:40	<ul style="list-style-type: none"> Overview of CRSP & Data-Driven Safety Analysis Video Discussion: <i>What is important to advance road safety in the county?</i> Proactive Systemic Safety Approach 	MnDOT All Howard Preston, Jacobs
1:45	Implemented Safety Projects and Redwood County Implementation Approach	Howard/ Keith
2:00	Redwood County Crash Data Overview	Howard
2:20	Stretch Break (10 Min.)	
2:30	Featured Infrastructure Safety Strategies Discussion	All
	Priority Site Location Discussion: Intersection TH19 & CSAH7	
3:15	<ul style="list-style-type: none"> County Site Overview [10 min.] Site Crash Facts [5 min.] Alternative Safety Strategy Discussion [20 min.] 	Keith & Safety Stakeholders Howard All
3:55	Wrap Up: Next Steps + Workshop Evaluation	Cheri Marti
4:00	Adjourn	

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**Redwood County
County Roadway Safety Plan
Workshop**

December 11, 2018

County Roadway Safety Plan Updates

Discussion Goals and Agenda Review

Goals:

- Create a shared understanding of CRSP and Redwood County's infrastructure roadway safety approach.
- Solicit and share safety stakeholder perspectives to reduce severe crashes.
- Develop understanding of and collaboratively explore proven infrastructure strategies for CRSP plan consideration.

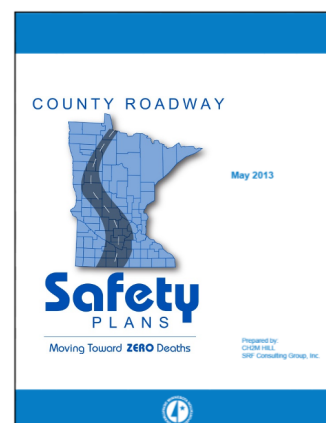
Agenda Review

Handouts Review

- Agenda
- PPT Slides
- County Rural Crash Tree
- County Urban Crash Tree
- Statewide/County Focus Area Tables
- Big Book of Ideas
- Site Location Packet
- Evaluation Form
- CRSP one-pager
- TZD one-pager
- Data-Driven Safety Analysis (DDSA) one-pager (FHWA)
- Research Syntheses/Strategy one-pagers

What is a County Roadway Safety Plan or "CRSP?"

- **Switching from a reactive to a proactive approach**
- CRSP Identifies priority location-specific safety concerns and suggested priority infrastructure improvements.
 - County segments, curves, & intersections
 - Locations that are most at risk
 - Proven safety strategies
- In 2014, initial CRSP plan created for all 87 MN counties in partnership with MnDOT and the Federal Highway Administration.
- The "CRSP Update" is an effort to continue to advance safety on county roadways.



Data-Driven Safety Analysis: Minnesota Case Study Video



Why the need for County Roadway Safety Plans?

- 60% of severe crashes (fatality or serious injury) occur on local roadways; **most severe are on county roads.**
- Local agencies are responsible for more than 90% of the state's roadway miles.
- The majority of roadway safety investments have been made on the state system.

"It will be impossible to achieve Minnesota's long-term goal of zero fatalities if minimal investment is made to address safety on local roadways"
Mitch Rasmussen, Assistant
Commissioner State Aid
Division



What is the goal of County Road Safety Plans or CRSP ?

To support the statewide initiative of moving **Minnesota Toward Zero Deaths Program** through **continued reduction of fatalities and serious injuries** on county roadways.

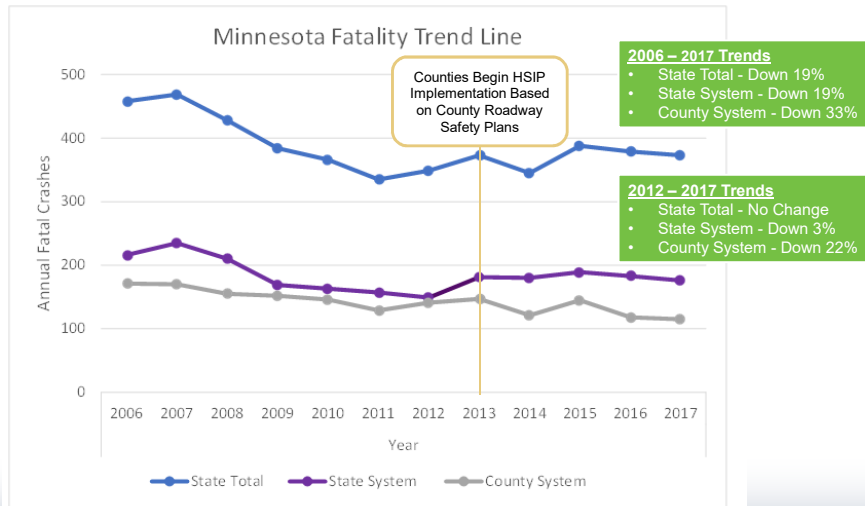
- Minnesota TZD Program:
 - Even one traffic death is unacceptable
 - Interdisciplinary approach: Engineering, Enforcement, Education, Emergency medical and trauma services
 - Partnership with community safety stakeholders
- CRSP aligns with the Minnesota Strategic Highway Safety Plan (SHSP)
- Support TZD Goal of fewer than 300 fatalities and 850 serious injuries by 2020

CRSP Funding

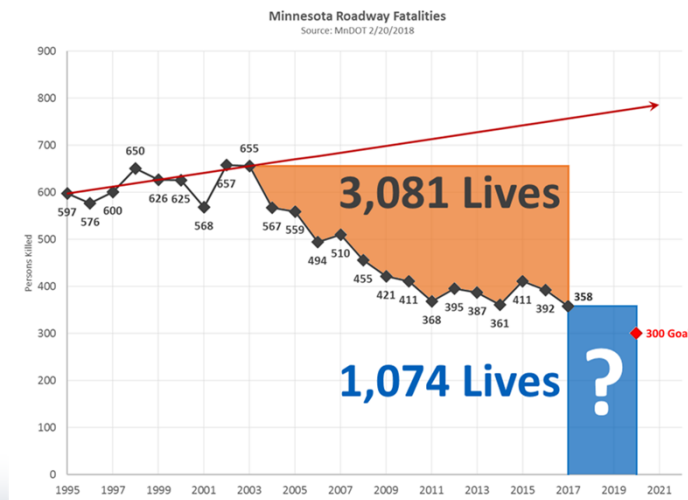
- Every Year, Minnesota receives ~\$30 Million Federal Highway safety funding
- Highway Safety Improvements Program (HSIP)
- Minnesota shares HSIP funding with the local governing agencies (about 50%)



What are the initial results of county road safety improvements?



MN Roadway Fatalities



Your thoughts...

What is important to advance road safety in the county?



Overview of Proactive Systemic Safety Approach

County Roadway Safety Plan Updates

Why Proactive Systemic Safety Approach?

Traditional method: **“high crash” locations**

- Concern: no locations met the high crash designation

The solution for local system safety analyses =
Proactive Systemic Risk Analysis

What is a Systemic Risk Analysis?

- **Analytical approach** identifies and prioritizes safety deficiencies on roads based on risk of crash
- **Identifies risk factors** based on roadway and traffic characteristics
- **Prioritizes the road system for safety investment** by documenting the number of risk factors present at each location.

What is the benefit of a systemic process?

- It leads to more effective implementation and results.
- It allows agencies to proactively deploy safety projects on at-risk locations.

With the systemic process, the answer to “*How many people have to die before you do something?*” – is Zero!

Risk Factor Identification

Segments:

- Density of Road Departure
- Traffic Volume
- Critical Curve Radius
- Access Density
- Edge Risk Assessment



Risk Factor Identification

Curves:

- ADT Range
- Radius Range
- Severe Crash on Curve
- Intersection on Curve
- Visual Trap on Curve



Risk Factor Identification

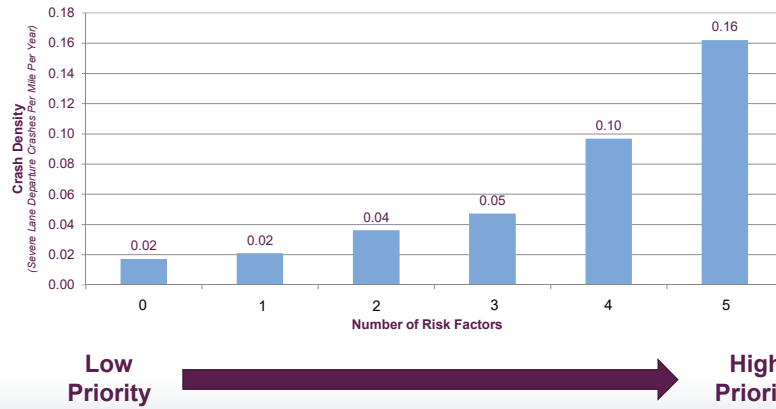
Intersections

- Skewed Approach
- On/near curve
- Volume
- Proximity to railroad crossing
- Proximity to last STOP sign
- Intersection related crashes
- Commercial Development in Quadrant



Systemic Safety Approach Works!

Higher priority segments have higher crash densities

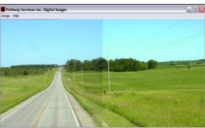


Project Form & Impact of Having a Safety Plan

CSAH 34 from CSAH 35 to PERHAM CORP LMTS Project
Agency: Otter Tail County

Roadway Data

Type: CSAH
Number: 34
Start: CSAH 35
End: PERHAM CORP LMTS
City/Rural: Rural
County: Otter Tail
ATP: 4
ADT: 1148
Facility Type: 2-Lane
Lane Width: 11
Shoulder Width: 2
Shoulder Type: gravel
Length (miles): 0.8
Rumble Installed: No



Crash Data
2005-2009 MRC/MAT Crash Data

	Total	Road Dept	K+A
Crashes	15	11	1
Density (per mile per year)	0.44	0.32	0.03
Rate (per MVM)	1.05	0.77	0.07

Ranking Criteria

	Value	Critical	Risk Ranking
ADT Range	1148	600 to 1199	*
R/D Density	0.32	0.08	+
Access Density	11.32	10.80	+
Curve Critical Radius Density	0.99	0.95	+
Edge Risk	3	2 of 3	*****

Short List of Strategies Considered

Description	Type	Cost per mi	Mileage	Cost	Notes - (if applicable 2011)
2' Shoulder Paver/RS-Safety Wedge	Proactive	\$40,000	4.8	\$1,920,000	HSIP: Project selection adjusted for Little McDonald
Rumble Strip	Proactive	\$3,000	0.0	\$0	Lake, Paul Lake and Rusch
Rumble Strip	Proactive	\$3,500	0.0	\$0	Lake, Paul Lake and Rusch
6' edgeline	Proactive	\$650	0.0	\$0	Lake shoreline properties.
Ground in Wet Reflective Markings	Proactive	\$8,500	2.0	\$17,000	

Implementation Cost

Federal Funds	\$188,894
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Implemented Safety Projects and County Implementation Approach

County Roadway Safety Plan Updates

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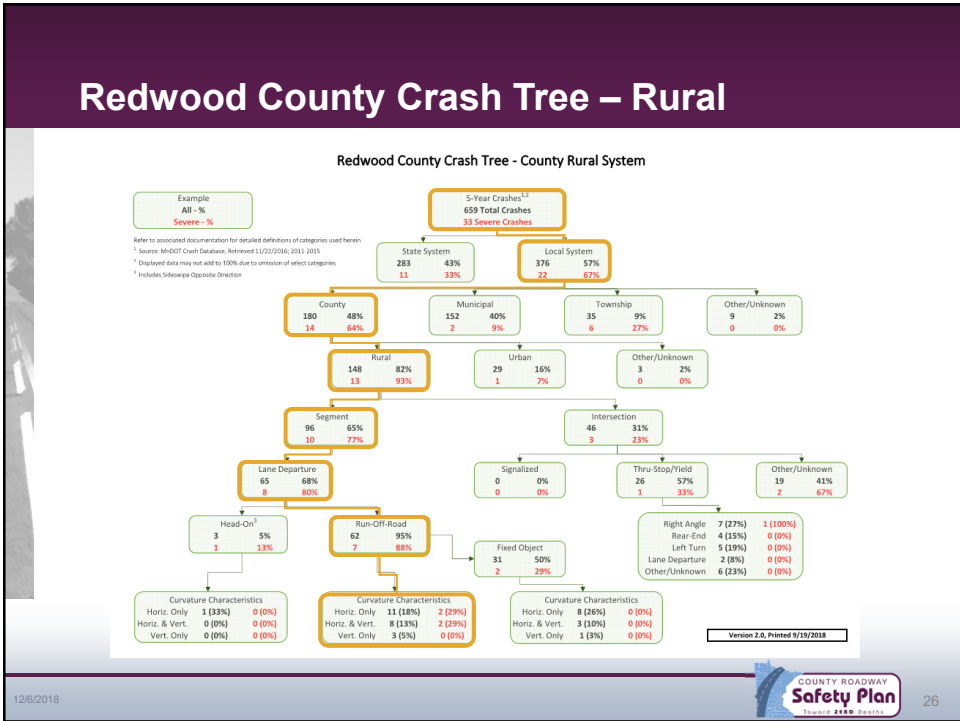
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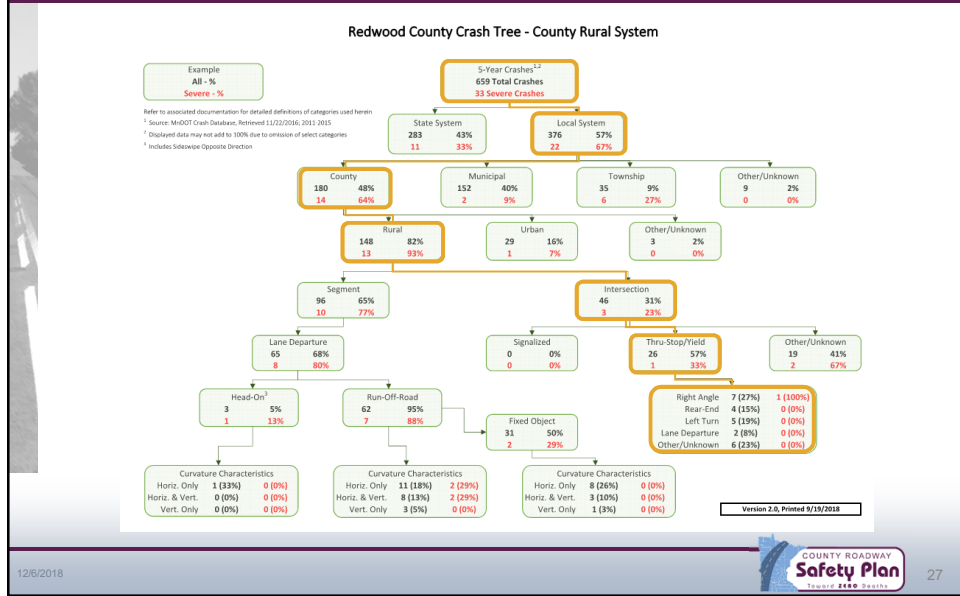


Redwood County Crash Data Overview

County Roadway Safety Plan Updates



Redwood County Crash Tree – Rural



12/6/2018

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County Versus State Crash Data - Rural

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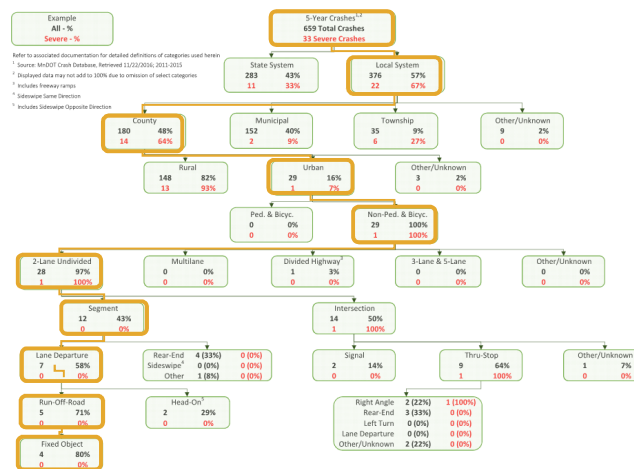
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Redwood County Crash Tree - Urban

Redwood County Crash Tree - County System Urban 2-Lane Undivided



County Versus State Crash Data - Urban

Redwood County Crash Summary - Urban

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Redwood County Crash Tree– Urban Key Takeaways

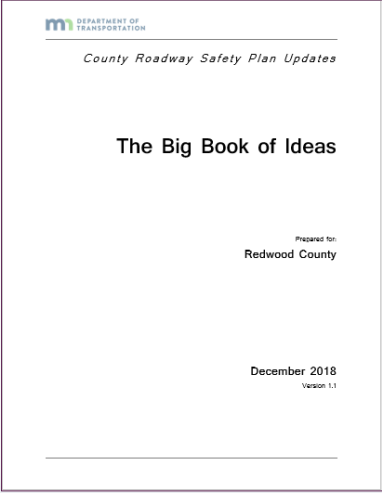
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**Redwood County
Infrastructure Safety Strategies**

County Roadway Safety Plan Updates

Big Book of Ideas




m DEPARTMENT OF
TRANSPORTATION

County Roadway Safety Plan Updates

The Big Book of Ideas

Prepared for
Redwood County

December 2018
Version 1.1



34

Rural Segments



Shoulder/ Edgeline Rumble Strips

Crash Reduction Factor

- 20% run off road crashes

Typical Installation Costs

- \$5,850 per mile



Enhanced Edgeline (6" & 8")

Crash Reduction Factor

- 10% to 45% all rural serious crashes (6")

Typical Installation Costs

- \$2,000 per mile



Shoulder Paving (2', 4', 6')

Crash Reduction Factor

- 20% to 30% run-off-the-road crashes (with shoulder rumble) (2' only)

Typical Installation Costs

- \$54,000 per mile + \$5,850 per mile (for Edge Rumble)



Clear Zone Maintenance/ Enhancements

Crash Reduction Factor

- Fatal, serious & minor Injury crashes: increase of 28% to decrease of 18%

Typical Installation Costs

- \$50,000 to \$500,000 per mile



Rural Curves



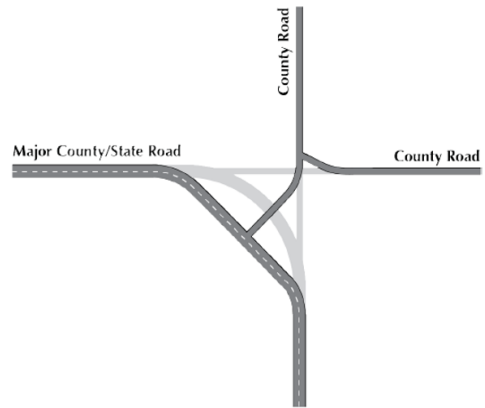
Reconstruct (TT to a Single T Intersection)

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- \$150,000 to \$300,000 per curve



Rural Intersections



Streetlights (and Approaches)

Crash Reduction Factor

- 25% to 40% of nighttime crashes

Typical Installation Costs

- \$6,000 per light



LED Stop Signs

Crash Reduction Factor

- Angle crashes: 0% to 71%

Typical Installation Costs

- \$2,000 to \$6,000 per intersection



Turn Lanes (Offset, Channelized)

Crash Reduction Factor

- Create positive offset left turn lanes ~35% (all + severe crashes)
- Channelize right turn lanes 43% - 60% (all crash severities)



Typical Installation Costs

- \$75,000 - \$250,000

12/6/2018

45



Redwood County Site Location Discussions

County Roadway Safety Plan Updates

Site Location Discussions

For each Site:

- County Overview
- Crash Facts
- Alternative Safety Strategies
- Summary

Wrap-Up

Next Steps:

- Complete systemic roadway risk-factors and high-crash data analyses
- Develop safety recommendations for priority crash locations
- Develop County Road Safety Plan draft report

Thank you for your participation and input!

Questions?

Keith Berndt– Redwood County Engineer

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County Roadway Safety Plan Updates

The Big Book of Ideas

Prepared for:
Redwood County

December 2018

Version 1.1

List of Strategies

Rural Segments

- Centerline Rumble Strip
 - Sinusoidal Rumble “Mumble” Strips included
- Shoulder/Edgeline Rumble Strips
 - Sinusoidal Rumble “Mumble” Strips included
- Safety Edge
- Enhanced Edgeline (6” & 8”)
- Shoulder Paving (2’, 4’, 6’)
- Clear Zone Maintenance/Enhancements
- Ditch/embankment Improvements
- Separated Bike Trail/Path

Rural Curves

- Chevrons
- Delineators
- High Friction Surface Treatment (HFST)
- Dynamic Curve Signing
- Lighting
- Clear Zone Maintenance/Enhancements
- Reconstruct [TT to a Single T intersection]

Rural Intersections

- Upgrade Signs and Pavement Markings
- Streetlights (and approaches)
- All-Way Stop/Yield
- Rural Intersection Conflict Warning System (RICWS)
- Offset T-Intersection
- Roundabout
- Turn Lanes (Offset, Channelized)
- Continuous Green T

- Mainline Dynamic Warning System
- LED Stop Signs
- Remove Skew / Realign Intersections

Rural Segments

Strategy	Crash Reduction Factor*	Typical Installation Costs
Centerline Rumble Strip	40% head-on/sideswipe crashes	\$3,600 per mile
Shoulder/Edgeline Rumble Strip	20% run off road crashes	\$5,850 per mile
Safety Edge	5% to 10% [§]	\$10,000 to \$20,000 per mile
Enhanced Edgeline (6" & 8")	10% to 45% all rural serious crashes (6")	\$2,000 per mile
Shoulder Paving (2', 4', 6')	20% to 30% run-off-the-road crashes (with shoulder rumble) (2' only)	\$54,000 per mile + \$5,850 per mile (for Edge Rumble)
Clear Zone Maintenance/Enhancements	Fatal, Serious & Minor Injury Crashes: Increase of 28% to Decrease of 18%	\$50,000 to \$500,000 per mile
Ditch/Embankment Improvements	32% to 41% (Adding new guardrail to embankments – Run off road crashes)	\$500,000 to \$1M per mile
Bike Paths/Trails	Not Available	\$50,000 to \$150,000 per mile
Notes: * - Crash reduction factors based on review of CMF Clearinghouse and other published research § - For all crashes		



Centerline Rumble Strips

Source: Mitigation Strategies for Design Exceptions (FHWA, FHWA-SA-07-011)



Shoulder Rumble Strips

Source: Mitigation Strategies for Design Exceptions (FHWA, FHWA-SA-07-011)



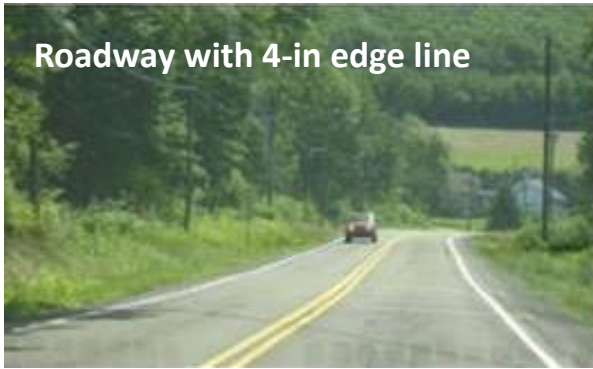
Edgeline Rumble Strips

Source: Proven Countermeasures, Longitudinal Rumble Strips and Stripes on 2-Lane Roads (FHWA)



Safety Edge

Source: FHWA Public Roads (Sept/Oct 2014; Vol. 78 No. 2)



Roadway with 4-in edge line

Enhanced Edgeline

Source: Low-Cost Treatments for Horizontal Curve Safety (FHWA, FHWA-SA-07-002)



Roadway with 8-in edge line

Enhanced Edgeline

Source: Low-Cost Treatments for Horizontal Curve Safety (FHWA, FHWA-SA-07-002)



Shoulder Paving

Source: https://mntransportationresearch.files.wordpress.com/2014/06/dsc_8665nv.jpg?w=672&h=372&crop=1



Clear Zone Maintenance

Source: <https://nativeengineering.files.wordpress.com/2016/12/3.jpg?w=300&h=204>



Ditch/Embankment Improvements

Source: <http://www.roadex.org/wp-content/uploads/elearning/drainage/5/521.jpg>



Separated Bike Path

Source: <http://www.bikethebyways.org/lakes-to-locks-passage/rouses-point-keeseville/>

Rural Curves

Strategy	Crash Reduction Factor*	Typical Installation Costs
Chevrons	20% to 30%	\$3,960 per curve
Delineators	18% to 34%†	\$500 per curve
High Friction Surface Treatment (HFST)	All Crash Types - 24% Wet Road Crash Type – 52%	\$25 to \$35 per square yard
Dynamic Curve Signing	Not Available	\$50,000 per curve
Lighting	See Rural Intersections	See Rural Intersections
Clear Zone Maintenance/Enhancements	Fatal, Serious & Minor Injury Crashes: Increase of 28% to Decrease of 18%	\$10,000 - \$250,000 per curve
Reconstruct → TT to Single T Intersection	Not Available	\$150,000 - \$300,000 per curve
Notes: * - Crash reduction factors based on review of CMF Clearinghouse and other published research † - Non-intersection, head-on, run-off-road, sideswipe, Nighttime crash types		



Chevrons

Source: Low Cost Traffic Engineering Improvements: A Primer (FHWA, FHWA-OP-03-078)



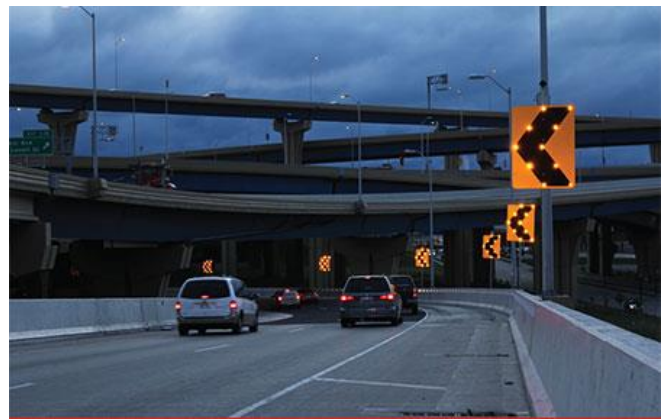
Delineators

Source: Low-Cost Treatments for Horizontal Curve Safety (FHWA, FHWA-SA-07-002)



High Friction Surface Treatment

Source: Minnesota LTAP Technology Exchange (Fall 2014, Vo. 22 No. 4)



Dynamic Curve Signing

Source: FHWA, Sequential Dynamic Curve Warning System: Product Safety Performance Evaluation (2011)



Street Lights

Source: Mitigation Strategies for Design Exceptions (FHWA, FHWA-SA-07-011)



Clear Zone Maintenance

Source: <https://nativeengineering.files.wordpress.com/2016/12/3.jpg?w=300&h=204>



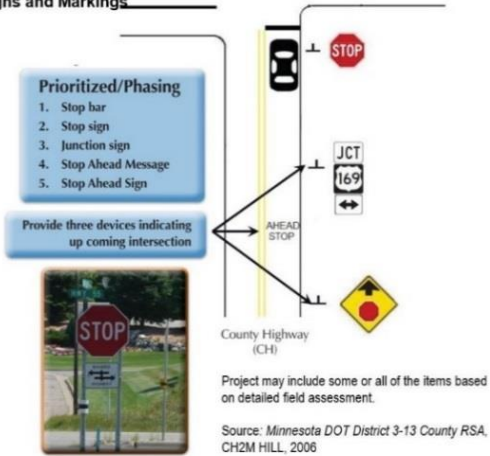
TT to T Intersection Reconstruction

Source: MnDOT 2015 Traffic Safety Fundamentals Handbook

Rural Intersection

Strategy	Crash Reduction Factor*	Typical Installation Costs
Upgrade Signs and Pavement Markings	40% upgrade of all signs and pavement markings/ 15% for STOP AHEAD pavement marking	\$2,640 per approach†
Streetlights (and approaches)	25% to 40% of nighttime crashes	\$6,000 per light
All-Way Stop/Yield	Not Available	\$1,000 per intersection
Rural Intersection Conflict Warning System (RICWS)	50% all crashes/ 75% severe right angle crashes	\$75,000 to \$125,000 per intersection
Offset T-Intersection (Convert 4-legged intersection to 2 3-legged intersection)	All Crash Types & Severities 53%	\$150,000 - \$300,000 per intersection
Roundabout	20% to 50% all crashes/ 60% to 90% right-angle crashes	\$1,000,000 per intersection
Turn Lanes (Offset, Channelized)	Create Positive Offset Left Turn Lanes - ~35% (All + Severe Crashes) Channelize Right Turn Lanes – 43% - 60% (All crash severities)	\$75,000 - \$250,000
Continuous Green T (Signalized)§	Angle Crashes – 96.8% Injury Crashes – 70% Total Crashes – 60%	\$300,000 per intersection
Mainline Dynamic Warning System@	Angle Crashes – 67% All Crashes – 54% to 70%	\$150,000 (estimated)
LED Stop Signsδ	Angle Crashes: 0% to 71%	\$2,000 to \$6,000 per intersection
Remove Skew	0% to 33%	\$150,000 - \$300,000 per intersection
<p>Notes:</p> <p>* - Crash reduction factors based on review of CMF Clearinghouse and other published research</p> <p>† - Includes \$540 per STOP sign, \$540 per junction sign assembly, \$600 per STOP AHEAD sign, \$600 per STOP AHEAD pavement marking message, and \$360 per stop bar</p> <p>§ - Source: https://safety.fhwa.dot.gov/intersection/innovative/others/casestudies/fhwas09016/fhwas09016.pdf</p> <p>@ - 2-star quality studies only</p> <p>^ - http://www.dot.state.mn.us/trafficeng/safety/medianaccelerationlanestudy.pdf</p> <p>δ – Source: http://www.its.umn.edu/Publications/ResearchReports/reportdetail.html?id=2330</p>		

Upgraded Signs and Markings



Upgrade Signs and Pavement Markings

Source: Minnesota CRSP



All-Way Stop Controlled intersection

Source: http://www.ite.org/uiig/images/type/clip_image010.jpg

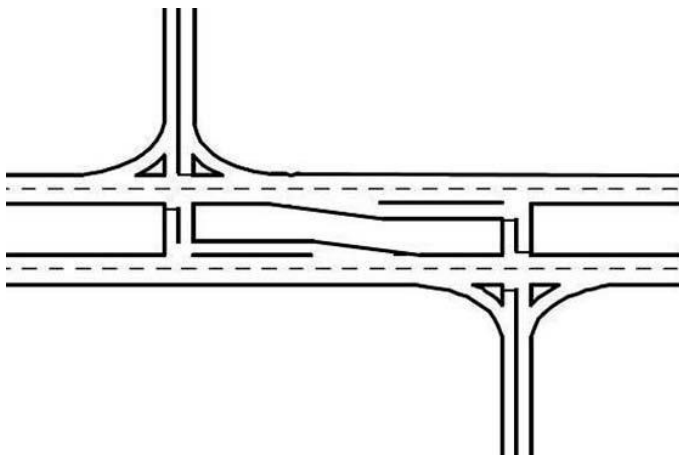
Street Lights

Source: Mitigation Strategies for Design Exceptions (FHWA, FHWA-SA-07-011)



Rural Intersection Conflict Warning System

Source: MnDOT Traffic Engineering (<http://www.dot.state.mn.us/trafficeng/signals/conflictwarning.html>)



Offset T-Intersection

Source: Alternative Intersections/Interchanges: Informational Report (FHWA, FHWA-HRT-09-060)



Roundabout

Source: Innovative Intersection Safety Improvement Strategies and Management Practices: A Domestic Scan (FHWA, FHWA-SA-06-016)



Offset Right Turn Lane

Source: Review of Iowa's Rural Intersection Crashes: Application of Methodology for Identifying Intersections for IDS (MnDOT, MN/RC 2007-27)



Continuous Green T Intersection

Source: St. Louis County, Minnesota



Mainline Dynamic Warning System

Source: Google Earth – US 169 & Mille Lacs County Road 11



LED Stop Sign

Source: MnDOT – MNTH 95 & Chisago County State Aide Highway 9



Before



After

Remove Skew

Source: Google Earth



Redwood County Safety Workshop

WORKSHOP DATE: Tuesday, December 11, 2018

MEETING TIME: 12:00 – 12:30 Registration/Lunch;
12:30 PM – 4:00 PM Safety Stakeholder Workshop;

LOCATION: Redwood County Government Center
Commission Room
403 South Mill Street
Redwood Falls, MN

Attendees

- Annette Larson, MnDOT
- Bo Hagert, Redwood County
- Bob Van Hee, Commissioner
- Dave Forkrud, Commissioner
- Jeff Bommersbach, Redwood County
- Jenna Peterson, Redwood County Attorneys Offices
- Jim Doering, City of Redwood Falls
- John Hager, MnDOT District 8
- Keith Berndt, Redwood County
- Lindsey Bruer, MnDOT
- Matthew Guetter, Redwood County
- Netty Fiedler, Southwest Regional Development Commission
- Nick Leske, United Community Action Partnership
- Ryan Becklund, Redwood County
- Todd Broadwell, MnDOT District 8 State Aid

Project Team

- Tara Olds, MnDOT
- Girma Feyissa, MnDOT
- Howard Preston, CH2M
- Cheri Marti, CH2M
- Nicole Buehne, SRF

Workshop Goals

Welcome, Introductions, and Workshop Goals

- Create a shared understanding of CRSP and Redwood County's infrastructure roadway safety approach.
 - Keith Berndt - welcomed his attendees and thanked them for their time
 - Cheri introduced the CRSP and covered objectives/goals
 - Solicit and share safety stakeholder perspectives to reduce severe crashes.
 - Develop understanding of and collaboratively explore proven infrastructure strategies for CRSP plan consideration.
-

County Roadway Safety Plan (CRSP) Updates

- **Overview of CRSP and Minnesota TZD Goals**
 - Girma presented the TZD Goals and showed the Data Driven Safety Analysis Video.
- **Discussion: What is important to advance road safety in the county?**
 - Redwood County has over representation in unbelted

- Redwood County has almost double the state percentage for older drivers (65 and older)
- Redwood County is also slightly over-represented in impaired
- Education to the Out-of-town drivers
 - How does education reach the drivers who are from out-of-town, but get in an accident in a different County? The crash data stays in the County where the crash occurred, so then education may increase due to the number of crashes the County experiences. But then, the driver who really needs the education are not benefiting from the education because they live in another County. We need to make sure education goes beyond the County where the crash occurred.
- How does weather affect roadways and crashes, especially after this summer's flooding/rain events?
 - Keith – The County needed to create some detours. They did not experience anything too extreme.
- Seatbelt rates are a little over 80%. The western region is struggling increasing above 80% where the national rate is.
- Out of County residents – TZD program is good because coalitions operate in multiple locations to get out education.
- In Redwood, there is a two county TZD coalition. Redwood and Lyon County are together. Now the question is how should the two counties pull together?
- Distracted driving is an ever-increasing problem
- **Overview of Proactive Systemic Safety Approach**
 - Howard presented on the Proactive Systemic Approach.
 - Has there been analysis on the improvements and their effects on crash data?
 - County system is down 22%.
 - Collectively what we know is that 20% occur on pavements with snow/ice. If you look at the conditions that are typical for majority of crashes it is during the day with clear weather.
 - Redwood Fall City – 1200 more people are going out of the area and 1800 coming in. It is important to get those residents out safely and return safely.
- **Implemented Safety Projects and Redwood County Safety Approach**
 - Includes 12 Counties
 - 2011 Plan for the County, some of things have been implemented
 - Wider edgeline/ground in wet reflective
- **Redwood County Crash Data Overview and Focus Areas**
 - Howard presented on the Crash Trees
- **Infrastructure Safety Strategies Presentation & Discussion**
 - Edgeline rumble strips
 - Implemented the first project recently
 - Mumble strips
 - Significantly, reduced noise
 - Also, reduced the complaints from motorcyclists (anecdotal)
 - Enhanced Edgelines (6" or 8")
 - Implemented the first project recently (6")
 - Shoulder Paving (2', 4', 6')
 - County is beginning to implement.
 - Clear Zone Maintenance/Enhancements
 - Limit the location of this strategy with locations where crashes occurred.

- Reconstruct TT to single T intersections
- Rural Intersection Streetlights
 - Statistically significant strategy
 - Do we have solar streetlights?
 - In Minnesota, with the weather, a battery is required. But, the battery life would not support the time the lights are needed. However, down the line, technology will catch up.
 - District 4 installed a few lights on 15. However, they are not very bright.
 - The literature also talks about a day time crash reduction from streetlights.
- LED Stop Signs
 - 95% confidence that the LED Stops signs reduce angle crashes 0-71%
 -
- RICWS
 - Only flashes when cars are approaching: Howard asked if this would be something to consider. Keith will let us know if this is a strategy to be considered.
- Turn Lanes
 - As part of Systemic approach, need to have a prior crash for HSIP funds to support offset, channelized turn lanes
- **Site Specific Location Discussion**
 - **TH 19 and CSAH 7**
 - Six crashes over the period of 10 years. The majority of crashes were daylight.
 - Some are distracted, speed, failure to yield
 - Keith shared:
 - Farmstead on the southwest quadrant with large trees – issue of sight lines
 - No stop bars exist. The stop sign is more than likely 30-40 feet back, which poses a sight issue especially in rural areas with farmland, ditches, trees, etc.
 - Existing
 - Streetlight on the Northeast quadrant
 - Transverse Rumble Strips
 - Stop Ahead sign in the South
 - LED Stop sign on the stop ahead in the South
 - Increased stop signs to 48" (After 2011)
 - Thinned out grove/tree in south quadrant
 - Potential strategies
 - Stop bar is 8-10 feet from the edge of the through lane.
 - RICWS may be an option. However, the cost is significantly higher.
 - Loop detector is used at the stop sign. However, if the vehicle doesn't stop, will the car still be detected?
 - The System can be engineered a certain way to manipulate the system to activate for both ways.
 - RICWS has two designs
 - Warning on major road showing that there may be conflict on the minor road. (Most popular)

- In Minnesota, some have put it on the minor road to aid drivers in choosing a gap/stop assist. The one issue is that drivers may depend on the sign and look there to choose a gap rather than looking at the road.
 - MnDOT does put the loop on the minor road.
 - Efforts with law enforcement and the crash data to identify the best strategies moving forward.
 - Streetlight in the SW quadrant
 - Review Signs obstructing the visibility at the intersection, especially going South looking West and East.
- **Wrap Up: Next Steps and Staff Workshop Evaluation**



Appendix D – List of Prioritized Locations

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Rural Segment Prioritization for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No	Project Page No.	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Length [miles]	ADT [vpd]	Speed Limit	ADT Single-Vehicle	ADT Multi-Vehicle	Access Density	Curve Density	Edge Risk	Total Stars
47	1	2.005	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	11.01	1338	★	★	★	★	★		★★★★★
4	2	1.004	CSAH	1	Intersection of CSAH1 and MN 67	Intersection of CSAH 1 and US 71	1.72	1975	★	★	★	★			★★★★
28	3	13.002	CSAH	13	Intersection of CSAH13 and MN 67	Intersection of CSAH 13 and CSAH 2	5.15	1500	★	★	★	★			★★★★
58	4	32.001	CSAH	32	2.0 Miles West of Intersection of CSAH32 and MN 68	Intersection of CSAH 32 and MN 68	2.00	1350	★	★	★	★			★★★★
63	5	46.001	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	4.59	560	★	★	★	★	★		★★★★
64	6	5.001	CSAH	5	Intersection of CSAH55 and CSAH 7	Intersection of CSAH 5 and Clark St	1.50	790	★	★	★	★	★		★★★★
69	7	6.003	CSAH	6	Intersection of CSAH6/Ilex St and US 14	2790 ft North of Intersection of CSAH 6 and of 130th St	1.00	1300	★	★	★	★	★		★★★★
75	8	6.009	CSAH	6	3497 ft North of Intersection of CSAH6 and 400th St	.16 Miles North of Intersection of 410th St and CSAH 6	1.04	760	★	★	★	★	★		★★★★
10	9	101.004	CSAH	101	Intersection of CSAH101 and US 71	400 ft South of Intersection of CSAH 101 and of Burr Oak Rd	0.81	2850			★	★	★		★★★
12	10	101.006	CSAH	101	2415 north of Intersection of CSAH101/Main St and Burr Oak Rd	56 ft South of Intersection of CSAH 101 and of Front St	0.29	2850			★	★	★		★★★
13	11	101.007	CSAH	101	56ft south of Intersection of CSAH101/River Rd and Front St	116 ft South of Intersection of CSAH 101 and of Cedar Cliff Rd	0.39	2250			★	★	★		★★★
27	12	13.001	CSAH	13	Intersection of CSAH13 and 160 St	Intersection of CSAH 13 and MN 67	11.87	890	★	★	★	★			★★★
34	13	15.004	CSAH	15	66 ft East of Intersection of CSAH15/E Central St and Public St	Intersection of CSAH 15 and US 71	0.17	520		★	★	★	★		★★★
41	14	17.005	CSAH	17	Intersection of CSAH17/Laser Ave and MN 67	Intersection of CSAH 17 and CSAH 9	5.41	745	★	★	★	★			★★★
49	15	24.001	CSAH	24	Intersection of CSAH24 and MN 67	1823 ft West of Intersection of CSAH 24 and of CSAH 2	4.66	2350	★		★	★			★★★
51	16	25.002	CSAH	25	Intersection of CSAH25/River Rd W and Laser Ave	Intersection of CSAH 25 and CSAH 101	2.33	755	★	★	★	★			★★★
57	17	30.004	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	4.42	240	★		★	★	★		★★★
61	18	45.001	CSAH	45	.46 Miles West of Intersection of CSAH45/310th Ave and 241st St	Intersection of CSAH 45 and 310th Ave	0.47	580	★	★	★	★			★★★
67	19	6.001	CSAH	6	Intersection of CSAH 6 and 100th St	Intersection of CSAH 6 and 120th St	2.02	790	★	★	★	★			★★★
70	20	6.004	CSAH	6	2790 ft North of Intersection of CSAH6 and 130th St	Intersection of CSAH 6 and MN 68	10.52	960	★	★	★	★			★★★
72	21	6.006	CSAH	6	Intersection of CSAH6 and North St	575 ft North of Intersection of CSAH 6 and of CSAH 12	3.79	1100	★	★	★	★			★★★
73	22	6.007	CSAH	6	575 ft North East of Intersection of CSAH6/280th St and CSAH 12	Intersection of CSAH 6 and MN 67	6.68	860	★	★	★	★			★★★
74	23	6.008	CSAH	6	Intersection of CSAH6/West St and MN 67	3497 ft North of Intersection of CSAH 6 and of 400th St	6.69	880	★	★	★	★			★★★
80	24	7.004	CSAH	7	Intersection of CSAH7 and MN 19	Intersection of CSAH 7 and Marion Ave	4.16	1075	★	★	★	★			★★★
82	25	7.006	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	6.41	610	★	★	★	★	★		★★★
91	26	9.005	CSAH	9	75 ft East of Intersection of CSAH9/North Ave and East St	Intersection of CSAH 9 and CSAH 17	1.49	540	★	★	★	★			★★★
1	27	1.001	CSAH	1	Intersection of CSAH1 and 220th St	542 ft North of Intersection of CSAH 1 and of Noble St	6.63	290	★					★	★★
3	28	1.003	CSAH	1	Intersection of CSAH1 and CSAH 16	Intersection of CSAH 1 and MN 67	8.90	375	★			★			★★
9	29	101.001	CSAH	101	Intersection of CSAH101/Normand le Rd and US 71	Intersection of CSAH 101 and Magnolia Ave	0.57	1250		★	★	★			★★
11	30	101.005	CSAH	101	400 ft South of Intersection of CSAH101 and Burr Oak RD	Intersection of CSAH 101 and 2415 North of Burr Oak Rd	0.53	2850			★	★	★		★★
20	31	11.001	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St	5.44	485	★			★	★		★★
21	32	11.002	CSAH	11	3982 ft North of Intersection of CSAH11 and 350th St	1.53 Miles North of Intersection of CSAH 11 and 350th St	0.80	480	★			★	★		★★
23	33	115.002	CSAH	115	606 ft North of Intersection of CSAH115/Main St and E Johns St	Intersection of CSAH 115 and US 71	0.49	870	★	★	★	★			★★
29	34	133.001	CSAH	133	Intersection of CSAH133/245th St and Ideal Ave	537 ft West of Intersection of CSAH 133 and of Perry St	0.25	560		★	★	★			★★
35	35	16.001	CSAH	16	Intersection of CSAH16 and US 71	Intersection of CSAH 16 and Center St	3.48	390	★			★	★		★★
37	36	16.003	CSAH	16	Intersection of CSAH16 and Elm St	Intersection of CSAH 16 and CSAH 2	6.17	240	★			★	★		★★
40	37	17.003	CSAH	17	812 ft North East of Intersection of CSAH17 and S Railroad St	Intersection of CSAH 17 and MN 68	6.59	250	★			★	★		★★
44	38	2.002	CSAH	2	Intersection of CSAH2 and CSAH 4	Intersection of CSAH 2 and Tempel Dr	4.79	325	★			★	★		★★
46	39	2.004	CSAH	2	Intersection of CSAH2/Carleton Ave and Front St	45 ft North of Intersection of CSAH 2 and of Reetz St	0.45	1175		★	★	★	★		★★
48	40	20.001	CSAH	20	Intersection of CSAH20 and Lyon Redwood Rd	Intersection of CSAH 20 and 8th St	6.00	502	★	★	★	★			★★
50	41	24.002	CSAH	24	1823 ft West of Intersection of CSAH24 and CSAH 2	Intersection of CSAH 24 and CSAH 2	0.34	2350			★	★	★		★★
52	42	27.001	CSAH	27	Intersection of CSAH27 and Frontier Ave	Intersection of CSAH 27 and CSAH 7	1.02	160	★			★	★		★★
53	43	3.001	CSAH	3	Intersection of CSAH3 and MN 68	1108 ft East of Intersection of CSAH 3 and of CSAH 102	0.49	870		★	★	★	★		★★
54	44	3.002	CSAH	3	1108 ft East of Intersection of CSAH3 and CSAH 102	Intersection of CSAH 3 and 340th Ave	2.44	870	★	★	★	★			★★
60	45	4.002	CSAH	4	Intersection of CSAH4 and CSAH 1	Intersection of CSAH 4 and 340th Ave	8.95	185	★			★	★		★★
66	46	5.003	CSAH	5	Intersection of CSAH5/8th St and N Boundary St	Intersection of CSAH 5 and MN 19	16.04	429	★			★	★		★★
68	47	6.002	CSAH	6	Intersection of CSAH6/S Ilex St and 120th St	Intersection of CSAH 6 and US 14	0.54	1450		★	★	★	★		★★
77	48	7.001	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	21.25	152	★			★	★		★★
81	49	7.005	CSAH	7	Intersection of CSAH7/S Main St and Marrion Ave	747 ft North of Intersection of CSAH 7 and of Elevator Ave	0.47	1250		★	★	★	★		★★
83	50	78.001	CR	78	Intersection of CR78 and CSAH 20	Intersection of CR 78 and CSAH 5	2.31	115				★	★		★★
85	51	8.002	CSAH	8	Intersection of CSAH8 and MN 19	Intersection of CSAH 8 and CSAH 46	5.78	158	★			★	★		★★
87	52	9.001	CSAH	9	Intersection of CSAH9 and Frontier Ave	Intersection of CSAH 9 and CSAH 7	1.52	450	★			★	★		★★
5	53	10.001	CSAH	10	Intersection of CSAH10 and Evergreen Ave	389 ft South of Intersection of CSAH 10 and of 4th St	14.42	248	★			★	★		★
6	54	10.002	CSAH	10	389 ft South of Intersection of CSAH10/Main St and 4th St	Intersection of CSAH 10 and 250th St	0.50	610		★	★	★	★		★
7	55	10.003	CSAH	10	Intersection of CSAH10 and 250th St	Intersection of CSAH 10 and E High St	6.26	430	★			★	★		★
15	56	105.001	CSAH	105	Intersection of CSAH105 and US 14	Intersection of CSAH 105 and 8th St	0.28	647			★	★	★		★
16	57	106.001	CSAH	106	Intersection of CSAH106/S Birch St and 9th Ave E	Intersection of CSAH 106 and 1st Ave E	0.57	890			★	★	★		★
17	58	106.002	CSAH	106	Intersection of CSAH106/1st Ave W and S Birch St	Intersection of CSAH 106 and Ilex St	0.36	950			★	★	★		★
22	59	115.001	CSAH	115	Intersection of CSAH115/Main St and E Central St	606 ft North of Intersection of CSAH 115 and of E Johns St	0.38	910			★	★	★		★
24	60	117.001	CSAH	117	Intersection of CSAH117/Main St and Oak St	65 ft East of Intersection of CSAH 117 and of N Railroad St	0.09	275					★		★
25	61	12.001	CSAH	12	Intersection of CSAH12/208th St and MN 19	Intersection of CSAH 12 and CSAH 7	7.24	242	★			★	★		★
26	62	127.001	CSAH	127	Intersection of CSAH127/CSAH 127 and Frontier Ave	Intersection of CSAH 127 and US 14	0.36	162	★			★	★		★
30	63	133.002	CSAH	133	537 ft West of Intersection of CSAH133/Main St and Perry St	Intersection of CSAH 133 and CSAH 6	0.76	608		★	★	★	★		★
31	64	15.001	CSAH	15	Intersection of CSAH15/9th Ave W and S Ilex St	404 ft East of Intersection of CSAH 15 and of S Birch St	0.51	528		★	★	★	★		★
32	65	15.002	CSAH	15	404 ft East of Intersection of CSAH15 and S Birch St	187 ft West of Intersection of CSAH 15 and S Yeager St	7.09	412				★	★		★
33	66	15.003	CSAH	15	187 ft West Intersection of E Central St and S Yeager St of CSAH15/0	66 ft East of Intersection of CSAH 15 and of Public St	0.53	470					★		★
36	67	16.002	CSAH	16	Intersection of CSAH16 and Center St	Intersection of CSAH 16 and Elm St	0.29	620			★	★	★		★
38	68	17.001	CSAH	17	Intersection of CSAH17/Justice Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	5.60	245	★			★	★		★
39	69	17.002	CSAH	17	118 ft North of Intersection of CSAH17 and 180th St	812 ft North of Intersection of CSAH 17 and of S Railroad St	0.32	245					★		★
42	70	18.001	CSAH	18	Intersection of CSAH18/CSAH 18 and MN 68	Intersection of CSAH 18 and CSAH 7	4.99	277	★			★	★		★
43	71	2.001	CSAH	2	Intersection of CSAH2 and 160 St	Intersection of CSAH 2 and CSAH 4	4.01	375	★			★	★		★
45	72	2.003	CSAH	2	Intersection of CSAH2/S Somerville St and Tempel Dr	Intersection of CSAH 2 and MN 68	0.27	1150			★	★	★		★
55	73	30.002	CSAH	30	Intersection of CSAH30/Center St and CSAH 8	Intersection of CSAH 30 and MN 19	5.53	230	★			★	★		★
56	74	30.003	CSAH	30	Intersection of CSAH30/E Centre St and MN 19	Intersection of CSAH 30 and CSAH 10	0.50	570			★	★	★		★
59	75	4.001	CSAH	4	Intersection of CSAH4/190th St and Acorn Ave	Intersection of CSAH 4 and CSAH 1	27.11	220	★			★	★		★

Rural Segment Prioritization for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No	Project Page No.	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Length [miles]	ADT [vpd]	Speed Limit	ADT Single-Vehicle	ADT Multi-Vehicle	Access Density	Curve Density	Edge Risk	Total Stars
62	76	45.002	CSAH	45	1262 ft West of Intersection of CSAH45/200th St and Eagle Ave	Intersection of CSAH 45 and Evergreen Ave	1.30	120	★						★
65	77	5.002	CSAH	5	Intersection of CSAH5/8th St and Clark St	Intersection of CSAH 5 and N Boundary St	0.63	1200		★					★
71	78	6.005	CSAH	6	Intersection of CSAH6 and MN 68	Intersection of CSAH 6 and North St	0.28	1100		★					★
76	79	63.002	CR	63	Intersection of CR63/Center St and South St	Intersection of CR 63 and CSAH 16	0.34	122						★	★
79	80	7.003	CSAH	7	200 ft North of Intersection of CSAH 7 and 295th Ave	Intersection of CSAH 7 and MN 19	4.22	470				★			★
84	81	8.001	CSAH	8	Intersection of CSAH8 and US 14	Intersection of CSAH 8 and MN 68	11.25	360	★						★
88	82	9.002	CSAH	9	Intersection of CSAH9/380th St and CSAH 7	1297 ft East of Intersection of CSAH 9 and of CSAH 7	0.25	455				★			★
89	83	9.003	CSAH	9	1297 ft East of Intersection of CSAH9/380th St and CSAH 7	127 ft West of Intersection of CSAH 9 and of CSAH 6	5.21	455	★						★
90	84	9.004	CSAH	9	127 ft West of Intersection of CSAH9/North Ave and CSAH 6	75 ft East of Intersection of CSAH 9 and of St	0.54	540		★					★
2	85	1.002	CSAH	1	542 ft NorthWest of Intersection of CSAH1 and Noble St	Intersection of CSAH 1 and CSAH 16	0.58	378							
8	86	10.004	CSAH	10	Intersection of CSAH10/Center St and E High St	Intersection of CSAH 10 and CSAH 30	0.25	355							
14	87	102.001	CSAH	102	Intersection of CSAH102/3rd St and Carleton Ave	Intersection of CSAH 102 and CSAH 3	0.60	405							
18	88	107.001	CSAH	107	Intersection of CSAH107/Oak St and Main St	Intersection of CSAH 107 and CSAH 7	0.21	130							
19	89	109.001	CSAH	109	200 ft South of Intersection of CSAH109/3rd St and Franklin Ave	Intersection of CSAH 109 and North Ave	0.18	180							
78	90	7.002	CSAH	7	513 ft South of Intersection of CSAH 7 and Elm St	200 ft North of Intersection of CSAH 7 and of 295th Ave	0.39	445							
86	91	80.001	CR	80	1589 ft South of Intersection of CR80/Duncan Ave and US 14	Intersection of CR 80 and US 14	2.01	198							

Total Length (Miles) 329.05

	Count	Percent
★★★★★	0	0%
★★★★	1	1%
★★★	7	8%
★★	18	20%
★	26	29%
	32	35%
	7	8%
	91	100%

	Count of Stars --	51	43	14	43	18	2
Percent of Stars --	56%	47%	15%	47%	20%	2%	

Curve Prioritization for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Radius [feet]	ADT [vpd]	Lane Width [feet]	High Side Shoulder Type	Total Cross Section Width [feet]	Adjacent Intersection	Visual Trail	Outside Edge Risk	Total Stars
23	1	17.002	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	★	★	★	★		★	★	★	★★★★★★
22	2	17.001	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	★	★	★	★		★	★	★	★★★★★★
21	3	15.004	CSAH	15	66 ft East of Intersection of CSAH15/E Central St and Public St	Intersection of CSAH 15 and US 71	★	★			★	★	★	★	★★★★★★
47	4	5.001	CSAH	5	Intersection of CSAH55 and CSAH 7	Intersection of CSAH 5 and Clark St	★	★		★	★	★		★	★★★★★★
39	5	30.002	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	★	★	★		★	★	★		★★★★★★
46	6	46.003	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	★	★		★	★	★		★	★★★★★★
20	7	15.002	CSAH	15	404 ft East of Intersection of CSAH15 and S Birch St	187 ft West of Intersection of CSAH 15 and S Yeager St	★	★		★	★	★	★		★★★★★★
43	8	45.001	CSAH	45	.46 Miles West of Intersection of CSAH45/310th Ave and 241st St	Intersection of CSAH 45 and 310th Ave	★			★	★	★	★	★	★★★★★★
29	9	2.002	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71		★	★	★	★				★★★★
52	10	7.001	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	★		★	★		★			★★★★
18	11	11.006	CSAH	11	3982 ft North of Intersection of CSAH11 and 350th St	1.53 Miles North of Intersection of CSAH 11 and 350th St	★	★		★	★				★★★★
24	12	17.003	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	★	★	★	★				★	★★★★
28	13	18.001	CSAH	18	Intersection of CSAH18/CSAH 18 and MN 68	Intersection of CSAH 18 and CSAH 7	★	★		★	★	★			★★★★
13	14	11.001	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St	★	★	★			★		★	★★★★
53	15	7.002	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	★			★		★	★	★	★★★★
26	16	17.005	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	★		★	★		★		★	★★★★
27	17	17.006	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	★			★	★	★		★	★★★★
40	18	30.003	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	★	★	★		★		★		★★★★
64	19	8.001	CSAH	8	Intersection of CSAH8 and MN 19	Intersection of CSAH 8 and CSAH 46	★			★	★	★		★	★★★★
45	20	46.002	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	★	★		★	★	★		★	★★★★
44	21	46.001	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave		★		★	★	★		★	★★★★
30	22	2.003	CSAH	2	Intersection of CSAH2/S Somerville St and Tempel Dr	Intersection of CSAH 2 and MN 68		★	★	★	★	★		★	★★★★
54	23	7.003	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	★			★		★		★	★★★★
25	24	17.004	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St		★	★	★				★	★★★★
55	25	7.004	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	★			★		★		★	★★★★
56	26	7.005	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	★			★		★		★	★★★★
3	27	1.003	CSAH	1	Intersection of CSAH1 and CSAH 16	Intersection of CSAH 1 and MN 67	★	★	★					★	★★★★
4	28	1.004	CSAH	1	Intersection of CSAH1 and CSAH 16	Intersection of CSAH 1 and MN 67		★	★			★		★	★★★★
31	29	2.004	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	★	★		★	★				★★★★
33	30	2.006	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71			★	★	★	★			★★★★
34	31	2.007	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71			★	★	★	★		★	★★★★
7	32	101.003	CSAH	101	Intersection of CSAH101 and Magnolia Ave	42 ft South of Intersection of CSAH 101 and of E 2nd St	★			★		★		★	★★★★
42	33	30.005	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	★	★	★		★				★★★★
57	34	7.006	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	★	★		★		★			★★★★
19	35	15.001	CSAH	15	404 ft East of Intersection of CSAH15 and S Birch St	187 ft West of Intersection of CSAH 15 and S Yeager St		★		★	★	★			★★★★
68	36	78.004	CR	78	Intersection of CR78 and CSAH 20	Intersection of CR 78 and CSAH 5			★	★	★			★	★★★★
15	37	11.003	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St		★			★	★		★	★★★★
14	38	11.002	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St		★		★	★			★	★★★★
17	39	11.005	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St		★		★	★			★	★★★★
16	40	11.004	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St	★	★		★	★				★★★★
58	41	7.007	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	★	★		★		★			★★★★
62	42	7.011	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	★	★		★		★		★	★★★★
65	43	78.001	CR	78	Intersection of CR78 and CSAH 20	Intersection of CR 78 and CSAH 5	★				★			★	★★★
48	44	6.001	CSAH	6	Intersection of CSAH6 and North St	575 ft North of Intersection of CSAH 6 and of CSAH 12	★			★		★			★★★
49	45	6.002	CSAH	6	575 ft North East of Intersection of CSAH6/280th St and CSAH 12	Intersection of CSAH 6 and MN 67	★			★		★			★★★
2	46	1.002	CSAH	1	Intersection of CSAH1 and CSAH 16	Intersection of CSAH 1 and MN 67		★	★					★	★★★
32	47	2.005	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71			★	★	★				★★★
11	48	101.007	CSAH	101	2415 north of Intersection of CSAH101/Main St and Burr Oak Rd	56 ft South of Intersection of CSAH 101 and of Front St	★			★		★			★★★
12	49	101.010	CSAH	101	116 ft South of Intersection of CSAH101 and Cedar Cliff Rd	.35 Miles North of Intersection of River Rd W and CSAH 101	★			★		★			★★★
41	50	30.004	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7			★		★	★			★★★
66	51	78.002	CR	78	Intersection of CR78 and CSAH 20	Intersection of CR 78 and CSAH 5	★				★			★	★★★
67	52	78.003	CR	78	Intersection of CR78 and CSAH 20	Intersection of CR 78 and CSAH 5				★	★			★	★★★
51	53	6.004	CSAH	6	3497 ft North of Intersection of CSAH6 and 400th St	.16 Miles North of Intersection of 410th St and CSAH 6		★		★		★			★★★
60	54	7.009	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7		★		★		★			★★★
63	55	7.012	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	★	★		★					★★★
1	56	1.001	CSAH	1	Intersection of CSAH1/Lesueur and 100th St W	Intersection of Independence Ave and 100th St W		★						★	★★
5	57	101.001	CSAH	101	Intersection of CSAH101 and Magnolia Ave	42 ft South of Intersection of CSAH 101 and of E 2nd St				★		★			★★
6	58	101.002	CSAH	101	Intersection of CSAH101 and Magnolia Ave	42 ft South of Intersection of CSAH 101 and of E 2nd St				★		★			★★
8	59	101.004	CSAH	101	Intersection of CSAH101 and US 71	400 ft South of Intersection of CSAH 101 and of Burr Oak Rd				★		★			★★
9	60	101.005	CSAH	101	400 ft South of Intersection of CSAH101 and Burr Oak RD	Intersection of CSAH 101 and 2415 North of Burr Oak Rd				★		★			★★
10	61	101.006	CSAH	101	400 ft South of Intersection of CSAH101 and Burr Oak RD	Intersection of CSAH 101 and 2415 North of Burr Oak Rd	★			★					★★
59	62	7.008	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7		★		★					★★
61	63	7.010	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7		★		★					★★
35	64	2.008	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	★				★				★★
36	65	2.009	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	★				★				★★
37	66	2.010	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	★				★				★★

Curve Prioritization for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Radius [feet]	ADT [vpd]	Lane Width [feet]	High Side Shoulder Type	Total Cross Section Width [feet]	Adjacent Intersection	Visual Trail	Outside Edge Risk	Total Stars
38	67	2.011	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71					★				★
50	68	6.003	CSAH	6	3497 ft North of Intersection of CSAH6 and 400th St	.16 Miles North of Intersection of 410th St and CSAH 6		★							★

Stars	Count	Percent
★★★★★★★	0	0%
★★★★★★	2	3%
★★★★★	6	9%
★★★★	14	21%
★★★	20	29%
★★	13	19%
★	11	16%
	2	3%
	0	0%
Total	68	100%

Count of Stars --	41	37	20	50	34	37	8	36
Percent of Stars --	60%	54%	29%	74%	50%	54%	12%	53%

Rural Intersection Prioritization for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach	Minor Approach	Context Zone	Total Entering ADT or Cross Product	Leg Configuration	Alignment Skew [degrees]	Adjacent RR Crossing	Adjacent Curve	Adjacent Commercial Development	Previous Stop (>5 Mi)	Major Approach Speed Limit	Major Approach Turn Lane Configuration	Total Stars
98	1	6.004	CSAH	6	US 14	CSAH 6 (Ilex St)	★	★	★	★	★			★			★★★★★
22	2	105.001	CSAH	105	US 14	CSAH 105 (6th St)	★	★	★		★			★			★★★★★
24	3	115.001	CSAH	115	US 71	CSAH 155 (Main St)		★		★		★		★	★		★★★★★
28	4	127.001	CSAH	127	CSAH 127 (1st St)	CR 50 (Main St)	★		★	★	★			★			★★★★★
44	5	17.003	CSAH	17	CSAH 17 (Railroad St)	CSAH 117 (Main St)	★		★	★		★		★			★★★★★
48	6	17.007	CSAH	17	MN 68	CSAH 17 (Kenwood Ave)			★	★		★		★	★		★★★★★
55	7	2.006	CSAH	2	MN 68 (Front St)	CSAH 2 (Sommerville St)	★	★	★	★				★			★★★★★
68	8	30.003	CSAH	30	MN 19	CSAH 30 (Center St)	★	★	★			★		★			★★★★★
86	9	5.004	CSAH	5	US 14	CSAH 5 (8th St)	★	★	★		★			★			★★★★★
10	10	10.002	CSAH	10	US 14	CSAH 10		★	★		★			★			★★★★
34	11	13.005	CSAH	13	MN 67	CSAH 13		★	★	★				★			★★★★
40	12	15.004	CSAH	15	US 71	CSAH 15 (Central St)		★	★			★			★		★★★★
57	13	2.008	CSAH	2	US 71	CSAH 2		★				★		★	★		★★★★
79	14	4.009	CSAH	4	US 71	CSAH 4		★	★					★	★		★★★★
85	15	5.003	CSAH	5	CSAH 5 (8th St)	CSAH 20	★		★		★			★			★★★★
97	16	6.003	CSAH	6	CSAH 6 (Ilex St)	CSAH 106 (1st Ave W)	★		★	★	★						★★★★
102	17	6.008	CSAH	6	MN 68	CSAH 6		★	★					★	★		★★★★
103	18	6.009	CSAH	6	MN 19	CSAH 6		★						★	★	★	★★★★
104	19	6.010	CSAH	6	MN 19	CSAH 6		★						★	★	★	★★★★
118	20	7.014	CSAH	7	MN 19	CSAH 7		★	★					★	★		★★★★
125	21	8.001	CSAH	8	US 14	CSAH 8		★	★					★	★		★★★★
129	22	8.005	CSAH	8	MN 68	CSAH 8				★		★		★	★		★★★★
130	23	8.006	CSAH	8	MN 68 (Euclid Ave)	CSAH 32		★	★					★	★		★★★★
131	24	8.007	CSAH	8	MN 19	T 159 (Balsa Ave)		★	★					★	★		★★★★
139	25	76.001	CR	76	MN 68	CSAH 6	★	★	★					★			★★★★
8	26	1.008	CSAH	1	MN 67	CSAH 1		★		★				★			★★★
14	27	10.006	CSAH	10	MN 68	CSAH 10			★					★	★		★★★
21	28	102.001	CSAH	102	CSAH 2 (Carleton Ave)	CSAH 102 (3rd St W)	★		★					★			★★★
25	29	12.001	CSAH	12	MN 19	CSAH 12 (280th St)				★		★			★		★★★
29	30	127.002	CSAH	127	US 14	CSAH 127	★	★			★						★★★
39	31	15.003	CSAH	15	CSAH 115 (Main St)	CSAH 15 (W Central St)	★		★					★			★★★
41	32	16.001	CSAH	16	US 71	CSAH 16		★						★	★		★★★
42	33	17.001	CSAH	17	US 14	CSAH 17		★						★	★		★★★
43	34	17.002	CSAH	17	CSAH 17	CSAH 26 (150th St)				★		★		★			★★★
56	35	2.007	CSAH	2	MN 67 (Front St)	CSAH 2 (Carleton Ave)	★	★						★			★★★
60	36	24.001	CSAH	24	MN 67	CSAH 24		★		★					★		★★★
61	37	24.002	CSAH	24	CSAH 1	CSAH 24		★	★					★			★★★
62	38	24.003	CSAH	24	CSAH 24	CSAH 2	★	★	★					★			★★★
65	39	3.001	CSAH	3	MN 68 (Front St)	CSAH 3		★		★				★			★★★
91	40	5.009	CSAH	5	MN 68	CSAH 5			★					★	★		★★★
95	41	6.001	CSAH	6	CSAH 5	CSAH 6			★	★				★			★★★
96	42	6.002	CSAH	6	CSAH 6	CSAH 15 (9th Ave W)	★		★					★			★★★
107	43	7.003	CSAH	7	US 14	CSAH 7 (Frontier Ave)			★		★			★			★★★
112	44	7.008	CSAH	7	MN 68	CSAH 7			★					★	★		★★★
5	45	1.005	CSAH	1	CSAH 1	CSAH 16	★		★					★			★★
6	46	1.006	CSAH	1	MN 68	CSAH 1			★					★			★★
9	47	10.001	CSAH	10	CSAH 10	CSAH 77 (Evergreen Ave)				★		★					★★
15	48	10.007	CSAH	10	CSAH 10 (Main St)	CR 74 (250th St)	★		★								★★
18	49	101.001	CSAH	101	US 71 (Mill St)	CSAH 101 (Normandale Rd)	★	★									★★
19	50	101.002	CSAH	101	CSAH 101 (Normandale Rd)	MSAS 107 (Halverson St)	★		★								★★
23	51	11.001	CSAH	11	CSAH 2	CSAH 11 (280th St)			★					★			★★
26	52	12.003	CSAH	12	CSAH 6	CSAH 12 (280th St)						★				★	★★
27	53	12.004	CSAH	12	CSAH 6	CSAH 12 (300th St)			★					★			★★
32	54	13.003	CSAH	13	CSAH 13	CSAH 16			★					★			★★
33	55	13.004	CSAH	13	MN 68	CSAH 13			★					★			★★
36	56	133.001	CSAH	133	CSAH 6	CSAH 133 (Main St)	★							★			★★
37	57	15.001	CSAH	15	CSAH 15 (9th Ave E)	CSAH 106 (Birch St)	★			★							★★
38	58	15.002	CSAH	15	CSAH 15	CR 61						★		★			★★
45	59	17.004	CSAH	17	Justice Ave	CSAH 17 (210th St)						★		★			★★
46	60	17.005	CSAH	17	CSAH 17 (Kenwood Ave)	CR 67 (220th St)			★					★			★★
58	61	20.001	CSAH	20	CSAH 20	CR 75 (Camp Ave)			★		★						★★
59	62	20.002	CSAH	20	CSAH 20	CR 78 (Crown Ave)			★		★						★★

Rural Intersection Prioritization for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach	Minor Approach	Context Zone	Total Entering ADT or Cross Product	Leg Configuration	Alignment Skew [degrees]	Adjacent RR Crossing	Adjacent Curve	Adjacent Commercial Development	Previous Stop (>5 Mi)	Major Approach Speed Limit	Major Approach Turn Lane Configuration	Total Stars
69	63	30.004	CSAH	30	CSAH 30	CR 56 (Garden Ave)				★		★					★★
72	64	4.002	CSAH	4	CSAH 4	CR 57 (Camp Ave)			★					★			★★
74	65	4.004	CSAH	4	CSAH 4	CSAH 10			★					★			★★
75	66	4.005	CSAH	4	CSAH 4	CSAH 7			★					★			★★
76	67	4.006	CSAH	4	CSAH 4	CSAH 6			★					★			★★
80	68	4.010	CSAH	4	CSAH 4	CSAH 23			★					★			★★
84	69	5.002	CSAH	5	CSAH 5 (8th St)	CSAH 105 (Main St)	★		★								★★
90	70	5.008	CSAH	5	CSAH 5	CR 66 (220th St)			★					★			★★
93	71	5.011	0	0	CSAH 5	CSAH 12 (280th St)			★					★			★★
94	72	5.012	CSAH	5	MN 19	CSAH 5			★						★		★★
120	73	7.016	CSAH	7	CSAH 7	CSAH 9 (380th St)	★							★			★★
121	74	7.017	CSAH	7	CSAH 7 (Main St)	CSAH 9 (150th Ave)			★					★			★★
132	75	8.008	CSAH	8	MN 19	CSAH 8								★			★★
133	76	8.009	CSAH	8	CSAH 8	CSAH 30 (315th St)			★					★			★★
134	77	8.010	CSAH	8	CSAH 46	CSAH 8						★		★			★★
136	78	9.002	CSAH	9	CSAH 6 (West St)	CSAH 9 (North Ave)			★					★			★★
140	79	79.001	CR	79	CSAH 6	CR 79 (325th St)			★					★			★★
1	80	1.001	CSAH	1	CSAH 1	CR 60 (180th St)			★								★
2	81	1.002	CSAH	1	CSAH 1	CSAH 4			★								★
3	82	1.003	CSAH	1	CSAH 1	CSAH 4			★								★
4	83	1.004	CSAH	1	CSAH 16	CSAH 1 (Pine St)								★			★
7	84	1.007	CSAH	1	CSAH 1	CSAH 12 (300th St)			★								★
11	85	10.003	CSAH	10	CSAH 10	T 140 (140th St)			★								★
12	86	10.004	CSAH	10	CSAH 10	CR 57 (160th St)			★								★
13	87	10.005	CSAH	10	CSAH 10	CR 66 (220th St)			★								★
16	88	10.008	CSAH	10	CSAH 10	CSAH 12 (280th St)			★								★
17	89	10.009	CSAH	10	CSAH 10	CSAH 30	★										★
20	90	101.003	CSAH	101	CSAH 101 (Normandale Rd)	MSAS 105 (S Gould St)			★								★
30	91	13.001	CSAH	13	CSAH 13	CR 60 (180th St)			★								★
35	92	13.006	CSAH	13	CSAH 2	CSAH 13		★									★
47	93	17.006	CSAH	17	CSAH 17 (Kenwood Ave)	CR 70 (230th St)			★								★
50	94	2.001	CSAH	2	CSAH 2	CR 60 (180th St)			★								★
51	95	2.002	CSAH	2	CSAH 4	CSAH 2								★			★
54	96	2.005	CSAH	2	CSAH 2	CSAH 16			★								★
63	97	25.001	CSAH	25	CSAH 6	CSAH 25 (360th St)			★								★
64	98	25.002	CSAH	25	CSAH 17 (Laser Ave)	CSAH 25 (360th St)			★								★
66	99	3.002	CSAH	3	CSAH 3	CSAH 102 (3rd St E)				★							★
67	100	30.002	CSAH	30	CSAH 30	CR 59 (Dayton Ave)			★								★
70	101	30.006	CSAH	30	CSAH 6	CSAH 30 (310th St)			★								★
71	102	4.001	CSAH	4	CSAH 4 (190th St)	CSAH 8			★								★
73	103	4.003	CSAH	4	CSAH 4	CSAH 5			★								★
77	104	4.007	CSAH	4	CSAH 4	CSAH 17 (Justice Ave)			★								★
78	105	4.008	CSAH	4	CSAH 4	CR 67 (Knox Ave)			★								★
81	106	4.011	CSAH	4	CSAH 4	CR 63 (Nature Ave)			★								★
82	107	4.012	CSAH	4	CSAH 4	CSAH 13			★								★
83	108	5.001	CSAH	5	CSAH 5	CR 78 (110th St)			★								★
87	109	5.005	CSAH	5	CSAH 5	CR 52 (140th St)			★								★
88	110	5.006	CSAH	5	CSAH 5	CR 57 (160th St)			★								★
89	111	5.007	CSAH	5	CSAH 5	CR 55 (210th St)			★								★
92	112	5.010	CSAH	5	CSAH 5	CR 74 (250th St)			★								★
99	113	6.005	CSAH	6	CSAH 6	CSAH 26 (150th St)			★								★
101	114	6.007	CSAH	6	CSAH 6	CR 66 (210th St)			★								★
105	115	7.001	CSAH	7	CSAH 7	CR 77						★					★
106	116	7.002	CSAH	7	CSAH 7 (Frontier Ave)	CSAH 127 (1st St)					★						★
109	117	7.005	CSAH	7	CSAH 7	CR 64 (170th St)			★								★
110	118	7.006	CSAH	7	CSAH 7	CR 66 (210th St)			★								★
113	119	7.009	CSAH	7	CSAH 7	CSAH 18 (260th St)			★								★
114	120	7.010	CSAH	7	CSAH 7	CSAH 12 (280th St)			★								★
115	121	7.011	CSAH	7	CSAH 7	CSAH 107 (Oak St)	★										★
116	122	7.012	CSAH	7	CSAH 7	CR 56 (295th St)			★								★
117	123	7.013	CSAH	7	CSAH 7	CSAH 30			★								★
119	124	7.015	CSAH	7	CSAH 7	CR 81 (370th St)			★								★

Rural Intersection Prioritization for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach	Minor Approach	Context Zone	Total Entering ADT or Cross Product	Leg Configuration	Alignment Skew [degrees]	Adjacent RR Crossing	Adjacent Curve	Adjacent Commercial Development	Previous Stop (>5 Mi)	Major Approach Speed Limit	Major Approach Turn Lane Configuration	Total Stars
122	125	7.018	CSAH	7	CSAH 7	CSAH 29 (400th St)						★					★
123	126	7.019	CSAH	7	CSAH 7	CR 58 (420th St)				★							★
124	127	7.020	CSAH	7	CSAH 7	CSAH 27			★								★
126	128	8.002	CSAH	8	CSAH 8	CR 52 (140th St)			★								★
127	129	8.003	CSAH	8	CSAH 8	CR 71 (160th St)			★								★
128	130	8.004	CSAH	8	CSAH 8	CR 55 (210th St)			★								★
135	131	9.001	CSAH	9	CSAH 9 (380th St)	CSAH 19 (Hunter Ave)			★								★
137	132	9.003	CSAH	9	CSAH 9 (North Ave)	CSAH 109 (3rd St)	★										★
138	133	9.004	CSAH	9	CSAH 17 (Kenwood Ave)	CSAH 9			★								★
31	134	13.002	CSAH	13	CSAH 13	CR 68 (215th St)											
49	135	18.001	CSAH	18	CSAH 18 (Ideal Ave)	CSAH 133 (245th St)											
52	136	2.003	CSAH	2	CSAH 4	CSAH 2											
53	137	2.004	CSAH	2	CSAH 2	CR 68 (220th St)											
100	138	6.006	CSAH	6	CSAH 6	CR 64 (170th St)											
108	139	7.004	CSAH	7	CSAH 7	CSAH 26 (150th St)											
111	140	7.007	CSAH	7	CSAH 7	CR 66 (220th St)											

Stars	Count	Percent	Count of Stars --	27	30	97	20	12	17	0	63	21	4
★★★★★★★★★	0	0%	Percent of Stars --	19%	21%	69%	14%	9%	12%	0%	45%	15%	3%
★★★★★★★★	0	0%											
★★★★★★★	0	0%											
★★★★★★	0	0%											
★★★★★	1	1%											
★★★★	8	6%											
★★★	16	11%											
★★	19	14%											
★	35	25%											
	54	39%											
	7	5%											
Total	140	100%											

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Urban Segment Prioritization for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.2	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Length [miles]	ADT [vpd]	Context Zone	Speed Limit	Lane Width	Edgeline Striping	Parking	ADT	Access Density	Cross Section	Edge Risk	Shoulder Width	Total Stars	
2	2	101.003	CSAH	101	42 ft South of Intersection of CSAH101/S Dekalb St and E 2nd St	Intersection of CSAH 101 and US 71	0.09	3600	★											★★
1	1	101.002	CSAH	101	Intersection of CSAH101 and Magnolia Ave	42 ft South of Intersection of CSAH 101 and of E 2nd St	1.24	2550			★									★
3	3	101.008	CSAH	101	116 ft South of Intersection of CSAH101 and Cedar Cliff Rd	.35 Miles North of Intersection of River Rd W and CSAH 101	0.46	1800												

Stars	Count	Percent	Total Length (Miles)	Count of Stars --	Percent of Stars --	Context Zone	Speed Limit	Lane Width	Edgeline Striping	Parking	ADT	Access Density	Cross Section	Edge Risk	Shoulder Width	Total Stars
★★★★★★★	0	0%	1.79	1	33%	★										★★
★★★★★★	0	0%		0	0%			★								★
★★★★★	0	0%		0	0%											
★★★★	0	0%		0	0%											
★★★	0	0%		0	0%											
★★	1	33%		0	0%											
★	1	33%		1	33%	★										★★
	1	33%		0	0%											
Total	3	100%														

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Urban Intersection Prioritization for Redwood County - Vehicle Related

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach Name	Minor Approach Name	Context Zone	Traffic Control Device	Total Entering ADT or Cross Product	Leg Configuration	Major Division Type	Alignment Skew [degrees]	Adjacent Commercial Development	Major/Minor Approach Speed Limit	Major Approach Left Turn Lane Phasing	Major Approach Turn Lane Configuration	Total Stars
4	1	101.006	CSAH	101	MN 19 (Bridge St)	CSAH 101 (Dekalb ST)	*	*	*	*			*	*	*		*****
5	2	101.007	CSAH	101	MN 19 (Bridge St)	CSAH 101	*		*	*				*	*		****
2	3	101.004	CSAH	101	MN 67	CSAH 101 (Normandale Rd)				*		*		*			***
7	4	101.009	CSAH	101	CSAH 101	MSAS 104 (Northwood Dr)	*			*				*			***
1	5	25.003	CSAH	25	CSAH 25 (River Rd)	CSAH 101					*			*			**
3	6	101.005	CSAH	101	CSAH 101 (Dekalb ST)	MSAS 108 (Cook St)				*		*					**
6	7	101.008	CSAH	101	CSAH 101	MSAS 116 (Industrial Dr)	*							*			**
8	8	101.010	CSAH	101	CSAH 101	MSAS 109 (Activaide Rd)				*				*			**

Stars	Count	Percent
*****	0	0%
****	0	0%
***	0	0%
**	1	13%
*	0	0%
	0	0%
	1	13%
	2	25%
	4	50%
	0	0%
	0	0%
Total	8	100%

	4	1	2	6	1	2	1	7	1	0
Count of Stars --	4	1	2	6	1	2	1	7	1	0
Percent of Stars --	50%	13%	25%	75%	13%	25%	13%	88%	13%	0%

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Urban Intersection Prioritization for Redwood County - Pedestrian/Bike Related

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.2	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach Name	Minor Approach Name	Traffic Control Device	Total Entering ADT	Adjacent Commercial Development	Max Number of Lanes Crossed	Presence of Sidewalk	Pedestrian Crossing Type	Total Stars
4	1	101.006	CSAH	101	MN 19 (Bridge St)	CSAH 101 (Dekalb ST)	★	★	★	★	★	★	★★★★★
5	2	101.007	CSAH	101	MN 19 (Bridge St)	CSAH 101		★		★	★		★★★
3	3	101.005	CSAH	101	CSAH 101 (Dekalb ST)	MSAS 108 (Cook St)					★	★	★★
8	4	101.010	CSAH	101	CSAH 101	MSAS 109 (Activaide Rd)				★	★		★★
2	5	101.004	CSAH	101	MN 67	CSAH 101 (Normandale Rd)					★		★
1	6	25.003	CSAH	25	CSAH 25 (River Rd)	CSAH 101					★		★
6	7	101.008	CSAH	101	CSAH 101	MSAS 116 (Industrial Dr)					★		★
7	8	101.009	CSAH	101	CSAH 101	MSAS 104 (Northwood Dr)					★		★

Stars	Count	Percent	Count of Stars --	1	2	1	3	8	2
★★★★★	1	13%	Percent of Stars --	13%	25%	13%	38%	100%	25%
★★★★	0	0%							
★★★	0	0%							
★★	1	13%							
★	2	25%							
	4	50%							
	0	0%							
Total	8	100%							

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Appendix E – Regional TZD Coordinator Contact

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Contact MN TZD¹

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¹ List taken from

<http://www.minnesotatzd.org/whatistzd/mntzd/contact/>

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Appendix F – List of Recommended Projects

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Rural Segment Project List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Length [Miles]	Total Stars	Buffer between Opposing Lanes	Clear Zone Enhancements	Six Inch Wet Reflective Paint in Groove	Shoulder Paving and Safety Edge	Centerline Rumble Strip	Edgeline Rumble Strip	Shoulder Rumble Strip	Enhanced Edgeline	Cost
47	1	2.005	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	11.01	*****	0	0	0	0	1	1	0	1	\$95,783.43
4	2	1.004	CSAH	1	Intersection of CSAH1 and MN 67	Intersection of CSAH 1 and US 71	1.72	****	0	0	0	1	0	0	1	0	\$90,988.57
28	3	13.002	CSAH	13	Intersection of CSAH13 and MN 67	Intersection of CSAH 13 and CSAH 2	5.15	****	0	0	0	1	0	0	1	0	\$272,709.51
58	4	32.001	CSAH	32	2.0 Miles West of Intersection of CSAH32 and MN 68	Intersection of CSAH 32 and MN 68	2.00	****	0	0	0	0	1	1	0	1	\$17,413.86
63	5	46.001	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	4.59	****	0	0	0	0	0	0	0	1	\$12,401.79
64	6	5.001	CSAH	5	Intersection of CSAH55 and CSAH 7	Intersection of CSAH 5 and Clark St	1.50	****	0	0	0	0	0	1	0	1	\$8,554.28
69	7	6.003	CSAH	6	Intersection of CSAH6/Jlex St and US 14	2790 ft North of Intersection of CSAH 6 and of 130th St	1.00	****	0	0	0	0	1	1	0	1	\$8,702.39
75	8	6.009	CSAH	6	3497 ft North of Intersection of CSAH6 and 400th St	.16 Miles North of Intersection of 410th St and CSAH 6	1.04	****	0	0	0	0	0	0	County Completed	1	\$2,801.47
10	9	101.004	CSAH	101	Intersection of CSAH101 and US 71	400 ft South of Intersection of CSAH 101 and of Burr Oak Rd	0.81	***	0	0	0	1	0	0	1	0	\$42,778.69
12	10	101.006	CSAH	101	2415 north of Intersection of CSAH101/Main St and Burr Oak Rd	56 ft South of Intersection of CSAH 101 and of Front St	0.29	***	0	0	0	1	0	0	1	0	\$15,306.10
13	11	101.007	CSAH	101	56ft south of Intersection of CSAH101/River Rd and Front St	116 ft South of Intersection of CSAH 101 and of Cedar Cliff Rd	0.39	***	0	0	0	0	0	0	1	1	\$2,241.71
27	12	13.001	CSAH	13	Intersection of CSAH13 and 160 St	Intersection of CSAH 13 and MN 67	11.87	***	0	0	0	1	0	0	1	0	\$629,352.66
34	13	15.004	CSAH	15	66 ft East of Intersection of CSAH15/E Central St and Public St	Intersection of CSAH 15 and US 71	0.17	***	0	0	0	0	0	0	0	1	\$470.81
41	14	17.005	CSAH	17	Intersection of CSAH17/Laser Ave and MN 67	Intersection of CSAH 17 and CSAH 9	5.41	***	0	0	0	0	0	1	0	1	\$30,833.80
49	15	24.001	CSAH	24	Intersection of CSAH24 and MN 67	1823 ft West of Intersection of CSAH 24 and of CSAH 2	4.66	***	0	0	0	1	0	0	1	0	\$246,859.94
51	16	25.002	CSAH	25	Intersection of CSAH25/River Rd W and Laser Ave	Intersection of CSAH 25 and CSAH 101	2.33	***	0	0	0	0	0	1	0	1	\$13,295.43
57	17	30.004	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	4.42	***	0	0	0	0	0	0	0	1	\$11,924.55
61	18	45.001	CSAH	45	.46 Miles West of Intersection of CSAH45/310th Ave and 241st St	Intersection of CSAH 45 and 310th Ave	0.47	***	0	0	0	0	0	0	0	1	\$1,257.94
67	19	6.001	CSAH	6	Intersection of CSAH 6 and 100th St	Intersection of CSAH 6 and 120th St	2.02	***	0	0	0	0	0	County Completed	0	1	\$5,456.84
70	20	6.004	CSAH	6	2790 ft North of Intersection of CSAH6 and 130th St	Intersection of CSAH 6 and MN 68	10.52	***	0	0	0	0	0	County Completed	0	1	\$28,396.19
72	21	6.006	CSAH	6	Intersection of CSAH6 and North St	575 ft North of Intersection of CSAH 6 and of CSAH 12	3.79	***	0	0	0	0	1	County Completed	0	1	\$21,580.40
73	22	6.007	CSAH	6	575 ft North East of Intersection of CSAH6/280th St and CSAH 12	Intersection of CSAH 6 and MN 67	6.68	***	0	0	0	0	0	1	0	1	\$38,089.35
74	23	6.008	CSAH	6	Intersection of CSAH6/West St and MN 67	3497 ft North of Intersection of CSAH 6 and of 400th St	6.69	***	0	0	0	1	0	0	1	0	\$354,786.76
80	24	7.004	CSAH	7	Intersection of CSAH7 and MN 19	Intersection of CSAH 7 and Marion Ave	4.16	***	0	0	0	1	0	0	1	0	\$220,729.35
82	25	7.006	CSAH	7	747 ft North of Intersection of CSAH 7 and Elevator Ave	.60 Miles North of Intersection of 440th St and CSAH 7	6.41	***	0	0	0	0	0	0	0	1	\$17,295.65
91	26	9.005	CSAH	9	75 ft East of Intersection of CSAH9/North Ave and East St	Intersection of CSAH 9 and CSAH 17	1.49	***	0	0	0	0	0	0	0	1	\$4,036.25
Total Length (Miles)							100.59159		0	0	0	8	4	7	9	18	\$2,194,047.71

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Curve Project List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Length [Miles]	Total Stars	Clear Zone Enhancements	High Friction Surface Treatment	Reconstruct TT Intersection to T Intersection	Lighting	Curve Warning Sign	Speed Advisory Sign	Chevrons or Arrow Board	Cost
23	1	17.002	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	0.23	*****	0	0	1	0	County Completed	0	County Completed	\$400,000.00
22	2	17.001	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	0.23	*****	0	0	0	0	County Completed	0	County Completed	No Project - Previously Completed Projects
21	3	15.004	CSAH	15	66 ft East of Intersection of CSAH15/E Central St and Public St	Intersection of CSAH 15 and US 71	0.10	*****	0	0	0	0	County Completed	0	County Completed	No Project - Previously Completed Projects
47	4	5.001	CSAH	5	Intersection of CSAH55 and CSAH 7	Intersection of CSAH 5 and Clark St	0.22	*****	0	0	0	0	County Completed	0	County Completed	No Project - Previously Completed Projects
39	5	30.002	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	0.23	*****	0	0	0	0	1	0	1	\$3,500.00
46	6	46.003	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	0.17	*****	0	0	0	0	0	0	0	No Project - Criteria Not Met
20	7	15.002	CSAH	15	404 ft East of Intersection of CSAH15 and S Birch St	187 ft West of Intersection of CSAH 15 and S Yeager St	0.35	*****	0	0	0	0	0	0	0	No Project - Criteria Not Met
43	8	45.001	CSAH	45	.46 Miles West of Intersection of CSAH45/310th Ave and 241st St	Intersection of CSAH 45 and 310th Ave	0.25	*****	0	0	0	0	1	0	1	\$3,500.00
29	9	2.002	CSAH	2	45 ft North of Intersection of CSAH2 and Reetz St	Intersection of CSAH 2 and US 71	0.10	*****	0	0	0	0	0	0	0	No Project - Criteria Not Met
52	10	7.001	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	0.25	*****	0	0	0	0	County Completed	0	County Completed	No Project - Previously Completed Projects
18	11	11.006	CSAH	11	3982 ft North of Intersection of CSAH11 and 350th St	1.53 Miles North of Intersection of CSAH 11 and 350th St	0.14	*****	0	0	0	0	0	0	0	No Project - Criteria Not Met
24	12	17.003	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	0.09	*****	0	0	0	0	0	0	0	No Project - Criteria Not Met
28	13	18.001	CSAH	18	Intersection of CSAH18/CSAH 18 and MN 68	Intersection of CSAH 18 and CSAH 7	0.26	*****	0	0	0	0	1	0	1	\$3,500.00
13	14	11.001	CSAH	11	Intersection of CSAH11/280th St and CSAH 2	3982 ft North of Intersection of CSAH 11 and of 350th St	0.24	*****	0	0	0	0	1	1	1	\$4,500.00
53	15	7.002	CSAH	7	1285 ft West of Intersection of CSAH7 and CR 77	513 ft South of Intersection of CSAH 7 and of Elm St	0.25	*****	0	0	0	0	County Completed	0	County Completed	No Project - Previously Completed Projects
26	16	17.005	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	0.16	*****	0	0	0	0	County Completed	County Completed	County Completed	No Project - Previously Completed Projects
27	17	17.006	CSAH	17	Intersection of CSAH 17 Ave and US 14	118 ft North of Intersection of CSAH 17 and of 180th St	0.18	*****	0	0	0	0	County Completed	County Completed	County Completed	No Project - Previously Completed Projects
40	18	30.003	CSAH	30	Intersection of CSAH30/Center St and CSAH 10	Intersection of CSAH 30 and CSAH 7	0.20	*****	0	0	0	0	1	0	1	\$3,500.00
64	19	8.001	CSAH	8	Intersection of CSAH8 and MN 19	Intersection of CSAH 8 and CSAH 46	0.07	*****	0	0	0	0	County Completed	1	1	\$3,500.00
45	20	46.002	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	0.27	*****	0	0	0	0	0	0	0	No Project - Criteria Not Met
44	21	46.001	CSAH	46	Intersection of CSAH46/100th Ave and Lyon Redwood Rd	2603 ft West of Intersection of CSAH 46 and of Crown Ave	0.15	*****	0	0	0	0	0	0	0	No Project - Criteria Not Met
30	22	2.003	CSAH	2	Intersection of CSAH2/S Somerville St and Tempel Dr	Intersection of CSAH 2 and MN 68	0.10	*****	1	0	0	0	0	0	0	\$100,000.00
Total Length (miles)							4.25		1	0	1	0	5	2	6	\$522,000.00

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Rural Intersection Project List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No. 1	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach Name	Minor Approach Name	Total Stars	Reconstruct TT to Single T	Roundabout	J Turn	LED Stop Sign	Thru-Stop to All-Way Stop/Yield	Left Turn Lanes on Major Roads (Thru-Traffic)	Lighting	Review Signs and Markings	Upgrade Signs and Pavement Markings	Cost
98	1	6.004	CSAH	6	US 14	CSAH 6 (Ilex St)	★★★★★	0	0	0	0	1	0	0	1	0	\$3,000
22	2	105.001	CSAH	105	US 14	CSAH 105 (6th St)	★★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
24	3	115.001	CSAH	115	US 71	CSAH 155 (Main St)	★★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
28	4	127.001	CSAH	127	CSAH 127 (1st St)	CR 50 (Main St)	★★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
44	5	17.003	CSAH	17	CSAH 17 (Railroad St)	CSAH 117 (Main St)	★★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
48	6	17.007	CSAH	17	MN 68	CSAH 17 (Kenwood Ave)	★★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
55	7	2.006	CSAH	2	MN 68 (Front St)	CSAH 2 (Sommerville St)	★★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
68	8	30.003	CSAH	30	MN 19	CSAH 30 (Center St)	★★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
86	9	5.004	CSAH	5	US 14	CSAH 5 (8th St)	★★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
10	10	10.002	CSAH	10	US 14	CSAH 10	★★★★	0	0	0	0	0	0	1	0	0	\$15,000
34	11	13.005	CSAH	13	MN 67	CSAH 13	★★★★	0	0	0	0	1	0	1	0	0	\$18,000
40	12	15.004	CSAH	15	US 71	CSAH 15 (Central St)	★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
57	13	2.008	CSAH	2	US 71	CSAH 2	★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
79	14	4.009	CSAH	4	US 71	CSAH 4	★★★★	0	0	0	0	0	0	1	0	0	\$15,000
85	15	5.003	CSAH	5	CSAH 5 (8th St)	CSAH 20	★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
97	16	6.003	CSAH	6	CSAH 6 (Ilex St)	CSAH 106 (1st Ave W)	★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
102	17	6.008	CSAH	6	MN 68	CSAH 6	★★★★	0	0	0	0	0	0	1	0	0	\$15,000
103	18	6.009	CSAH	6	MN 19	CSAH 6	★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
104	19	6.010	CSAH	6	MN 19	CSAH 6	★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
118	20	7.014	CSAH	7	MN 19	CSAH 7	★★★★	0	0	0	0	0	0	1	0	0	\$15,000
125	21	8.001	CSAH	8	US 14	CSAH 8	★★★★	0	0	0	0	0	0	1	0	0	\$15,000
129	22	8.005	CSAH	8	MN 68	CSAH 8	★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
130	23	8.006	CSAH	8	MN 68 (Euclid Ave)	CSAH 32	★★★★	0	0	0	0	0	0	1	0	0	\$15,000
131	24	8.007	CSAH	8	MN 19	T 159 (Balsa Ave)	★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
139	25	76.001	CR	76	MN 68	CSAH 6	★★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
8	26	1.008	CSAH	1	MN 67	CSAH 1	★★★	0	0	0	0	0	0	1	0	0	\$15,000
14	27	10.006	CSAH	10	MN 68	CSAH 10	★★★	0	0	0	0	0	0	1	0	0	\$15,000
21	28	102.001	CSAH	102	CSAH 2 (Carleton Ave)	CSAH 102 (3rd St W)	★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
25	29	12.001	CSAH	12	MN 19	CSAH 12 (280th St)	★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
29	30	127.002	CSAH	127	US 14	CSAH 127	★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
39	31	15.003	CSAH	15	CSAH 115 (Main St)	CSAH 15 (W Central St)	★★★	0	0	0	1	0	0	1	0	0	\$17,000
41	32	16.001	CSAH	16	US 71	CSAH 16	★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
42	33	17.001	CSAH	17	US 14	CSAH 17	★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
43	34	17.002	CSAH	17	CSAH 17	CSAH 26 (150th St)	★★★	1	0	0	0	0	0	0	1	0	\$400,000
56	35	2.007	CSAH	2	MN 67 (Front St)	CSAH 2 (Carleton Ave)	★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
60	36	24.001	CSAH	24	MN 67	CSAH 24	★★★	0	0	0	0	1	0	1	0	0	\$18,000
61	37	24.002	CSAH	24	CSAH 1	CSAH 24	★★★	0	0	0	0	0	0	1	0	0	\$15,000
62	38	24.003	CSAH	24	CSAH 24	CSAH 2	★★★	0	0	0	0	1	0	0	1	0	\$3,000
65	39	3.001	CSAH	3	MN 68 (Front St)	CSAH 3	★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
91	40	5.009	CSAH	5	MN 68	CSAH 5	★★★	0	0	0	0	0	0	1	0	0	\$15,000
95	41	6.001	CSAH	6	CSAH 5	CSAH 6	★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
96	42	6.002	CSAH	6	CSAH 6	CSAH 15 (9th Ave W)	★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
107	43	7.003	CSAH	7	US 14	CSAH 7 (Frontier Ave)	★★★	0	0	0	0	0	0	0	1	0	No Project - Criteria Not Met
112	44	7.008	CSAH	7	MN 68	CSAH 7	★★★	0	0	0	0	0	0	1	0	0	\$15,000
								1	0	0	1	4	0	14	30	0	\$624,000

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Urban Segment Project List for Redwood County

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.2	CRSP 2 ID	Route System	Route No.	Segment Start Description	Segment End Description	Length [miles]	Total Stars	Divided Roadway	Access Management	Road Diet	Vehicle Speed Feedback Signs	Sidewalk	Cost
2	2	101.003	CSAH	101	42 ft South of Intersection of CSAH101/S Dekalb St and E 2nd St	Intersection of CSAH 101 and US 71	0.09	★ ★	0	0	0	1	0	\$30,000.00
Total Length (Miles)							0.09		0	0	0	1	0	\$30,000.00

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Urban Intersection Project List for Redwood County - Vehicle Related

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach Name	Minor Approach Name	Total Stars	Lighting	Roundabout	J Turn	Signalized J Turn	Thru-Stop to All-Way Stop/Yield	Upgrade Signs and Pavement Markings	Confirmation Lights	Upgrade Signal Hardware	Cost
4	1	101.006	CSAH	101	MN 19 (Bridge St)	CSAH 101 (Dekalb ST)	★★★★★★	0	0	0	0	0	0	1	0	\$1,500
5	2	101.007	CSAH	101	MN 19 (Bridge St)	CSAH 101	★★★★	0	0	0	0	0	1	0	0	\$3,500
2	3	101.004	CSAH	101	MN 67	CSAH 101 (Normandale Rd)	★★★	0	0	0	0	0	1	0	0	\$3,500
7	4	101.009	CSAH	101	CSAH 101	MSAS 104 (Northwood Dr)	★★★	0	0	0	0	0	1	0	0	\$3,500
Total Projects								0	0	0	0	0	3	1	0	\$12,000

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Urban Intersection Project List for Redwood County - Pedestrian/Bike Related

CRSP2 ID Example: 1.001: 1= Route Number, 001 = First Segment

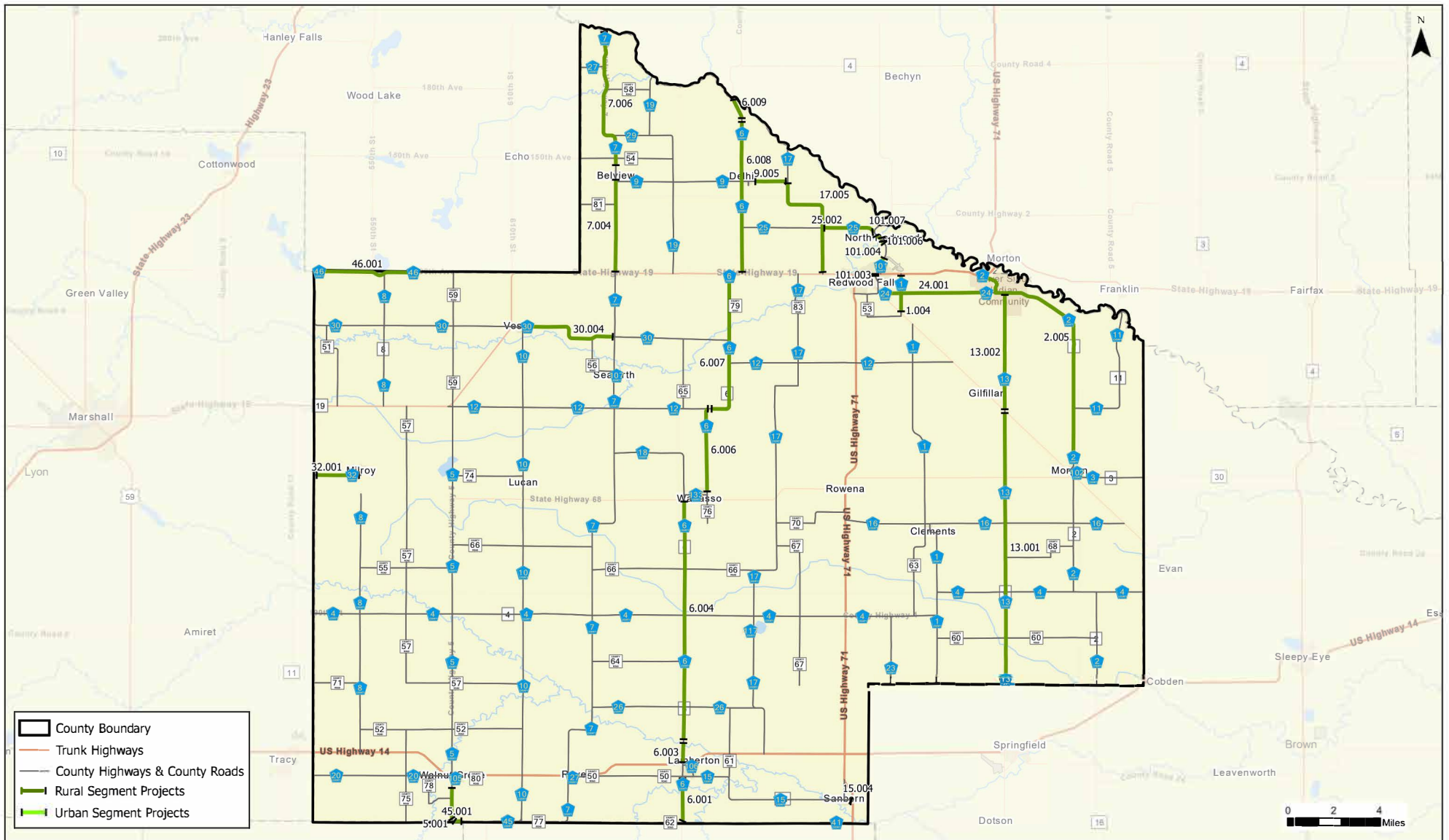
List No.	Project Page No.	CRSP 2 ID	Route System	Route No.	Major Approach Name	Minor Approach Name	Total Stars	Mini Roundabout	Median Refuge Island	RRFB	RRFB with Refuge Island	Pedestrian Hybrid Beacon	No Right Turn on Red Sign (static or blank out)	Curb Extensions	Leading Pedestrian Interval	Pedestrian Countdown Timer	Upgrade Signal Hardware and Review and Revise Signal Timing and Operations	Cost
4	1	101.006	CSAH	101	MN 19 (Bridge St)	CSAH 101 (Dekalb ST)	*****	0	0	0	0	0	0	1	1	0	1	\$16,000
5	2	101.007	CSAH	101	MN 19 (Bridge St)	CSAH 101	***	0	1	0	0	0	0	1	0	0	0	\$35,000
3	3	101.005	CSAH	101	CSAH 101 (Dekalb ST)	MSAS 108 (Cook St)	**	0	1	0	0	0	0	1	0	0	0	\$35,000
8	4	101.010	CSAH	101	CSAH 101	MSAS 109 (Activaide Rd)	**	0	1	0	0	0	0	1	0	0	0	\$35,000
Total Projects								0	3	0	0	0	0	4	1	0	1	\$121,000

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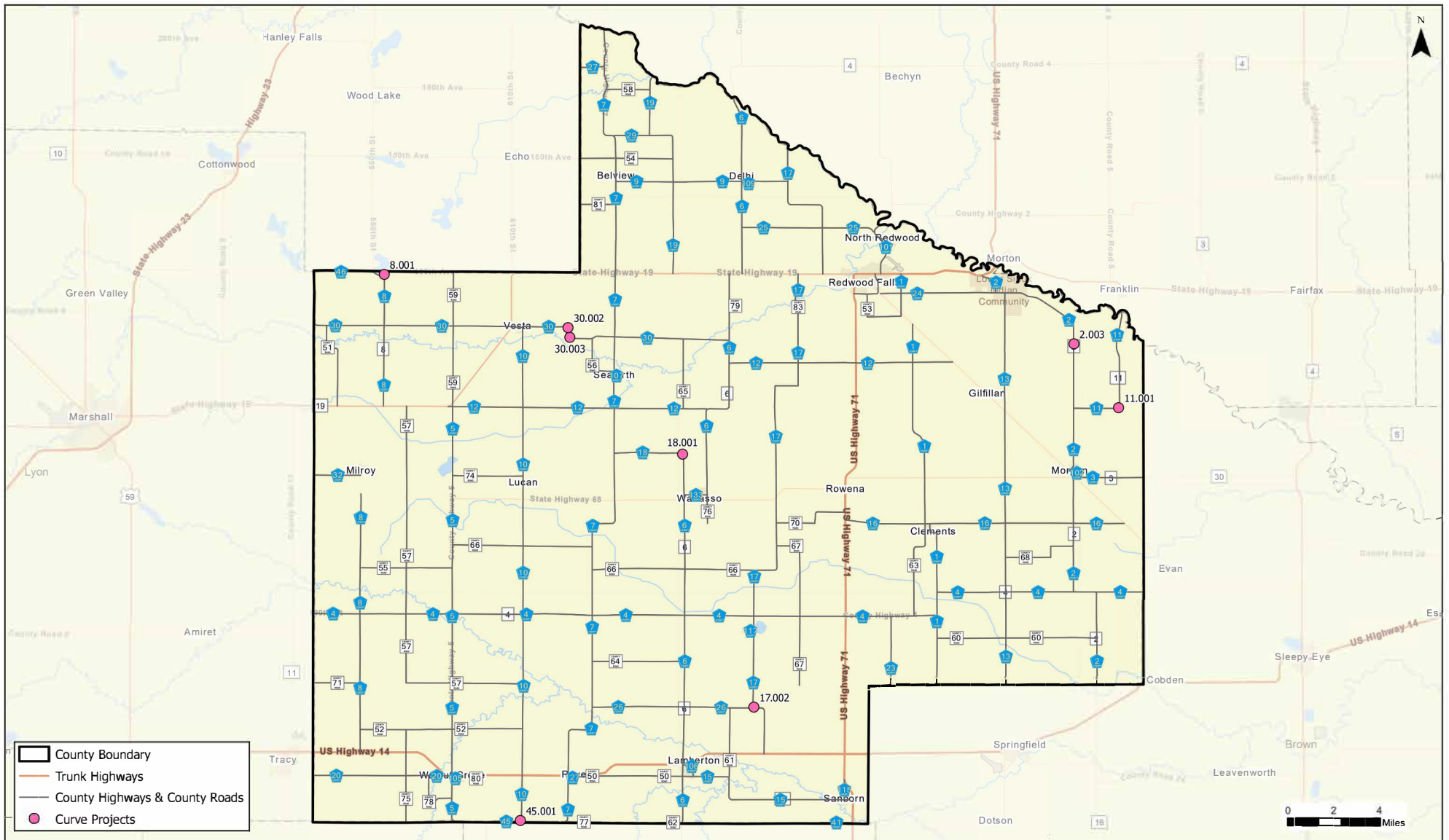
Appendix G – Recommended Project Maps

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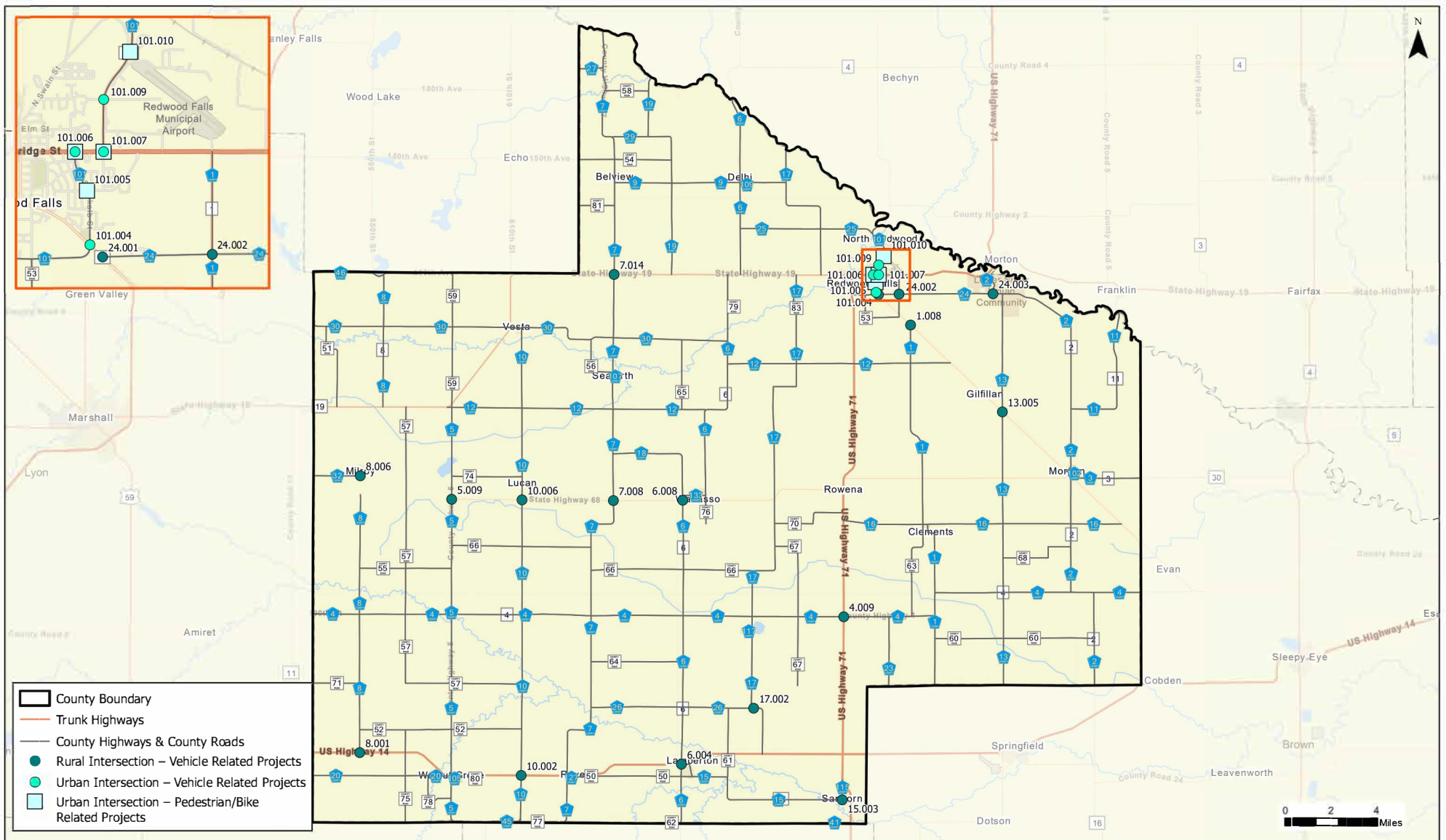
Redwood County - Segment Projects

Created on 3/20/2023



Redwood County - Curve Projects

Created on 3/20/2023



Redwood County - Intersection Projects

Created on 3/20/2023

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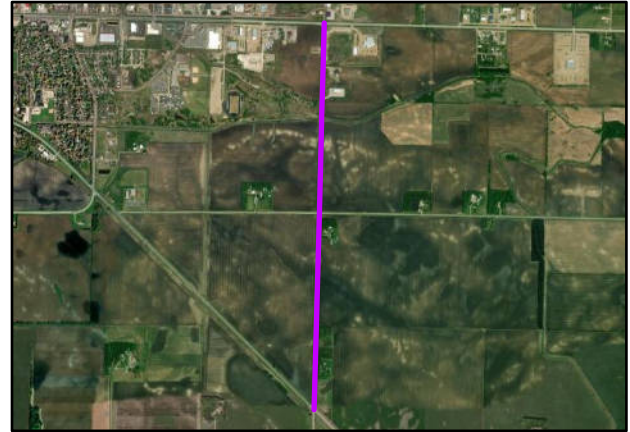
Appendix H – HSIP Submission Forms

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Rural Segment Project on CSAH 1

Roadway Information

Segment Start: Intersection of CSAH1 and MN 67
 Segment End: Intersection of CSAH 1 and US 71
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 1
 Facility Type: 2-Lane
 Segment Length (mile): 1.72
 Traffic Volume (vpd): 1975
 Lane Width (ft): 11
 Shoulder Type: Gravel
 Shoulder Width (ft): 5



[Click to View in Google Maps](#)

Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	8	0	2	0
Density (per mile per yr):	0.93	0	0.23	0
Rate (per MVM):	1.29	0	0.32	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	1975	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	1975	$xx \geq 1,250$	★
Curve Density (cur per mile):	0	$xx \geq 0.6$	-
Access Density (access per mile):	14.56	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	1	\$85,838.28
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	1	\$5,150.3
Enhanced Edgeline:	Proactive	\$2,700	per mile	0	\$0

Total Estimated Project Cost \$90,988.57

Systemic Project	√
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Rural Segment Project on CSAH 2

Roadway Information

Segment Start: 45 ft North of Intersection of CSAH2 and Reetz St
 Segment End: Intersection of CSAH 2 and US 71
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 2
 Facility Type: 2-Lane
 Segment Length (mile): 11.01
 Traffic Volume (vpd): 1338
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 3



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	15	2	8	0
Density (per mile per yr):	0.27	0.04	0.15	0
Rate (per MVM):	0.56	0.07	0.3	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	1338	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	1338	xx ≥ 1,250	★
Curve Density (cur per mile):	0.91	xx ≥ 0.6	★
Access Density (access per mile):	9.17	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	1	\$33,028.77
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	1	\$33,028.77
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$29,725.89

Total Estimated Project Cost \$95,783.43

Systemic Project	√
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Rural Segment Project on CSAH 5

Roadway Information

Segment Start: Intersection of CSAH55 and CSAH 7
 Segment End: Intersection of CSAH 5 and Clark St
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 5
 Facility Type: 2-Lane
 Segment Length (mile): 1.5
 Traffic Volume (vpd): 790
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 4



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	3	0	2	0
Density (per mile per yr):	0.4	0	0.27	0
Rate (per MVM):	1.39	0	0.92	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	790	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	790	xx ≥ 1,250	-
Curve Density (cur per mile):	0.67	xx ≥ 0.6	★
Access Density (access per mile):	12.66	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	1	\$4,502.26
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$4,052.03

Total Estimated Project Cost \$8,554.28

Systemic Project	√
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Rural Segment Project on CSAH 6

Roadway Information

Segment Start: Intersection of CSAH 6 and 100th St
 Segment End: Intersection of CSAH 6 and 120th St
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 6
 Facility Type: 2-Lane
 Segment Length (mile): 2.02
 Traffic Volume (vpd): 790
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 5



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	1	0	1	0
Density (per mile per yr):	0.1	0	0.1	0
Rate (per MVM):	0.34	0	0.34	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	790	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	790	$xx \geq 1,250$	-
Curve Density (cur per mile):	0	$xx \geq 0.6$	-
Access Density (access per mile):	12.37	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$5,456.84

Total Estimated Project Cost \$5,456.84

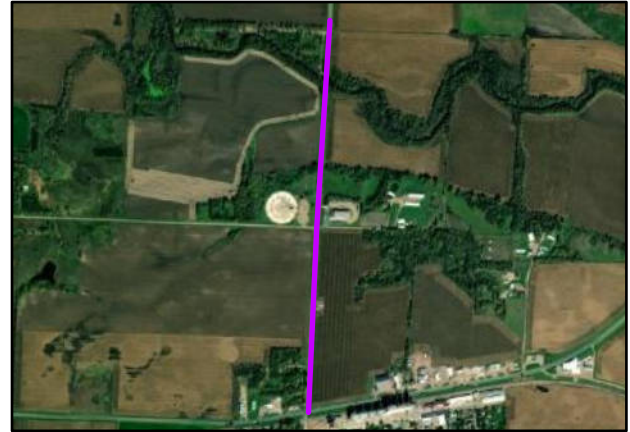
Systemic Project	√
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County Completed - Edgeline Rumble Strip

Rural Segment Project on CSAH 6

Roadway Information

Segment Start: Intersection of CSAH6/Ilex St and US 14
 Segment End: 2790 ft North of Intersection of CSAH 6 and of 130th St
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 6
 Facility Type: 2-Lane
 Segment Length (mile): 1
 Traffic Volume (vpd): 1300
 Lane Width (ft): 12
 Shoulder Type: Paved
 Shoulder Width (ft): 7



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	5	2	2	1
Density (per mile per yr):	1	0.4	0.4	0.2
Rate (per MVM):	2.11	0.84	0.84	0.42

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	1300	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	1300	xx ≥ 1,250	★
Curve Density (cur per mile):	0	xx ≥ 0.6	-
Access Density (access per mile):	15	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-
Total Stars:			★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	1	\$3,000.82
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	1	\$3,000.82
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$2,700.74

Total Estimated Project Cost \$8,702.39

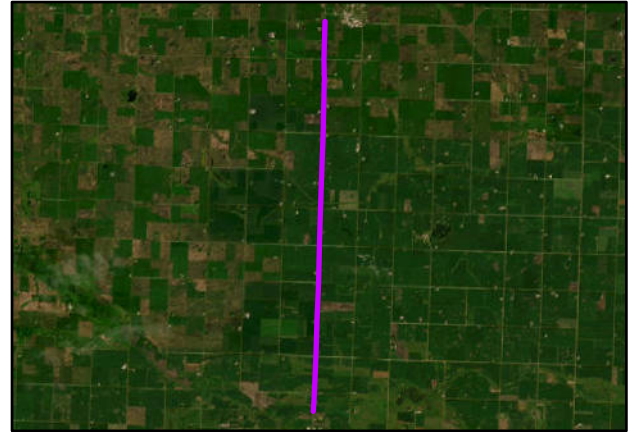
Systemic Project	√
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Rural Segment Project on CSAH 6

Roadway Information

Segment Start: 2790 ft North of Intersection of CSAH6 and 130th St
 Segment End: Intersection of CSAH 6 and MN 68
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 6
 Facility Type: 2-Lane
 Segment Length (mile): 10.52
 Traffic Volume (vpd): 960
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 7



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	4	1	0	0
Density (per mile per yr):	0.08	0.02	0	0
Rate (per MVM):	0.22	0.05	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	960	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	960	$xx \geq 1,250$	-
Curve Density (cur per mile):	0	$xx \geq 0.6$	-
Access Density (access per mile):	10.27	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-
Total Stars:			★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$28,396.19
Total Estimated Project Cost					\$28,396.19

Systemic Project	√
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County Completed - Edgeline Rumble Strip

Rural Segment Project on CSAH 6

Roadway Information

Segment Start: Intersection of CSAH6 and North St
 Segment End: 575 ft North of Intersection of CSAH 6 and of CSAH 12
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 6
 Facility Type: 2-Lane
 Segment Length (mile): 3.79
 Traffic Volume (vpd): 1100
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 7



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	3	1	2	0
Density (per mile per yr):	0.16	0.05	0.11	0
Rate (per MVM):	0.39	0.13	0.26	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	1100	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	1100	xx ≥ 1,250	-
Curve Density (cur per mile):	0.26	xx ≥ 0.6	-
Access Density (access per mile):	10.57	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	1	\$11,358.11
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$10,222.3

Total Estimated Project Cost \$21,580.4

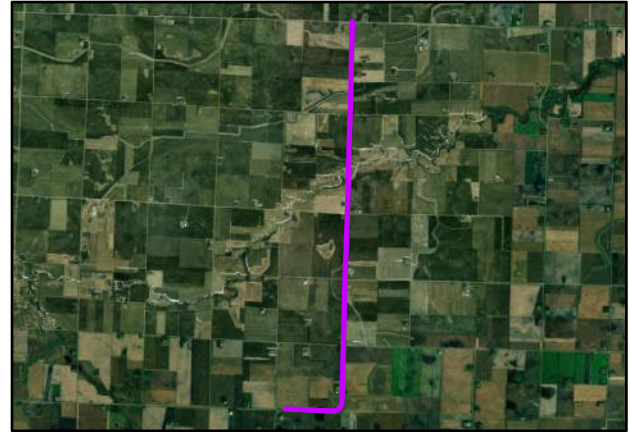
Systemic Project	√
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County Completed - Edgeline Rumble Strip

Rural Segment Project on CSAH 6

Roadway Information

Segment Start: 575 ft North East of Intersection of CSAH6/280th St and CSAH 12
 Segment End: Intersection of CSAH 6 and MN 67
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 6
 Facility Type: 2-Lane
 Segment Length (mile): 6.68
 Traffic Volume (vpd): 860
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 7



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	3	0	2	0
Density (per mile per yr):	0.09	0	0.06	0
Rate (per MVM):	0.29	0	0.19	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	860	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	860	$xx \geq 1,250$	-
Curve Density (cur per mile):	0.15	$xx \geq 0.6$	-
Access Density (access per mile):	9.88	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	1	\$20,047.03
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$18,042.32

Total Estimated Project Cost \$38,089.35

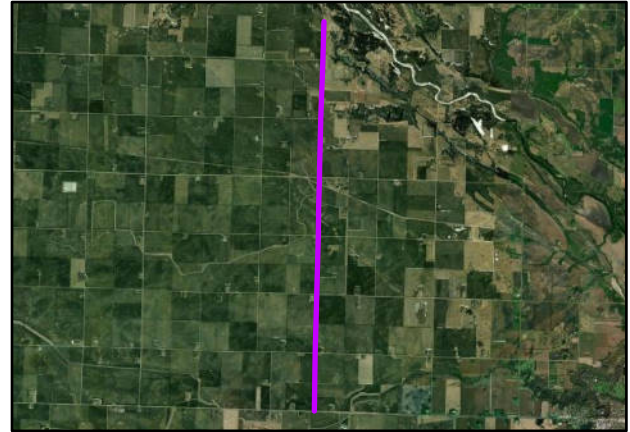
Systemic Project	√
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Rural Segment Project on CSAH 6

Roadway Information

Segment Start: Intersection of CSAH6/West St and MN 67
 Segment End: 3497 ft North of Intersection of CSAH 6 and of 400th St
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 6
 Facility Type: 2-Lane
 Segment Length (mile): 6.69
 Traffic Volume (vpd): 880
 Lane Width (ft): 11
 Shoulder Type: Gravel
 Shoulder Width (ft): 10



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	7	0	6	0
Density (per mile per yr):	0.21	0	0.18	0
Rate (per MVM):	0.65	0	0.56	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	880	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	880	xx ≥ 1,250	-
Curve Density (cur per mile):	0	xx ≥ 0.6	-
Access Density (access per mile):	9.86	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	1	\$334,704.49
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	1	\$20,082.27
Enhanced Edgeline:	Proactive	\$2,700	per mile	0	\$0

Total Estimated Project Cost \$354,786.76

Systemic Project	√
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Rural Segment Project on CSAH 6

Roadway Information

Segment Start: 3497 ft North of Intersection of CSAH6 and 400th St
 Segment End: .16 Miles North of Intersection of 410th St and CSAH 6
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 6
 Facility Type: 2-Lane
 Segment Length (mile): 1.04
 Traffic Volume (vpd): 760
 Lane Width (ft): 11
 Shoulder Type: Paved
 Shoulder Width (ft): 9



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	2	0	1	0
Density (per mile per yr):	0.39	0	0.19	0
Rate (per MVM):	1.39	0	0.69	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	760	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	760	$xx \geq 1,250$	-
Curve Density (cur per mile):	1.93	$xx \geq 0.6$	★
Access Density (access per mile):	7.71	$7 \leq xx \leq 18$	★
Outside Edge Risk:	2C	2S or 3	-

Total Stars: ★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$2,801.47

Total Estimated Project Cost \$2,801.47

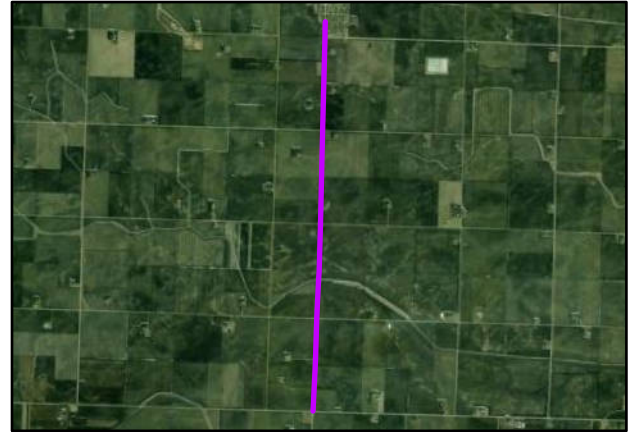
Systemic Project	√
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County Completed - Shoulder Rumble Strip

Rural Segment Project on CSAH 7

Roadway Information

Segment Start: Intersection of CSAH7 and MN 19
 Segment End: Intersection of CSAH 7 and Marion Ave
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 7
 Facility Type: 2-Lane
 Segment Length (mile): 4.16
 Traffic Volume (vpd): 1075
 Lane Width (ft): 11
 Shoulder Type: Gravel
 Shoulder Width (ft): 7



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	2	1	0	0
Density (per mile per yr):	0.1	0.05	0	0
Rate (per MVM):	0.24	0.12	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	1075	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	1075	$xx \geq 1,250$	-
Curve Density (cur per mile):	0	$xx \geq 0.6$	-
Access Density (access per mile):	8.88	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-
Total Stars:			★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	1	\$208,235.23
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	1	\$12,494.11
Enhanced Edgeline:	Proactive	\$2,700	per mile	0	\$0
Total Estimated Project Cost					\$220,729.35

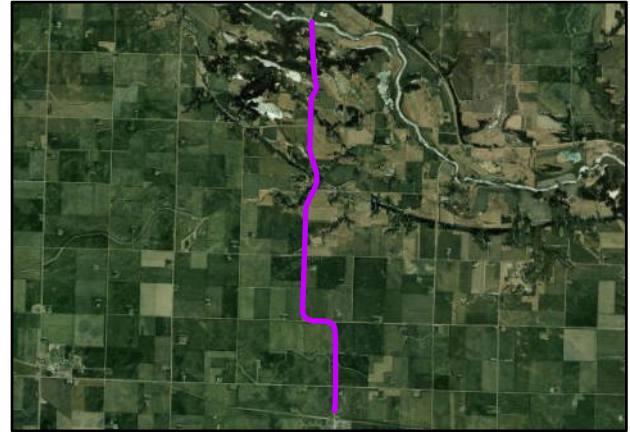
Systemic Project	√
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Rural Segment Project on CSAH 7

Roadway Information

Segment Start: 747 ft North of Intersection of CSAH 7 and Elevator Ave
 Segment End: .60 Miles North of Intersection of 440th St and CSAH 7
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 7
 Facility Type: 2-Lane
 Segment Length (mile): 6.41
 Traffic Volume (vpd): 610
 Lane Width (ft): 11
 Shoulder Type: Gravel
 Shoulder Width (ft): 6



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	5	3	4	2
Density (per mile per yr):	0.16	0.09	0.12	0.06
Rate (per MVM):	0.7	0.42	0.56	0.28

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	610	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	610	xx ≥ 1,250	-
Curve Density (cur per mile):	1.09	xx ≥ 0.6	★
Access Density (access per mile):	6.56	7 ≤ xx ≤ 18	-
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$17,295.65

Total Estimated Project Cost \$17,295.65

Systemic Project	√
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Rural Segment Project on CSAH 9

Roadway Information

Segment Start: 75 ft East of Intersection of CSAH9/North Ave and East St
 Segment End: Intersection of CSAH 9 and CSAH 17
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 9
 Facility Type: 2-Lane
 Segment Length (mile): 1.49
 Traffic Volume (vpd): 540
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 6



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	540	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	540	$xx \geq 1,250$	-
Curve Density (cur per mile):	0	$xx \geq 0.6$	-
Access Density (access per mile):	8.03	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-
Total Stars:			★★★

Priority Location	√
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List of Strategies Considered

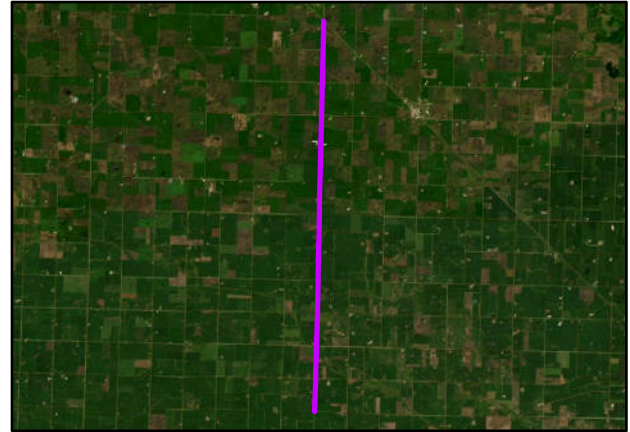
	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$4,036.25
Total Estimated Project Cost					\$4,036.25

Systemic Project	√
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Rural Segment Project on CSAH 13

Roadway Information

Segment Start: Intersection of CSAH13 and 160 St
 Segment End: Intersection of CSAH 13 and MN 67
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 13
 Facility Type: 2-Lane
 Segment Length (mile): 11.87
 Traffic Volume (vpd): 890
 Lane Width (ft): 11
 Shoulder Type: Gravel
 Shoulder Width (ft): 8



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	7	2	4	1
Density (per mile per yr):	0.12	0.03	0.07	0.02
Rate (per MVM):	0.36	0.1	0.21	0.05

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	890	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	890	xx ≥ 1,250	-
Curve Density (cur per mile):	0	xx ≥ 0.6	-
Access Density (access per mile):	7.5	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
-------------------	---

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	1	\$593,728.93
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	1	\$35,623.74
Enhanced Edgeline:	Proactive	\$2,700	per mile	0	\$0

Total Estimated Project Cost \$629,352.66

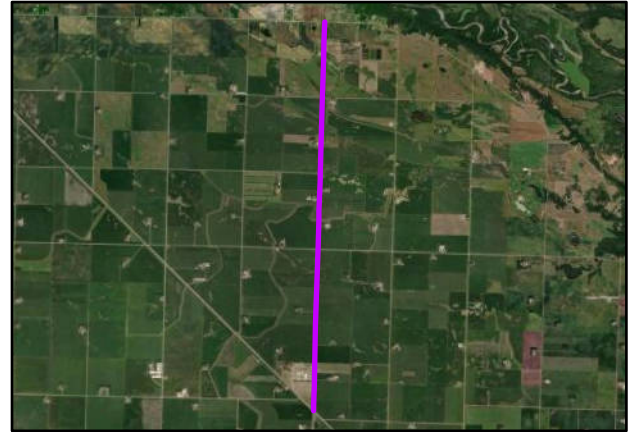
Systemic Project	√
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Rural Segment Project on CSAH 13

Roadway Information

Segment Start: Intersection of CSAH13 and MN 67
 Segment End: Intersection of CSAH 13 and CSAH 2
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 13
 Facility Type: 2-Lane
 Segment Length (mile): 5.15
 Traffic Volume (vpd): 1500
 Lane Width (ft): 11
 Shoulder Type: Gravel
 Shoulder Width (ft): 6



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	5	1	1	0
Density (per mile per yr):	0.19	0.04	0.04	0
Rate (per MVM):	0.35	0.07	0.07	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	1500	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	1500	xx ≥ 1,250	★
Curve Density (cur per mile):	0	xx ≥ 0.6	-
Access Density (access per mile):	8.16	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	1	\$257,273.12
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	1	\$15,436.39
Enhanced Edgeline:	Proactive	\$2,700	per mile	0	\$0

Total Estimated Project Cost \$272,709.51

Systemic Project	√
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Rural Segment Project on CSAH 15

Roadway Information

Segment Start: 66 ft East of Intersection of CSAH15/E Central St and Public St
 Segment End: Intersection of CSAH 15 and US 71
 Area Type: Small Town
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 15
 Facility Type: 2-Lane
 Segment Length (mile): 0.17
 Traffic Volume (vpd): 520
 Lane Width (ft): 12
 Shoulder Type: Paved
 Shoulder Width (ft): 2



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	2	1	1	1
Density (per mile per yr):	2.29	1.15	1.15	1.15
Rate (per MVM):	12.09	6.04	6.04	6.04

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	30	≥ 55	-
ADT-RS (Rural Single-veh) (vpd):	520	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	520	xx ≥ 1,250	-
Curve Density (cur per mile):	5.73	xx ≥ 0.6	★
Access Density (access per mile):	11.47	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$470.81

Total Estimated Project Cost \$470.81

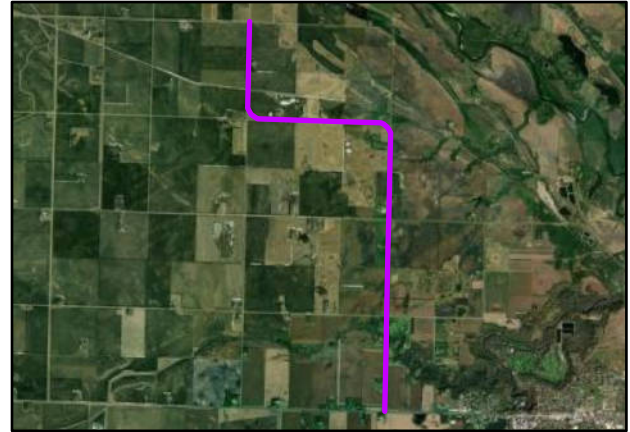
Systemic Project	√
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Rural Segment Project on CSAH 17

Roadway Information

Segment Start: Intersection of CSAH17/Laser Ave and MN 67
 Segment End: Intersection of CSAH 17 and CSAH 9
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 17
 Facility Type: 2-Lane
 Segment Length (mile): 5.41
 Traffic Volume (vpd): 745
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 3



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	2	0	1	0
Density (per mile per yr):	0.07	0	0.04	0
Rate (per MVM):	0.27	0	0.14	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	745	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	745	xx ≥ 1,250	-
Curve Density (cur per mile):	0	xx ≥ 0.6	-
Access Density (access per mile):	9.24	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	1	\$16,228.32
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$14,605.48

Total Estimated Project Cost \$30,833.8

Systemic Project	√
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Rural Segment Project on CSAH 24

Roadway Information

Segment Start: Intersection of CSAH24 and MN 67
 Segment End: 1823 ft West of Intersection of CSAH 24 and of CSAH 2
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 24
 Facility Type: 2-Lane
 Segment Length (mile): 4.66
 Traffic Volume (vpd): 2350
 Lane Width (ft): 11
 Shoulder Type: Gravel
 Shoulder Width (ft): 6



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	4	0	1	0
Density (per mile per yr):	0.17	0	0.04	0
Rate (per MVM):	0.2	0	0.05	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	2350	$500 \leq xx \leq 2,000$	-
ADT-RM (Rural Multi-veh) (vpd):	2350	$xx \geq 1,250$	★
Curve Density (cur per mile):	0	$xx \geq 0.6$	-
Access Density (access per mile):	7.51	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

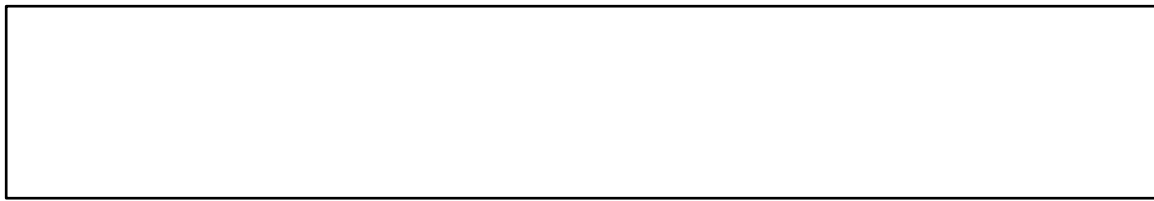
Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	1	\$232,886.73
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	1	\$13,973.2
Enhanced Edgeline:	Proactive	\$2,700	per mile	0	\$0

Total Estimated Project Cost \$246,859.94

Systemic Project	√
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Rural Segment Project on CSAH 25

Roadway Information

Segment Start: Intersection of CSAH25/River Rd W and Laser Ave
 Segment End: Intersection of CSAH 25 and CSAH 101
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 25
 Facility Type: 2-Lane
 Segment Length (mile): 2.33
 Traffic Volume (vpd): 755
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 4



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	755	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	755	$xx \geq 1,250$	-
Curve Density (cur per mile):	0	$xx \geq 0.6$	-
Access Density (access per mile):	7.29	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

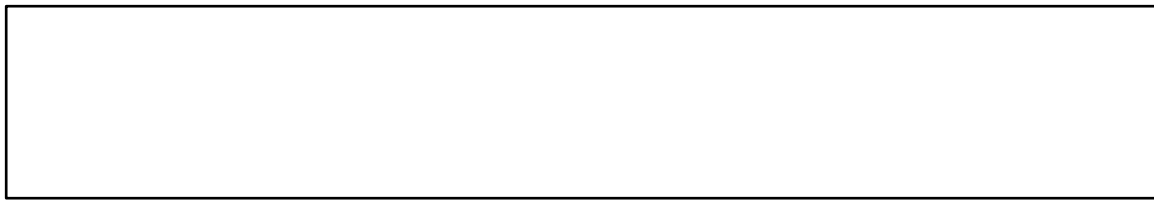
Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	1	\$6,997.6
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$6,297.84

Total Estimated Project Cost \$13,295.43

Systemic Project	√
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Rural Segment Project on CSAH 30

Roadway Information

Segment Start: Intersection of CSAH30/Center St and CSAH 10
 Segment End: Intersection of CSAH 30 and CSAH 7
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 30
 Facility Type: 2-Lane
 Segment Length (mile): 4.42
 Traffic Volume (vpd): 240
 Lane Width (ft): 11
 Shoulder Type: Gravel
 Shoulder Width (ft): 3



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	240	$500 \leq xx \leq 2,000$	-
ADT-RM (Rural Multi-veh) (vpd):	240	$xx \geq 1,250$	-
Curve Density (cur per mile):	0.68	$xx \geq 0.6$	★
Access Density (access per mile):	10.87	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$11,924.55

Total Estimated Project Cost \$11,924.55

Systemic Project	√
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Rural Segment Project on CSAH 32

Roadway Information

Segment Start: 2.0 Miles West of Intersection of CSAH32 and MN 68
 Segment End: Intersection of CSAH 32 and MN 68
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 32
 Facility Type: 2-Lane
 Segment Length (mile): 2
 Traffic Volume (vpd): 1350
 Lane Width (ft): 12
 Shoulder Type: Paved
 Shoulder Width (ft): 3



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	2	0	2	0
Density (per mile per yr):	0.2	0	0.2	0
Rate (per MVM):	0.41	0	0.41	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	1350	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	1350	$xx \geq 1,250$	★
Curve Density (cur per mile):	0	$xx \geq 0.6$	-
Access Density (access per mile):	10.99	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	1	\$6,004.78
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	1	\$6,004.78
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$5,404.3

Total Estimated Project Cost \$17,413.86

Systemic Project	√
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Rural Segment Project on CSAH 45

Roadway Information

Segment Start: .46 Miles West of Intersection of CSAH45/310th Ave and 241st St
 Segment End: Intersection of CSAH 45 and 310th Ave
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 45
 Facility Type: 2-Lane
 Segment Length (mile): 0.47
 Traffic Volume (vpd): 580
 Lane Width (ft): 11
 Shoulder Type: Gravel
 Shoulder Width (ft): 2



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	580	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	580	$xx \geq 1,250$	-
Curve Density (cur per mile):	0	$xx \geq 0.6$	-
Access Density (access per mile):	12.88	$7 \leq xx \leq 18$	★
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$1,257.94

Total Estimated Project Cost \$1,257.94

Systemic Project	√
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Rural Segment Project on CSAH 46

Roadway Information

Segment Start: Intersection of CSAH46/100th Ave and Lyon Redwood Rd
 Segment End: 2603 ft West of Intersection of CSAH 46 and of Crown Av
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 46
 Facility Type: 2-Lane
 Segment Length (mile): 4.59
 Traffic Volume (vpd): 560
 Lane Width (ft): 11
 Shoulder Type: Paved
 Shoulder Width (ft): 2



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	3	1	2	1
Density (per mile per yr):	0.13	0.04	0.09	0.04
Rate (per MVM):	0.64	0.21	0.43	0.21

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	55	≥ 55	★
ADT-RS (Rural Single-veh) (vpd):	560	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	560	xx ≥ 1,250	-
Curve Density (cur per mile):	0.65	xx ≥ 0.6	★
Access Density (access per mile):	7.18	7 ≤ xx ≤ 18	★
Outside Edge Risk:	1	2S or 3	-
Total Stars:			★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$12,401.79
Total Estimated Project Cost					\$12,401.79

Systemic Project	√
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Rural Segment Project on CSAH 101

Roadway Information

Segment Start: Intersection of CSAH101 and US 71
 Segment End: 400 ft South of Intersection of CSAH 101 and of Burr Oak Rd
 Area Type: Small Town
 County: Redwood
 Context Zone: Industrial
 Segment Route System: CSAH
 Segment Route No: 101
 Facility Type: 2-Lane
 Segment Length (mile): 0.81
 Traffic Volume (vpd): 2850
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 12



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	15	0	1	0
Density (per mile per yr):	3.72	0	0.25	0
Rate (per MVM):	3.57	0	0.24	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	30	≥ 55	-
ADT-RS (Rural Single-veh) (vpd):	2850	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	2850	xx ≥ 1,250	★
Curve Density (cur per mile):	1.24	xx ≥ 0.6	★
Access Density (access per mile):	9.91	7 ≤ xx ≤ 18	-
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	1	\$40,357.25
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	1	\$2,421.44
Enhanced Edgeline:	Proactive	\$2,700	per mile	0	\$0

Total Estimated Project Cost \$42,778.69

Systemic Project	√
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Rural Segment Project on CSAH 101

Roadway Information

Segment Start: 2415 north of Intersection of CSAH101/Main St and Burr Oak Rd
 Segment End: 56 ft South of Intersection of CSAH 101 and of Front St
 Area Type: Small Town
 County: Redwood
 Context Zone: Natural
 Segment Route System: CSAH
 Segment Route No: 101
 Facility Type: 2-Lane
 Segment Length (mile): 0.29
 Traffic Volume (vpd): 2850
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 15



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	1	0	1	0
Density (per mile per yr):	0.69	0	0.69	0
Rate (per MVM):	0.67	0	0.67	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	30	≥ 55	-
ADT-RS (Rural Single-veh) (vpd):	2850	500 ≤ xx ≤ 2,000	★
ADT-RM (Rural Multi-veh) (vpd):	2850	xx ≥ 1,250	★
Curve Density (cur per mile):	3.46	xx ≥ 0.6	★
Access Density (access per mile):	10.39	7 ≤ xx ≤ 18	-
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
-------------------	---

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	1	\$14,439.72
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	1	\$866.38
Enhanced Edgeline:	Proactive	\$2,700	per mile	0	\$0

Total Estimated Project Cost \$15,306.1

Systemic Project	√
------------------	---

Rural Segment Project on CSAH 101

Roadway Information

Segment Start: 56ft south of Intersection of CSAH101/River Rd and Front St
 Segment End: 116 ft South of Intersection of CSAH 101 and of Cedar Cliff Rd
 Area Type: Small Town
 County: Redwood
 Context Zone: Residential
 Segment Route System: CSAH
 Segment Route No: 101
 Facility Type: 2-Lane
 Segment Length (mile): 0.39
 Traffic Volume (vpd): 2250
 Lane Width (ft): 12
 Shoulder Type: Paved
 Shoulder Width (ft): 8



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	6	0	6	0
Density (per mile per yr):	3.05	0	3.05	0
Rate (per MVM):	3.72	0	3.72	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	30	≥ 55	-
ADT-RS (Rural Single-veh) (vpd):	2250	$500 \leq xx \leq 2,000$	★
ADT-RM (Rural Multi-veh) (vpd):	2250	$xx \geq 1,250$	★
Curve Density (cur per mile):	5.09	$xx \geq 0.6$	★
Access Density (access per mile):	10.17	$7 \leq xx \leq 18$	-
Outside Edge Risk:	1	2S or 3	-

Total Stars: ★★★

Priority Location	√
-------------------	---

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Buffer Between Opposing Lanes:	Proactive	\$150,000	per mile	0	\$0
Clear Zone Enhancements:	Proactive	\$100,000	per mile	0	\$0
6" Wet Reflective Paint in Groove:	Proactive	\$2,700	per mile	0	\$0
Shoulder Paving, Safety Edge:	Proactive	\$50,000	per mile	0	\$0
Centerline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Edgeline Rumble Strip:	Proactive	\$3,000	per mile	0	\$0
Shoulder Rumble Strip:	Proactive	\$3,000	per mile	1	\$1,179.85
Enhanced Edgeline:	Proactive	\$2,700	per mile	1	\$1,061.86

Total Estimated Project Cost \$2,241.71

Systemic Project	√
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Curve along CSAH 2

Roadway Information

Segment Start: Intersection of CSAH2/S Somerville St and Tempel Dr
 Segment End: Intersection of CSAH 2 and MN 68
 Area Type: Rural
 County: Redwood
 Context Zone: Natural
 Segment Route System: CSAH
 Segment Route No: 2
 Curve Length (ft): 544.74
 Curve Radius (ft): 609.19
 Traffic Volume (vpd): 750
 Lane Width (ft): 11
 Shoulder Type: None
 Shoulder Width (ft): 0



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	1	0	1	0
Density (per mile per yr):	0.2	0	0.2	0
Rate (per MVM):	0.73	0	0.73	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Radius (ft):	609.19	500 ≤ xx < 1400	-
ADT (vpd):	750	200 ≤ xx < 800	★
Lane Width (ft):	11	< 12	★
Shoulder Type:	None	None, Gravel, Composite	★
Total Cross Section Width (ft)	28	28 ≤ xx < 34	★
Adjacent Intersection:	None	Roadway or Railroad Crossing	-
Visual Trap:	None	Present	-
Outside Edge Risk:	3	2S or 3 deficiencies	★
Total Stars:			★★★★★

Priority Location	√
-------------------	---

List of Strategies Considered

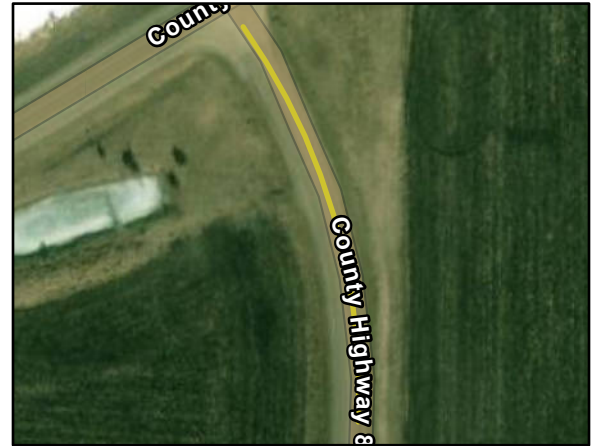
	Type	Unit Cost	Unit	Quantity	Total Cost
Clear Zone Enhancements:	Proactive	\$100,000	Per curve	1	\$100,000
High Friction Surface Treatment:	Proactive	\$30/sq yd	Per sq yd	0	\$0
Reconstruct TT to Single T:	Proactive	\$400,000	Per curve	0	\$0
Lighting:	Proactive	\$15,000	Per light/curve	0	\$0
Curve Warning Sign:	Proactive	\$1,000	Per curve	0	\$0
Speed Advisory Signs:	Proactive	\$1,000	Per curve	0	\$0
Chevrons/Arrow Board:	Proactive	\$2,500	Per curve	0	\$0
Total Estimated Project Cost:					\$100,000

Systemic Project	√
------------------	---

Curve along CSAH 8

Roadway Information

Segment Start: Intersection of CSAH8 and MN 19
 Segment End: Intersection of CSAH 8 and CSAH 46
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 8
 Curve Length (ft): 363.69
 Curve Radius (ft): 168.03
 Traffic Volume (vpd): 170
 Lane Width (ft): 13
 Shoulder Type: Gravel
 Shoulder Width (ft): 2



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment	
Radius (ft):	168.03	$500 \leq xx < 1400$	★	
ADT (vpd):	170	$200 \leq xx < 800$	-	
Lane Width (ft):	13	< 12	-	
Shoulder Type:	Gravel	None, Gravel, Composite	★	
Total Cross Section Width (ft)	32	$28 \leq xx < 34$	★	
Adjacent Intersection:	Intersection	Roadway or Railroad Crossing	★	
Visual Trap:	None	Present	-	
Outside Edge Risk:	2S	2S or 3 deficiencies	★	<input type="checkbox"/> Priority Location <input checked="" type="checkbox"/>
Total Stars:			★★★★★	

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Clear Zone Enhancements:	Proactive	\$100,000	Per curve	0	\$0
High Friction Surface Treatment:	Proactive	\$30/sq yd	Per sq yd	0	\$0
Reconstruct TT to Single T:	Proactive	\$400,000	Per curve	0	\$0
Lighting:	Proactive	\$15,000	Per light/curve	0	\$0
Curve Warning Sign:	Proactive	\$1,000	Per curve	0	\$0
Speed Advisory Signs:	Proactive	\$1,000	Per curve	1	\$1,000
Chevrons/Arrow Board:	Proactive	\$2,500	Per curve	1	\$2,500
Total Estimated Project Cost:					\$3,500

Systemic Project

County Completed - Curve Warning Sign

Curve along CSAH 11 / 280th St

Roadway Information

Segment Start: Intersection of CSAH11/280th St and CSAH 2
 Segment End: 3982 ft North of Intersection of CSAH 11 and of 350th St
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 11
 Curve Length (ft): 1253.18
 Curve Radius (ft): 210.25
 Traffic Volume (vpd): 490
 Lane Width (ft): 11
 Shoulder Type: Paved
 Shoulder Width (ft): 4



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	1	0	1	0
Density (per mile per yr):	0.2	0	0.2	0
Rate (per MVM):	1.12	0	1.12	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment			
Radius (ft):	210.25	$500 \leq xx < 1400$	★			
ADT (vpd):	490	$200 \leq xx < 800$	★			
Lane Width (ft):	11	< 12	★			
Shoulder Type:	Paved	None, Gravel, Composite	-			
Total Cross Section Width (ft)	26	$28 \leq xx < 34$	-			
Adjacent Intersection:	Intersection	Roadway or Railroad Crossing	★			
Visual Trap:	None	Present	-			
Outside Edge Risk:	2S	2S or 3 deficiencies	★			
Total Stars:			★★★★★	<table border="1" style="float: right;"> <tr> <td>Priority Location</td> <td style="text-align: center;">√</td> </tr> </table>	Priority Location	√
Priority Location	√					

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Clear Zone Enhancements:	Proactive	\$100,000	Per curve	0	\$0
High Friction Surface Treatment:	Proactive	\$30/sq yd	Per sq yd	0	\$0
Reconstruct TT to Single T:	Proactive	\$400,000	Per curve	0	\$0
Lighting:	Proactive	\$15,000	Per light/curve	0	\$0
Curve Warning Sign:	Proactive	\$1,000	Per curve	1	\$1,000
Speed Advisory Signs:	Proactive	\$1,000	Per curve	1	\$1,000
Chevrons/Arrow Board:	Proactive	\$2,500	Per curve	1	\$2,500
Total Estimated Project Cost:					\$4,500

Systemic Project	√
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Curve along Dalton Ave (Co Hwy 17)

Roadway Information

Segment Start: Intersection of CSAH 17 Ave and US 14
 Segment End: 118 ft North of Intersection of CSAH 17 and of 180th St
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 17
 Curve Length (ft): 1213.67
 Curve Radius (ft): 225.59
 Traffic Volume (vpd): 245
 Lane Width (ft): 11
 Shoulder Type: None
 Shoulder Width (ft): 0



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Radius (ft):	225.59	$500 \leq xx < 1400$	★
ADT (vpd):	245	$200 \leq xx < 800$	★
Lane Width (ft):	11	< 12	★
Shoulder Type:	None	None, Gravel, Composite	★
Total Cross Section Width (ft)	26	$28 \leq xx < 34$	-
Adjacent Intersection:	Intersection	Roadway or Railroad Crossing	★
Visual Trap:	Present	Present	★
Outside Edge Risk:	2S	2S or 3 deficiencies	★
Total Stars:			★★★★★★

Priority Location	√
-------------------	---

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Clear Zone Enhancements:	Proactive	\$100,000	Per curve	0	\$0
High Friction Surface Treatment:	Proactive	\$30/sq yd	Per sq yd	0	\$0
Reconstruct TT to Single T:	Proactive	\$400,000	Per curve	1	\$400,000
Lighting:	Proactive	\$15,000	Per light/curve	0	\$0
Curve Warning Sign:	Proactive	\$1,000	Per curve	0	\$0
Speed Advisory Signs:	Proactive	\$1,000	Per curve	0	\$0
Chevrons/Arrow Board:	Proactive	\$2,500	Per curve	0	\$0

Total Estimated Project Cost: \$400,000

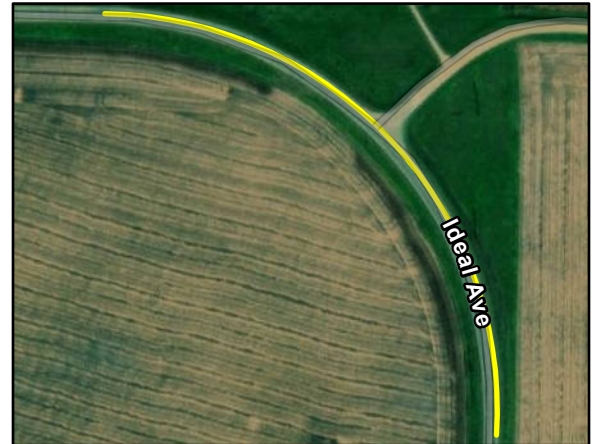
Systemic Project	√
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County Completed - Curve Warning Sign and Chevrons or Arrow Board

Curve along CSAH 18

Roadway Information

Segment Start: Intersection of CSAH18/CSAH 18 and MN 68
 Segment End: Intersection of CSAH 18 and CSAH 7
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 18
 Curve Length (ft): 1396.64
 Curve Radius (ft): 262.38
 Traffic Volume (vpd): 310
 Lane Width (ft): 12
 Shoulder Type: Gravel
 Shoulder Width (ft): 5



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	1	0	1	0
Density (per mile per yr):	0.2	0	0.2	0
Rate (per MVM):	1.77	0	1.77	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment	
Radius (ft):	262.38	$500 \leq xx < 1400$	★	
ADT (vpd):	310	$200 \leq xx < 800$	★	
Lane Width (ft):	12	< 12	-	
Shoulder Type:	Gravel	None, Gravel, Composite	★	
Total Cross Section Width (ft)	32	$28 \leq xx < 34$	★	
Adjacent Intersection:	Intersection	Roadway or Railroad Crossing	★	
Visual Trap:	None	Present	-	
Outside Edge Risk:	1	2S or 3 deficiencies	-	Priority Location <input checked="" type="checkbox"/>
Total Stars:			★★★★★	

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Clear Zone Enhancements:	Proactive	\$100,000	Per curve	0	\$0
High Friction Surface Treatment:	Proactive	\$30/sq yd	Per sq yd	0	\$0
Reconstruct TT to Single T:	Proactive	\$400,000	Per curve	0	\$0
Lighting:	Proactive	\$15,000	Per light/curve	0	\$0
Curve Warning Sign:	Proactive	\$1,000	Per curve	1	\$1,000
Speed Advisory Signs:	Proactive	\$1,000	Per curve	0	\$0
Chevrons/Arrow Board:	Proactive	\$2,500	Per curve	1	\$2,500
Total Estimated Project Cost:					\$3,500

Systemic Project

Curve along CSAH 30 / Center St

Roadway Information

Segment Start: Intersection of CSAH30/Center St and CSAH 10
 Segment End: Intersection of CSAH 30 and CSAH 7
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 30
 Curve Length (ft): 1208.82
 Curve Radius (ft): 221.44
 Traffic Volume (vpd): 240
 Lane Width (ft): 11
 Shoulder Type: Unknown
 Shoulder Width (ft): 0



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Radius (ft):	221.44	$500 \leq xx < 1400$	★
ADT (vpd):	240	$200 \leq xx < 800$	★
Lane Width (ft):	11	< 12	★
Shoulder Type:	Unknown	None, Gravel, Composite	-
Total Cross Section Width (ft)	28	$28 \leq xx < 34$	★
Adjacent Intersection:	Intersection	Roadway or Railroad Crossing	★
Visual Trap:	Present	Present	★
Outside Edge Risk:	Unknown	2S or 3 deficiencies	-
Total Stars:			★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Clear Zone Enhancements:	Proactive	\$100,000	Per curve	0	\$0
High Friction Surface Treatment:	Proactive	\$30/sq yd	Per sq yd	0	\$0
Reconstruct TT to Single T:	Proactive	\$400,000	Per curve	0	\$0
Lighting:	Proactive	\$15,000	Per light/curve	0	\$0
Curve Warning Sign:	Proactive	\$1,000	Per curve	1	\$1,000
Speed Advisory Signs:	Proactive	\$1,000	Per curve	0	\$0
Chevrons/Arrow Board:	Proactive	\$2,500	Per curve	1	\$2,500
Total Estimated Project Cost:					\$3,500

Systemic Project	√
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Curve along CSAH 30 / Center St

Roadway Information

Segment Start: Intersection of CSAH30/Center St and CSAH 10
 Segment End: Intersection of CSAH 30 and CSAH 7
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 30
 Curve Length (ft): 1060.64
 Curve Radius (ft): 218.07
 Traffic Volume (vpd): 240
 Lane Width (ft): 11
 Shoulder Type: Unknown
 Shoulder Width (ft): 0



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Radius (ft):	218.07	$500 \leq xx < 1400$	★
ADT (vpd):	240	$200 \leq xx < 800$	★
Lane Width (ft):	11	< 12	★
Shoulder Type:	Unknown	None, Gravel, Composite	-
Total Cross Section Width (ft)	28	$28 \leq xx < 34$	★
Adjacent Intersection:	None	Roadway or Railroad Crossing	-
Visual Trap:	Present	Present	★
Outside Edge Risk:	Unknown	2S or 3 deficiencies	-
Total Stars:			★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Clear Zone Enhancements:	Proactive	\$100,000	Per curve	0	\$0
High Friction Surface Treatment:	Proactive	\$30/sq yd	Per sq yd	0	\$0
Reconstruct TT to Single T:	Proactive	\$400,000	Per curve	0	\$0
Lighting:	Proactive	\$15,000	Per light/curve	0	\$0
Curve Warning Sign:	Proactive	\$1,000	Per curve	1	\$1,000
Speed Advisory Signs:	Proactive	\$1,000	Per curve	0	\$0
Chevrons/Arrow Board:	Proactive	\$2,500	Per curve	1	\$2,500
Total Estimated Project Cost:					\$3,500

Systemic Project	√
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Curve along CSAH 45 / 241st St

Roadway Information

Segment Start: .46 Miles West of Intersection of CSAH45/310th Ave and 241st St
 Segment End: Intersection of CSAH 45 and 310th Ave
 Area Type: Rural
 County: Redwood
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 45
 Curve Length (ft): 1298.2
 Curve Radius (ft): 248.34
 Traffic Volume (vpd): 155
 Lane Width (ft): 12
 Shoulder Type: None
 Shoulder Width (ft): 0



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Crash Information

5-year Crash History (2016 - 2020)	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Radius (ft):	248.34	$500 \leq xx < 1400$	★
ADT (vpd):	155	$200 \leq xx < 800$	-
Lane Width (ft):	12	< 12	-
Shoulder Type:	None	None, Gravel, Composite	★
Total Cross Section Width (ft)	28	$28 \leq xx < 34$	★
Adjacent Intersection:	Intersection	Roadway or Railroad Crossing	★
Visual Trap:	Present	Present	★
Outside Edge Risk:	3	2S or 3 deficiencies	★
Total Stars:			★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Clear Zone Enhancements:	Proactive	\$100,000	Per curve	0	\$0
High Friction Surface Treatment:	Proactive	\$30/sq yd	Per sq yd	0	\$0
Reconstruct TT to Single T:	Proactive	\$400,000	Per curve	0	\$0
Lighting:	Proactive	\$15,000	Per light/curve	0	\$0
Curve Warning Sign:	Proactive	\$1,000	Per curve	1	\$1,000
Speed Advisory Signs:	Proactive	\$1,000	Per curve	0	\$0
Chevrons/Arrow Board:	Proactive	\$2,500	Per curve	1	\$2,500
Total Estimated Project Cost:					\$3,500

Systemic Project	√
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Rural Intersection on MN 67

Roadway Information

Description: MN 67 & CSAH 1
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 1
 Design Type: Traditional
 Configuration: T
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 2,150
 Minor ADT: 210
 Total Entering ADT: 2,360



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	55	≥60	-
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	2,360	≥2,000	★
OR Traffic Volume Cross Product:	451,500	≥1,000,000	-
Leg Configuration:	T	X	-
Alignment Skew(degrees):	45	≥10	★
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	0	Present	-
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	0	LTTR or TB	-
Total Stars:			★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project	√
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Rural Intersection on US 71

Roadway Information

Description: US 71 & CSAH 4
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 4
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 2,500
 Minor ADT: 255
 Total Entering ADT: 2,755



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	1	0	0	0
Density (per mile per yr):	0.2	0	0	0
Rate (per MVM):	0.2	0	0	0

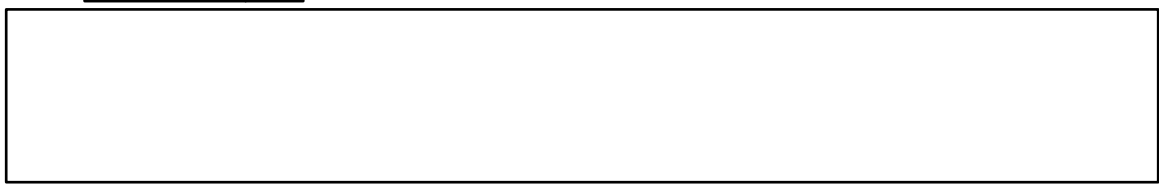
Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	60	≥60	★
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	2,755	≥2,000	★
OR Traffic Volume Cross Product:	637,500	≥1,000,000	-
Leg Configuration:	X	X	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	1	Present	-
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	1	LTTR or TB	-
Total Stars:			★★★★
			Priority Location <input checked="" type="checkbox"/>

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project



Rural Intersection on MN 68

Roadway Information

Description: MN 68 & CSAH 5
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 5
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 1,150
 Minor ADT: 295
 Total Entering ADT: 1,445



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	60	≥60	★
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	1,445	≥2,000	-
OR Traffic Volume Cross Product:	339,250	≥1,000,000	-
Leg Configuration:	X	X	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	0	Present	-
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	0	LTR or TB	-
Total Stars:			★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project	√
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Rural Intersection on US 14

Roadway Information

Description: US 14 & CSAH 6 (Ilex St)
 County: Redwood
 Area Type: Small Town
 Context Zone: Industrial
 Segment Route System: CSAH
 Segment Route No: 6
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: Present
 Flasher: None
 Major ADT: 2,000
 Minor ADT: 1,375
 Total Entering ADT: 3,375



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	3	1	2	1
Density (per mile per yr):	0.6	0.2	0.4	0.2
Rate (per MVM):	0.5	0.2	0.3	0.2

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	55	≥60	-
Context Zone:	Industrial	Commercial, Industrial, Mixed Use, Residential	★
Entering ADT(vpd):	3,375	≥2,000	★
OR Traffic Volume Cross Product:	2,750,000	≥1,000,000	★
Leg Configuration:	X	X	★
Alignment Skew(degrees):	15	≥10	★
Adjacent Curve:	None	Horizontal, Vertical, Both	-
Adjacent Development:	None	Present	-
Adjacent RR Crossing:	3	Present	★
Previous Stop:	>5	> 5 Miles	★
1st Major Approach			
Turn Lane Configuration:	3	LTTR or TB	-
Total Stars:			★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	1	\$3,000
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	0	\$0
Review Signs and Markings:	Proactive	\$0	Per Intersection	1	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$3,000

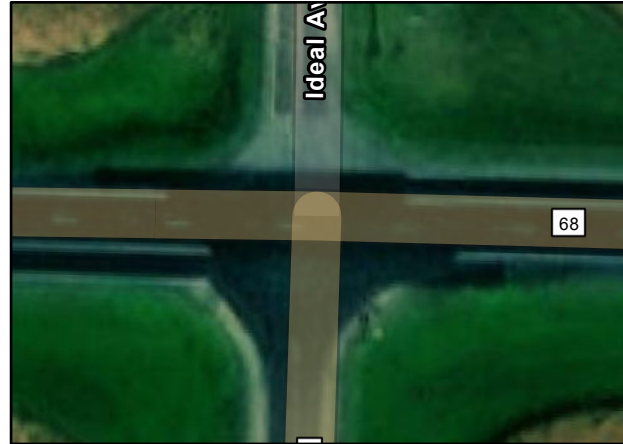
Systemic Project	√
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Rural Intersection on MN 68

Roadway Information

Description: MN 68 & CSAH 6
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 6
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 2,300
 Minor ADT: 632
 Total Entering ADT: 2,932



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	3	0	1	0
Density (per mile per yr):	0.6	0	0.2	0
Rate (per MVM):	0.6	0	0.2	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	60	≥60	★
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	2,932	≥2,000	★
OR Traffic Volume Cross Product:	1,453,600	≥1,000,000	★
Leg Configuration:	X	X	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	3	Present	-
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	3	LTRR or TB	-
Total Stars:			★★★★

Priority Location	<input checked="" type="checkbox"/>
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project	<input checked="" type="checkbox"/>
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Rural Intersection on MN 68

Roadway Information

Description: MN 68 & CSAH 7
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 7
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 1,575
 Minor ADT: 262
 Total Entering ADT: 1,838



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment	
Major Approach Speed Limit (mph):	60	≥60	★	
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-	
Entering ADT(vpd):	1,838	≥2,000	-	
OR Traffic Volume Cross Product:	412,650	≥1,000,000	-	
Leg Configuration:	X	X	★	
Alignment Skew(degrees):	0	≥10	-	
Adjacent Curve:	None	Horizontal,	-	
Adjacent Development:	None	Vertical, Both	-	
Adjacent RR Crossing:	0	Present	-	
Previous Stop:	>5	Present	★	
1st Major Approach		> 5 Miles	-	
Turn Lane Configuration:	0	LTTR or TB	-	
Total Stars:			★★★	Priority Location <input checked="" type="checkbox"/>

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project

Rural Intersection on MN 19

Roadway Information

Description: MN 19 & CSAH 7
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 7
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 2,450
 Minor ADT: 760
 Total Entering ADT: 3,210



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	1	0	0	0
Density (per mile per yr):	0.2	0	0	0
Rate (per MVM):	0.2	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	60	≥60	★
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	3,210	≥2,000	★
OR Traffic Volume Cross Product:	1,862,000	≥1,000,000	-
Leg Configuration:	X	X	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	1	Present	-
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	1	LTTR or TB	-
Total Stars:			★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project	√
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Rural Intersection on US 14

Roadway Information

Description: US 14 & CSAH 8
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 8
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 1,800
 Minor ADT: 205
 Total Entering ADT: 2,005



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment	
Major Approach Speed Limit (mph):	60	≥60	★	
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-	
Entering ADT(vpd):	2,005	≥2,000	★	
OR Traffic Volume Cross Product:	369,000	≥1,000,000	-	
Leg Configuration:	X	X	★	
Alignment Skew(degrees):	0	≥10	-	
Adjacent Curve:	None	Horizontal,	-	
Adjacent Development:	None	Vertical, Both	-	
Adjacent RR Crossing:	0	Present	-	
Previous Stop:	>5	Present	★	
1st Major Approach		> 5 Miles	-	
Turn Lane Configuration:	0	LTTR or TB	-	
Total Stars:			★★★★	Priority Location <input checked="" type="checkbox"/>

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project



Rural Intersection on MN 68 (Euclid Ave)

Roadway Information

Description: MN 68 (Euclid Ave) & CSAH 32
 County: Redwood
 Area Type: Small Town
 Context Zone: Recreational
 Segment Route System: CSAH
 Segment Route No: 8
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 1,400
 Minor ADT: 705
 Total Entering ADT: 2,105



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	60	≥60	★
Context Zone:	Recreational	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT (vpd):	2,105	≥2,000	★
OR Traffic Volume Cross Product:	987,000	≥1,000,000	-
Leg Configuration:	X	X	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	0	Present	-
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	0	LTTR or TB	-
Total Stars:			★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project	√
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Rural Intersection on US 14

Roadway Information

Description: US 14 & CSAH 10
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 10
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 1,900
 Minor ADT: 225
 Total Entering ADT: 2,125



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	1	0	1	0
Density (per mile per yr):	0.2	0	0.2	0
Rate (per MVM):	0.3	0	0.3	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	55	≥60	-
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	2,125	≥2,000	★
OR Traffic Volume Cross Product:	427,500	≥1,000,000	-
Leg Configuration:	X	X	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	1	Present	★
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	1	LTTR or TB	-
Total Stars:			★★★★

Priority Location	<input checked="" type="checkbox"/>
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project	<input checked="" type="checkbox"/>
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Rural Intersection on MN 68

Roadway Information

Description: MN 68 & CSAH 10
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 10
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 1,150
 Minor ADT: 452
 Total Entering ADT: 1,602



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	60	≥60	★
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	1,602	≥2,000	-
OR Traffic Volume Cross Product:	519,800	≥1,000,000	-
Leg Configuration:	X	X	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	0	Present	-
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	0	LTTR or TB	-
Total Stars:			★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project	√
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Rural Intersection on MN 67

Roadway Information

Description: MN 67 & CSAH 13
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 13
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 2,300
 Minor ADT: 1,140
 Total Entering ADT: 3,440



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	55	≥60	-
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	3,440	≥2,000	★
OR Traffic Volume Cross Product:	2,622,000	≥1,000,000	-
Leg Configuration:	X	X	★
Alignment Skew(degrees):	45	≥10	★
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	0	Present	-
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	0	LTTR or TB	-
Total Stars:			★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	1	\$3,000
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$18,000

Systemic Project	√
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Rural Intersection on CSAH 115 (Main St)

Roadway Information

Description: CSAH 115 (Main St) & CSAH 15 (W Central St)
 County: Redwood
 Area Type: Small Town
 Context Zone: Mixed Use
 Segment Route System: CSAH
 Segment Route No: 15
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: Present
 Flasher: None
 Major ADT: 950
 Minor ADT: 520
 Total Entering ADT: 1,470



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	1	0	1	0
Density (per mile per yr):	0.2	0	0.2	0
Rate (per MVM):	0.4	0	0.4	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	30	≥60	-
Context Zone:	Mixed Use	Commercial, Industrial, Mixed Use, Residential	★
Entering ADT(vpd):	1,470	≥2,000	-
OR Traffic Volume Cross Product:	494,000	≥1,000,000	★
Leg Configuration:	X	X	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	1	Present	-
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	1	LTTR or TB	-
Total Stars:			★★★

Priority Location	√
-------------------	---

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	1	\$2,000
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$17,000

Systemic Project	√
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Rural Intersection on CSAH 17

Roadway Information

Description: CSAH 17 & CSAH 26 (150th St)
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 17
 Design Type: Traditional
 Configuration: TT
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 245
 Minor ADT: 68
 Total Entering ADT: 312



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	55	≥60	-
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	312	≥2,000	-
OR Traffic Volume Cross Product:	16,660	≥1,000,000	-
Leg Configuration:	TT	X	★
Alignment Skew(degrees):	45	≥10	★
Adjacent Curve:	Horizontal	Horizontal, Vertical, Both	-
Adjacent Development:	None	Present	-
Adjacent RR Crossing:	0	Present	★
Previous Stop:	>5	> 5 Miles	-
1st Major Approach			-
Turn Lane Configuration:	0	LTTR or TB	-
Total Stars:			★★★

Priority Location

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	1	\$400,000
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	0	\$0
Review Signs and Markings:	Proactive	\$0	Per Intersection	1	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$400,000

Systemic Project



Rural Intersection on MN 67

Roadway Information

Description: MN 67 & CSAH 24
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 24
 Design Type: Traditional
 Configuration: T
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 2,000
 Minor ADT: 1,175
 Total Entering ADT: 3,175



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	1	0	0	0
Density (per mile per yr):	0.2	0	0	0
Rate (per MVM):	0.2	0	0	0

Systemic Safety Risk Factors

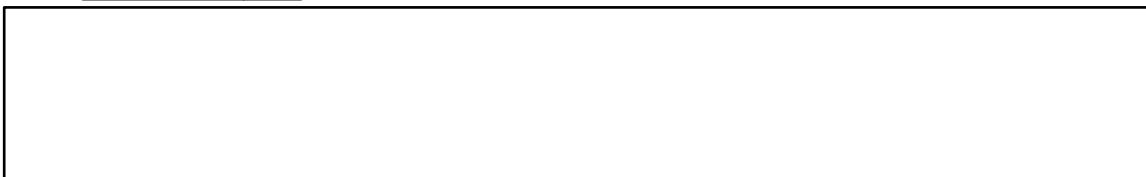
	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	55	≥60	-
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	3,175	≥2,000	★
OR Traffic Volume Cross Product:	2,350,000	≥1,000,000	-
Leg Configuration:	T	X	-
Alignment Skew(degrees):	45	≥10	★
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	1	Present	-
Previous Stop:	<5	Present	-
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	1	LTTR or TB	★
Total Stars:			★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	1	\$3,000
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$18,000

Systemic Project	√
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Rural Intersection on CSAH 1

Roadway Information

Description: CSAH 1 & CSAH 24
 County: Redwood
 Area Type: Rural
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 24
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: None
 Flasher: None
 Major ADT: 1,975
 Minor ADT: 2,350
 Total Entering ADT: 4,325



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	2	0	0	0
Density (per mile per yr):	0.4	0	0	0
Rate (per MVM):	0.3	0	0	0

Systemic Safety Risk Factors

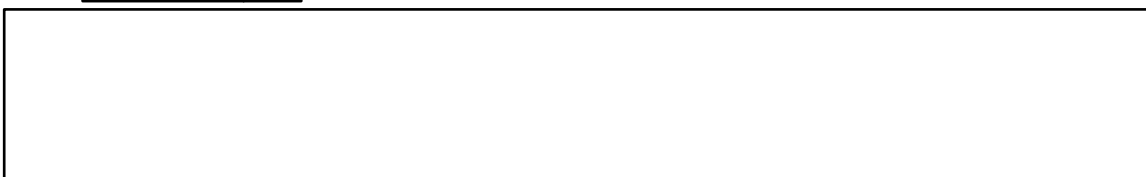
	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	55	≥60	-
Context Zone:	Agriculture	Commercial, Industrial, Mixed Use, Residential	-
Entering ADT(vpd):	4,325	≥2,000	★
OR Traffic Volume Cross Product:	4,641,250	≥1,000,000	★
Leg Configuration:	X	X	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	2	Present	-
Previous Stop:	>5	Present	★
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	2	LTTR or TB	-
Total Stars:			★★★

Priority Location

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	0	\$0
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	1	\$15,000
Review Signs and Markings:	Proactive	\$0	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$15,000

Systemic Project



Rural Intersection on CSAH 24

Roadway Information

Description: CSAH 24 & CSAH 2
 County: Redwood
 Area Type: Small Town
 Context Zone: Residential
 Segment Route System: CSAH
 Segment Route No: 24
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: Present
 Flasher: None
 Major ADT: 2,400
 Minor ADT: 1,255
 Total Entering ADT: 3,655



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	0	0	0	0
Density (per mile per yr):	0	0	0	0
Rate (per MVM):	0	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Major Approach Speed Limit (mph):	55	≥60	-
Context Zone:	Residential	Commercial, Industrial, Mixed Use, Residential	★
Entering ADT(vpd):	3,655	≥2,000	★
OR Traffic Volume Cross Product:	3,012,000	≥1,000,000	-
Leg Configuration:	X	X	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Curve:	None	Horizontal,	-
Adjacent Development:	None	Vertical, Both	-
Adjacent RR Crossing:	0	Present	-
Previous Stop:	<5	Present	-
1st Major Approach		> 5 Miles	-
Turn Lane Configuration:	0	LTTR or TB	-
Total Stars:			★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Reconstruct TT to Single T:	Proactive	\$400,000	Per Intersection	0	\$0
Roundabout:	Proactive	\$2,500,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
LED Stop Sign:	Proactive	\$2,000-6,000	Each	0	\$0
Thru-Stop to All Way Stop/Yield:	Proactive	\$3,000	Per Intersection	1	\$3,000
Left-Turn Lanes on Major Road:	Proactive	\$250,000	Each	0	\$0
Lighting:	Proactive	\$15,000	Each	0	\$0
Review Signs and Markings:	Proactive	\$0	Per Intersection	1	\$0
Upgrade Signs & Markings:	Proactive	\$1,500	Per Intersection	0	\$0
Total Estimated Project Cost					\$3,000

Systemic Project	√
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Urban Segment Project on CSAH 101

Roadway Information

Segment Start: 42 ft South of Intersection of CSAH101/S Dekalb St and E 2nd St
 Segment End: Intersection of CSAH 101 and US 71
 Area Type: Suburban
 County: Redwood
 Context Zone: Commercial
 Segment Route System: CSAH
 Segment Route No: 101
 Facility Type: 4-Lane
 Segment Length (mile): 0.09
 Traffic Volume (vpd): 3600
 Lane Width (ft): 12
 Shoulder Type: Paved
 Shoulder Width (ft): 8



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe Crash Count	Total Lane Departure	Severe Lane Departure
Crash Frequency:	11	0	0	0
Density (per mile per yr):	24.88	0	0	0
Rate (per MVM):	18.94	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Speed Limit (mph):	30	≥ 50	-
Traffic Volume (vpd):	3600	4,000 ≥ xx ≤ 14,000	-
Access Density (access per mile):	45.24	15 ≥ xx ≤ 25	-
Context Zone:	Commercial	Commercial, Mixed Use	★
Edgeline Striping:	Present	None	-
Lane Width (ft):	12	10 - 11.5 feet	-
Parking:	None	Present	-
Cross Section and Design:	4-Lane	Multi-lane	★
Edge Risk:	1	3 Deficiencies	-
Shoulder Width (ft):	8	< 3 Feet	-
Total Stars:			★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Divided Roadway:	Proactive	\$5,000,000	per mile	0	\$0
Access Management:	Proactive	\$360,000	per mile	0	\$0
Road Diet:	Proactive	\$25,000 - 40,000	per mile	0	\$0
Vehicle Speed Feedback Signs:	Proactive	\$30,000	per segment	1	\$30,000
Sidewalk:	Proactive	\$80,000	per mile	0	\$0

Total Estimated Project Cost \$30,000

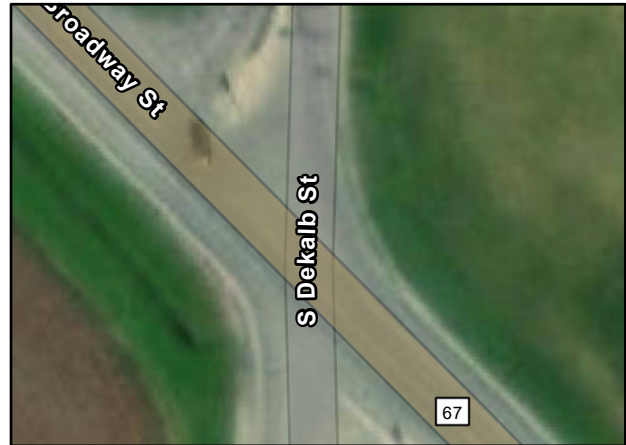
Systemic Project	√
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Urban (Vehicle) Intersection on MN 67

Roadway Information

Description: MN 67 & CSAH 101 (Normandale Rd)
 County: Redwood
 Area Type: Suburban
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 101
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: Present
 Flasher: None
 Major ADT: 2,475
 Minor ADT: 1,900
 Total Entering ADT: 4,375



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	2	1	2	1
Density (per mile per yr):	0.4	0.2	0.4	0.2
Rate (per MVM):	0.3	0.1	0.3	0.1

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Context Zone:	Agriculture	Commercial	-
Traffic Control Device:	Thru-Stop	Signal	-
Entering ADT(vpd):	4,375	≥12,000	-
OR Total Traffic Cross Product:	4,702,500	> 20,000,000	-
Leg Configuration:	X	X	★
Major Division Type:	Undivided	Divided	-
Alignment Skew(degrees):	45	≥10	★
Adjacent Development:	None	Present	-
Major Approach Speed Limit (mph):	50	≥40	★
OR Minor Approach Speed Limit (mph):	45	≥35	-
Major Approach Left Turn Lane Phasing:	NA	Permitted, Permitted/Protected	-
1st Major Approach Turn Lane Configuration:	TR	≥2 Left Turn, ≥2 Thru Lane	-
Total Stars:			★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Lighting:	Proactive	\$15,000	Each	0	\$0
Roundabout:	Proactive	\$3,000,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
Signalized J-Turn:	Proactive	\$1,500,000	Per Intersection	0	\$0
Thru-Stop to All-Way Stop/Yield:	Proactive	\$7,500	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$3,500	Per Intersection	1	\$3,500
Confirmation Lights:	Proactive	\$1,500	Per Intersection	0	\$0
Upgrade Signal Hardware:	Proactive	\$50,000	Per Intersection	0	\$0
Total Estimated Project Cost					\$3,500

Systemic Project	√
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Urban (Vehicle) Intersection on MN 19 (Bridge St)

Roadway Information

Description: MN 19 (Bridge St) & CSAH 101 (Dekalb ST)
 County: Redwood
 Area Type: Suburban
 Context Zone: Commercial
 Segment Route System: CSAH
 Segment Route No: 101
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Signal
 Street Lights: Present
 Flasher: None
 Major ADT: 10,500
 Minor ADT: 3,000
 Total Entering ADT: 13,500



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	16	0	5	0
Density (per mile per yr):	3.2	0	1	0
Rate (per MVM):	0.6	0	0.2	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Context Zone:	Commercial	Commercial	
Traffic Control Device:	Signal	Signal	★
Entering ADT(vpd):	13,500	≥12,000	★
OR Total Traffic Cross Product:	31,500,000	> 20,000,000	★
Leg Configuration:	X	X	
Major Division Type:	Undivided	Divided	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Development:	Present	Present	-
Major Approach Speed Limit (mph):	50	≥40	★
OR Minor Approach Speed Limit (mph):	30	≥35	★
Major Approach Left Turn Lane Phasing:	Permitted	Permitted, Protected	★
1st Major Approach Turn Lane Configuration:	TR	≥2 Left Turn, ≥2 Thru Lane	
Total Stars:			★★★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Lighting:	Proactive	\$15,000	Each	0	\$0
Roundabout:	Proactive	\$3,000,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
Signalized J-Turn:	Proactive	\$1,500,000	Per Intersection	0	\$0
Thru-Stop to All-Way Stop/Yield:	Proactive	\$7,500	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$3,500	Per Intersection	0	\$0
Confirmation Lights:	Proactive	\$1,500	Per Intersection	1	\$1,500
Upgrade Signal Hardware:	Proactive	\$50,000	Per Intersection	0	\$0
Total Estimated Project Cost					\$1,500

Systemic Project	√
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Urban (Vehicle) Intersection on MN 19 (Bridge St)

Roadway Information

Description: MN 19 (Bridge St) & CSAH 101
 County: Redwood
 Area Type: Suburban
 Context Zone: Commercial
 Segment Route System: CSAH
 Segment Route No: 101
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: Present
 Flasher: None
 Major ADT: 10,500
 Minor ADT: 2,050
 Total Entering ADT: 12,550



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	13	0	10	0
Density (per mile per yr):	2.6	0	2	0
Rate (per MVM):	0.6	0	0.4	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Context Zone:	Commercial	Commercial	★
Traffic Control Device:	Thru-Stop	Signal	-
Entering ADT(vpd):	12,550	≥12,000	-
OR Total Traffic Cross Product:	21,525,000	> 20,000,000	★
Leg Configuration:	X	X	-
Major Division Type:	Undivided	Divided	★
Alignment Skew(degrees):	0	≥10	-
Adjacent Development:	None	Present	-
Major Approach Speed Limit (mph):	50	≥40	-
OR Minor Approach Speed Limit (mph):	30	≥35	★
Major Approach Left Turn Lane Phasing:	NA	Permitted, Permitted/Protected	-
1st Major Approach Turn Lane Configuration:	TR	≥2 Left Turn, ≥2 Thru Lane	-
Total Stars:			★★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Lighting:	Proactive	\$15,000	Each	0	\$0
Roundabout:	Proactive	\$3,000,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
Signalized J-Turn:	Proactive	\$1,500,000	Per Intersection	0	\$0
Thru-Stop to All-Way Stop/Yield:	Proactive	\$7,500	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$3,500	Per Intersection	1	\$3,500
Confirmation Lights:	Proactive	\$1,500	Per Intersection	0	\$0
Upgrade Signal Hardware:	Proactive	\$50,000	Per Intersection	0	\$0
Total Estimated Project Cost					\$3,500

Systemic Project	√
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Urban (Vehicle) Intersection on CSAH 101

Roadway Information

Description: CSAH 101 & MSAS 104 (Northwood Dr)
 County: Redwood
 Area Type: Suburban
 Context Zone: Commercial
 Segment Route System: CSAH
 Segment Route No: 101
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: Present
 Flasher: None
 Major ADT: 2,850
 Minor ADT: 495
 Total Entering ADT: 3,345



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	1	0	0	0
Density (per mile per yr):	0.2	0	0	0
Rate (per MVM):	0.2	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment
Context Zone:	Commercial	Commercial	★
Traffic Control Device:	Thru-Stop	Signal	-
Entering ADT(vpd):	3,345	≥12,000	-
OR Total Traffic Cross Product:	1,410,750	> 20,000,000	-
Leg Configuration:	X	X	★
Major Division Type:	Undivided	Divided	-
Alignment Skew(degrees):	0	≥10	-
Adjacent Development:	None	Present	-
Major Approach Speed Limit (mph):	50	≥40	-
OR Minor Approach Speed Limit (mph):	30	≥35	★
Major Approach Left Turn Lane Phasing:	NA	Permitted, Permitted/Protected	-
1st Major Approach Turn Lane Configuration:	TR	≥2 Left Turn, ≥2 Thru Lane	-
Total Stars:			★★★

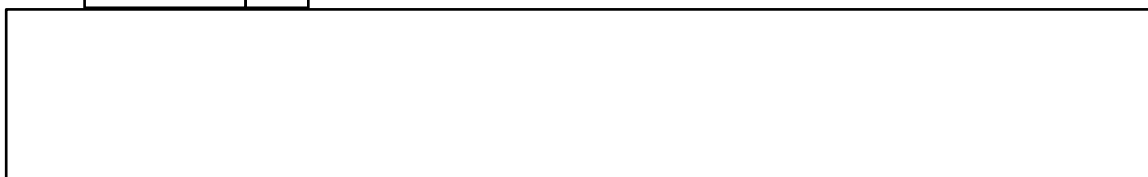
Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Lighting:	Proactive	\$15,000	Each	0	\$0
Roundabout:	Proactive	\$3,000,000	Per Intersection	0	\$0
J-Turn:	Proactive	\$1,000,000	Per Intersection	0	\$0
Signalized J-Turn:	Proactive	\$1,500,000	Per Intersection	0	\$0
Thru-Stop to All-Way Stop/Yield:	Proactive	\$7,500	Per Intersection	0	\$0
Upgrade Signs & Markings:	Proactive	\$3,500	Per Intersection	1	\$3,500
Confirmation Lights:	Proactive	\$1,500	Per Intersection	0	\$0
Upgrade Signal Hardware:	Proactive	\$50,000	Per Intersection	0	\$0

Total Estimated Project Cost \$3,500

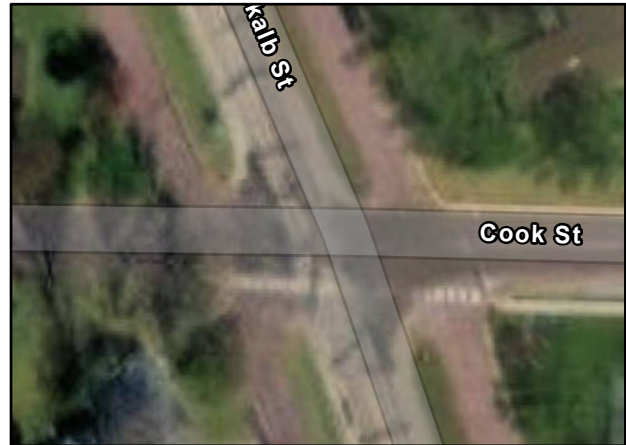
Systemic Project	√
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Urban (Bike/Ped) Intersection on CSAH 101 (Dekalb ST)

Roadway Information

Description: CSAH 101 (Dekalb ST) & MSAS 108 (Cook St)
 County: Redwood
 Area Type: Suburban
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 101
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: Present
 Flasher: None
 Major ADT: 3,075
 Minor ADT: 1,725
 Total Entering ADT: 4,800



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	2	0	1	0
Density (per mile per yr):	0.4	0	0.2	0
Rate (per MVM):	0.2	0	0.1	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment	
Traffic Control Device:	Thru-Stop	Signal	-	
Entering ADT(vpd):	4,800	≥12,000	-	
Adjacent Development:	None	Present	-	
Max Number of Lanes Crossed:	2	≥4	-	
Presence of Sidewalk:	Some	Some, None	★	
Pedestrian Crossing Type:	Marking	Markings	★	
Total Stars:			★★	

Priority Location

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Mini Roundabout:	Proactive	\$500,000	Each	0	\$0
Median Refuge Island:	Proactive	\$25,000-50,000	Each	1	\$25,000
RRFB:	Proactive	\$60,000	Per Intersection	0	\$0
RRFB w/ Refuge Island:	Proactive	\$75,000	Each	0	\$0
Pedestrian Hybrid Beacon:	Proactive	\$120,000	Per Intersection	0	\$0
No Right Turn on Red Sign (Static or Black out):	Proactive	\$2,400	Per Intersection	0	\$0
Curb Extension:	Proactive	\$10,000	Per Intersection	1	\$10,000
Leading Pedestrian Interval:	Proactive	\$1,000	Per Intersection	0	\$0
Pedestrian Countdown Timers:	Proactive	\$12,000	Each	0	\$0
Upgrade Signal Hardware and Review and Revise Signal Timing and Operations:	Proactive	\$5,000	Each	0	\$0
Total Estimated Project Cost					\$35,000

Systemic Project



Urban (Bike/Ped) Intersection on MN 19 (Bridge St)

Roadway Information

Description: MN 19 (Bridge St) & CSAH 101 (Dekalb ST)
 County: Redwood
 Area Type: Suburban
 Context Zone: Commercial
 Segment Route System: CSAH
 Segment Route No: 101
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Signal
 Street Lights: Present
 Flasher: None
 Major ADT: 10,500
 Minor ADT: 3,000
 Total Entering ADT: 13,500



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	16	0	5	0
Density (per mile per yr):	3.2	0	1	0
Rate (per MVM):	0.6	0	0.2	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment	
Traffic Control Device:	Signal	Signal	★	
Entering ADT(vpd):	13,500	≥12,000	★	
Adjacent Development:	Present	Present	★	
Max Number of Lanes Crossed:	4	≥4	★	
Presence of Sidewalk:	Some	Some, None	★	
Pedestrian Crossing Type:	Marking	Markings	★	
			Total Stars:	★★★★★
				Priority Location <input checked="" type="checkbox"/>

List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Mini Roundabout:	Proactive	\$500,000	Each	0	\$0
Median Refuge Island:	Proactive	\$25,000-50,000	Each	0	\$0
RRFB:	Proactive	\$60,000	Per Intersection	0	\$0
RRFB w/ Refuge Island:	Proactive	\$75,000	Each	0	\$0
Pedestrian Hybrid Beacon:	Proactive	\$120,000	Per Intersection	0	\$0
No Right Turn on Red Sign (Static or Black out):	Proactive	\$2,400	Per Intersection	0	\$0
Curb Extension:	Proactive	\$10,000	Per Intersection	1	\$10,000
Leading Pedestrian Interval:	Proactive	\$1,000	Per Intersection	1	\$1,000
Pedestrian Countdown Timers:	Proactive	\$12,000	Each	0	\$0
Upgrade Signal Hardware and Review and Revise Signal Timing and Operations:	Proactive	\$5,000	Each	1	\$5,000
Total Estimated Project Cost					\$16,000

Systemic Project



Urban (Bike/Ped) Intersection on MN 19 (Bridge St)

Roadway Information

Description: MN 19 (Bridge St) & CSAH 101
 County: Redwood
 Area Type: Suburban
 Context Zone: Commercial
 Segment Route System: CSAH
 Segment Route No: 101
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: Present
 Flasher: None
 Major ADT: 10,500
 Minor ADT: 2,050
 Total Entering ADT: 12,550



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	13	0	10	0
Density (per mile per yr):	2.6	0	2	0
Rate (per MVM):	0.6	0	0.4	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment	
Traffic Control Device:	Thru-Stop	Signal	-	
Entering ADT(vpd):	12,550	≥12,000	★	
Adjacent Development:	None	Present	-	
Max Number of Lanes Crossed:	4	≥4	★	
Presence of Sidewalk:	Some	Some, None	★	
Pedestrian Crossing Type:	None	Markings	-	
			Total Stars:	★★★

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Mini Roundabout:	Proactive	\$500,000	Each	0	\$0
Median Refuge Island:	Proactive	\$25,000-50,000	Each	1	\$25,000
RRFB:	Proactive	\$60,000	Per Intersection	0	\$0
RRFB w/ Refuge Island:	Proactive	\$75,000	Each	0	\$0
Pedestrian Hybrid Beacon:	Proactive	\$120,000	Per Intersection	0	\$0
No Right Turn on Red Sign (Static or Black out):	Proactive	\$2,400	Per Intersection	0	\$0
Curb Extension:	Proactive	\$10,000	Per Intersection	1	\$10,000
Leading Pedestrian Interval:	Proactive	\$1,000	Per Intersection	0	\$0
Pedestrian Countdown Timers:	Proactive	\$12,000	Each	0	\$0
Upgrade Signal Hardware and Review and Revise Signal Timing and Operations:	Proactive	\$5,000	Each	0	\$0
Total Estimated Project Cost					\$35,000

Systemic Project	√
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Urban (Bike/Ped) Intersection on CSAH 101

Roadway Information

Description: CSAH 101 & MSAS 109 (Activaide Rd)
 County: Redwood
 Area Type: Suburban
 Context Zone: Agriculture
 Segment Route System: CSAH
 Segment Route No: 101
 Design Type: Traditional
 Configuration: X
 Traffic Control Device: Thru-Stop
 Street Lights: Present
 Flasher: None
 Major ADT: 2,850
 Minor ADT: 108
 Total Entering ADT: 2,958



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Crash Information

5-year Crash History (2016 - 2020)

	Total	Severe	Total Right Angle	Severe Right Angle
Crash Frequency:	1	0	0	0
Density (per mile per yr):	0.2	0	0	0
Rate (per MVM):	0.2	0	0	0

Systemic Safety Risk Factors

	Value	Threshold	Star Assignment	
Traffic Control Device:	Thru-Stop	Signal	-	
Entering ADT(vpd):	2,958	≥12,000	-	
Adjacent Development:	None	Present	-	
Max Number of Lanes Crossed:	4	≥4	★	
Presence of Sidewalk:	None	Some, None	★	
Pedestrian Crossing Type:	None	Markings	-	
Total Stars:			★★	

Priority Location	√
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List of Strategies Considered

	Type	Unit Cost	Unit	Quantity	Total Cost
Mini Roundabout:	Proactive	\$500,000	Each	0	\$0
Median Refuge Island:	Proactive	\$25,000-50,000	Each	1	\$25,000
RRFB:	Proactive	\$60,000	Per Intersection	0	\$0
RRFB w/ Refuge Island:	Proactive	\$75,000	Each	0	\$0
Pedestrian Hybrid Beacon:	Proactive	\$120,000	Per Intersection	0	\$0
No Right Turn on Red Sign (Static or Black out):	Proactive	\$2,400	Per Intersection	0	\$0
Curb Extension:	Proactive	\$10,000	Per Intersection	1	\$10,000
Leading Pedestrian Interval:	Proactive	\$1,000	Per Intersection	0	\$0
Pedestrian Countdown Timers:	Proactive	\$12,000	Each	0	\$0
Upgrade Signal Hardware and Review and Revise Signal Timing and Operations:	Proactive	\$5,000	Each	0	\$0
Total Estimated Project Cost					\$35,000

Systemic Project	√
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