

# Draft Shoulder Widening Prioritization Study

**MnDOT District 8**

Prepared by:



September 10, 2021

SRF No. 13590

# Table of Contents

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<b>Introduction .....</b>	<b>1</b>
<b>Literature Review .....</b>	<b>2</b>
<b>Shoulder Widening Evaluation Criteria .....</b>	<b>4</b>
Safety.....	4
Mobility .....	7
Multimodal Accommodations .....	8
System Preservation.....	10
Environmental Impacts .....	11
Constructability .....	12
Functionality .....	13
Summary of Evaluation Criteria & Objectives.....	14
<b>Prioritization Scenarios .....</b>	<b>16</b>
<b>Recommendations.....</b>	<b>19</b>
<b>District 8 Shoulder Widening Prioritization Study Project Mapping .....</b>	<b>22</b>

## List of Figures

---

Figure 1. Study Segments	1
Figure 2. Example Prioritization Weighting System	3
Figure 3. Evaluation Criteria and Objectives	4
Figure 4. Trendline Analysis Example	7
Figure 5. District Bicycle Plan – Bicycle Investment Routes	8
Figure 6. District 8 Freight Plan – Map of Pure Ranked “Gaps”	9
Figure 7. Project Need Prioritization Weighting	17
Figure 8. Project Delivery Prioritization Weighting	17
Figure 9. Prioritized Segments	20
Figure 10. ArcGIS for Office Map	22
Figure 11. Project Dashboard Screenshot	23

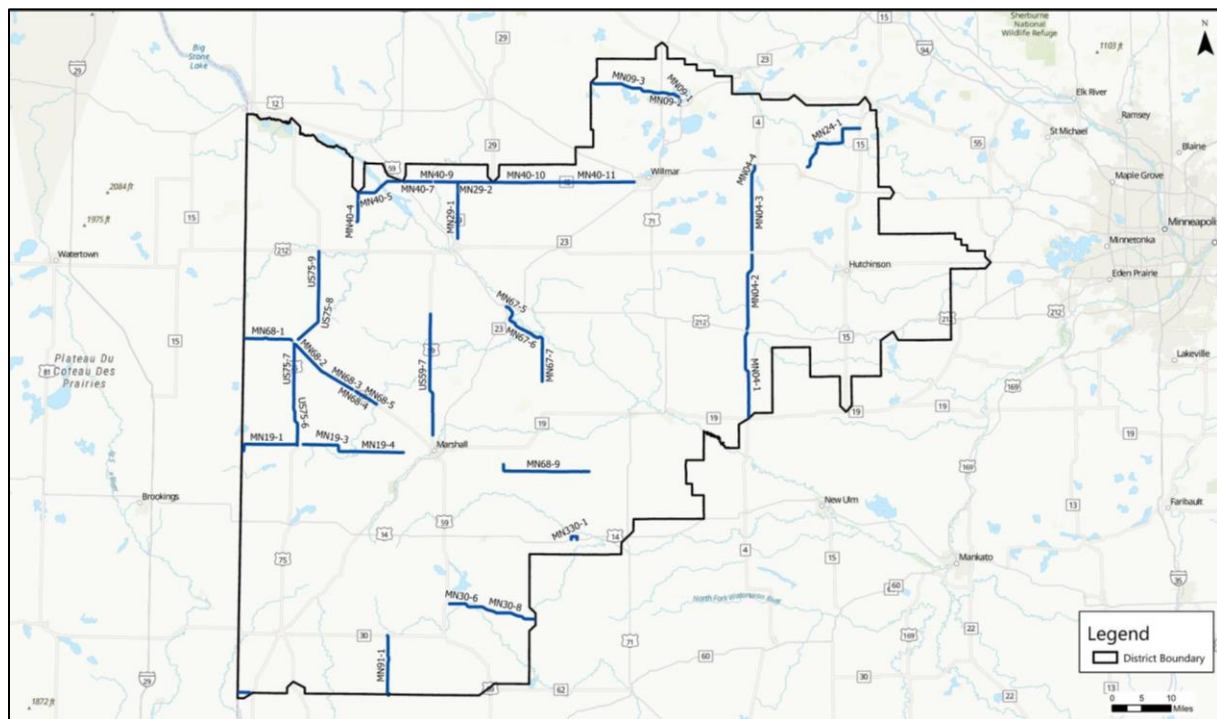
## List of Tables

Table 1. Summary of Evaluation Criteria and Objectives.....	15
Table 2. Recommended Tier 1 Segments.....	21

# Introduction

SRF Consulting Group assisted the Minnesota Department of Transportation (MnDOT) District 8 in using a data-driven approach to evaluate and prioritize locations for widening shoulders of roadways where existing shoulders are less than six feet wide (see Figure 1). All two-lane two-way State Highways in District 8 with shoulder widths that are less than six feet wide and do not meet existing standards were included in the study. Locations were prioritized using performance-based quantitative and qualitative measures.

**Figure 1. Study Segments**



This report documents the development of shoulder widening evaluation criteria and guidelines for prioritizing segments. The process to develop this information included reviewing the benefits and functions of shoulder lanes to identify potential evaluation measures with input from a literature review that identified best practices for prioritizing transportation improvement projects. Further, coordination with numerous District 8 functional groups occurred to ensure localized needs were met for all functional areas.

# Literature Review

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Shoulders serve many functions and offer many advantages. The MnDOT Road Design Manual identifies the following eight functions in which shoulders:

1. Provide an area for emergency parking.
2. Provide an area for evasive action and for recovery in the case of lane departure.
3. Improve highway capacity and driver comfort.
4. Improve lateral support and drainage for the pavement.
5. Provide lateral clearance for highway appurtenances and for snow removal.
6. Provide an area for pedestrians and bicyclists.
7. Provide an area that can function as a turn lane or bypass lane, if so designated.
8. Provide an area for maintaining roadway lights, signs, or signals.

Research was conducted to further identify potential evaluation measures based on the benefits and functions of shoulders and to identify best practices for prioritizing transportation improvement projects. The following summarizes key findings:

## **MnDOT – Road Design Manual<sup>1</sup>**

Chapter 4 of the design manual identifies roadway operations, safety, maintenance, and multimodal users as key elements to consider with shoulders. This was used to support the development of evaluation criteria.

## **Texas DOT – Systematic Approach to Project Selection for Highway Widening<sup>2</sup>**

This source reviewed current design standards for shoulder widths, identified safety effects of shoulder widths and developed a prioritization process for selecting corridors for shoulder widening. Findings from this source support the data-driven approach to prioritizing locations for widening.

## **FHWA – Mitigation Strategies for Design Exceptions<sup>3</sup>**

This source focuses on the traffic and safety implications of shoulder widths. Findings from this source support the data-driven approach used to quantify changes in safety and mobility.

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<sup>1</sup> MnDOT: <https://roaddesign.dot.state.mn.us/>

<sup>2</sup> Texas Department of Transportation: <http://ftp.dot.state.tx.us/pub/txdot-info/trf/hsip/widening-memo.pdf>

<sup>3</sup> FHWA: [https://safety.fhwa.dot.gov/geometric/pubs/mitigationstrategies/chapter3/3\\_shoulderwidth.cfm](https://safety.fhwa.dot.gov/geometric/pubs/mitigationstrategies/chapter3/3_shoulderwidth.cfm)

## FHWA – Highway Safety Manual<sup>4</sup>

This source documents the safety benefits of various shoulder widths based on the physical and operational characteristics of the roadway while providing the flexibility to incorporate local needs. This source supports the development of prioritization scenarios that weight study objectives based on the needs of the area.

## North Carolina DOT – Strategic Transportation Investments<sup>5</sup>

The North Carolina DOT developed a process to prioritize transportation projects using a data-driven approach while providing the flexibility to incorporate local needs. This source supports the development of prioritization scenarios that weight various study objectives based on needs of the area. The prioritization process for this study was modeled after the North Carolina DOT’s process and used in the District 4 pilot study.

**Figure 2. Example Prioritization Weighting System**

<b>Regional Impact Standard Ranking – Criteria and Weights</b>					
<i>(Note: Choose minimum of four criteria and determine percent weights; total points for any given project cannot exceed 100)</i>					
<b>Criteria</b>	<b>0 Points</b>	<b>5 Points</b>	<b>15 Points</b>	<b>25 Points</b>	<b>30 Points</b>
<b>Existing Congestion 30 % Weight</b>	Volume to capacity less than 0.3	Volume to capacity between 0.30 and 0.49	Volume to capacity between 0.50 and 0.69	Volume to capacity between 0.70 and 1.0	Volume to Capacity Over 1.0
<b>Criteria</b>	<b>0 Points</b>	<b>10 Points</b>	<b>20 Points</b>	<b>25 Points</b>	
<b>Safety Score 25 % weight</b>	SPOT safety points less than 30	SPOT safety points between 31-50	SPOT safety points between 51-65	SPOT safety points greater than 66	
<b>Criteria</b>	<b>0 Points</b>	<b>20 Points</b>			
<b>Corridor Continuity 20 % Weight</b>	Project does not complete of continue corridor improvement	Project does continue corridor improvement			

<sup>4</sup>FHWA: <https://safety.fhwa.dot.gov/rsdp/hsm.aspx>

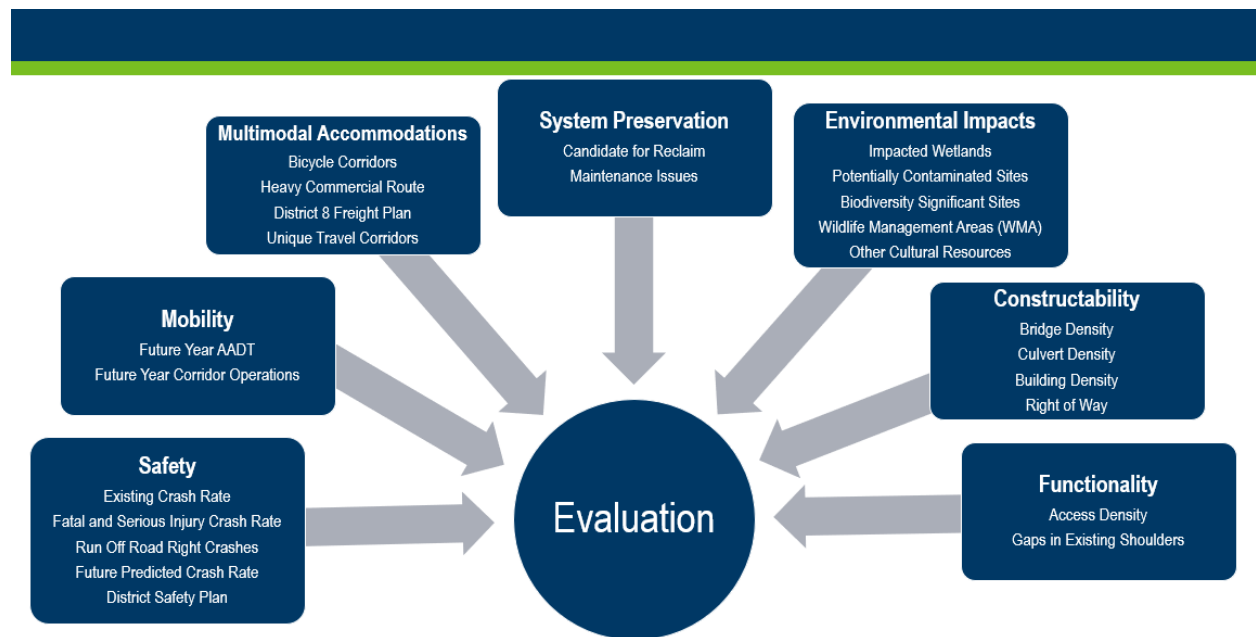
<sup>5</sup>North Carolina Department of Transportation:

<https://www.ncdot.gov/initiatives-policies/Transportation/stip/Pages/strategic-transportation-investments.aspx>

# Shoulder Widening Evaluation Criteria

Based on research conducted and coordination with District 8 staff, a process was developed to evaluate corridor segments that identifies the need for shoulder widening while considering the complexities of project delivery and the cost-effectiveness of shoulder widening. The evaluation criteria are based on several categories of engineering factors including safety, mobility, multimodal accommodations, system preservation, environmental impacts, constructability, and functionality. For each category, an evaluation objective(s) was identified with a measure(s) for comparison, as illustrated in Figure 3.

**Figure 3. Evaluation Criteria and Objectives**



The following summarizes the objectives, evaluation criteria, and measures for comparison. Each evaluation scoring criteria received a score ranging from zero to three, with zero being least beneficial and three being the most beneficial with respect to shoulder widening. The scoring thresholds were developed using a tiered approach based on the range of the evaluation measures. Appendix A summarizes the scoring thresholds used for each evaluation criteria.

## Safety

Safety relates to project need. Roadway segments were evaluated based on existing safety issues as well as future year predicted safety issues. Segments received a safety score based on the following evaluation criteria:

## Existing Crash Rate

Crash rates were calculated for each roadway segment:

- Segments with an **existing crash rate below the average crash rate** were assumed to have the lowest safety risk and **received the lowest score**.
- Segments with an **existing crash rate between the average crash rate and critical crash rate** were assumed to have a moderate risk and **received a higher score**.
- Segments with an **existing crash rate greater than the critical crash rate** were assumed to have the greatest risk and **received the highest score**.

## Fatal and Serious Injury Crash Rate

Fatal and Serious Injury (K+A) crash rates were calculated for each roadway segment:

- Segments with an **existing K+A crash rate below the average K+A crash rate** were assumed to have the lowest safety risk and **received the lowest score**.
- Segments with an **existing K+A crash rate between the average K+A crash rate and critical K+A crash rate** were assumed to have a moderate safety risk and **received a higher score**.
- Segments with an **existing K+A crash rate higher than the critical K+A crash rate** were assumed to have the greatest risk and **received the highest score**.

## History of Severe “Run Off Road Right” Crashes

Segments with a history of “run off the road right” crashes received a safety score:

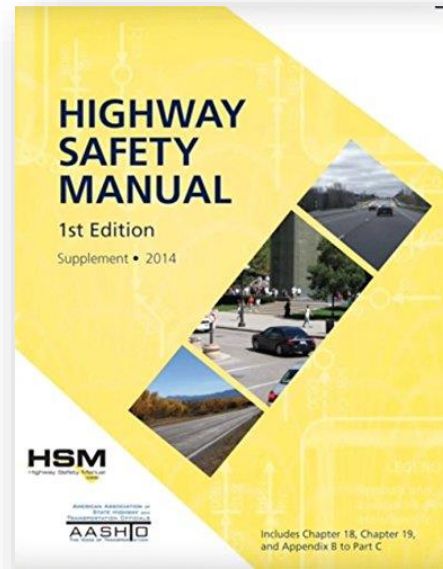
- Segments with the **greatest number** of these crashes per mile **received the highest score**.
- Segments with the **fewest number** of these crashes per mile **received the lowest score**.



## Future Year Predicted Crash Rate

Predicted future year crash rates were calculated using forecasted traffic volumes and the Highway Safety Manual (HSM) crash prediction methodology. This methodology considers shoulder width and shoulder type. Crash rates were calculated for each segment under a future year no build and future year build (assumed design standard) condition:

- Segments expected to have the **largest reduction in future year predicted crash rate** received the largest safety benefit for a shoulder meeting design standards and **received the highest score.**
- Segments expected to have the **lowest reduction in future year predicted crash rate** expect a lower safety benefit and **received the lowest score.**



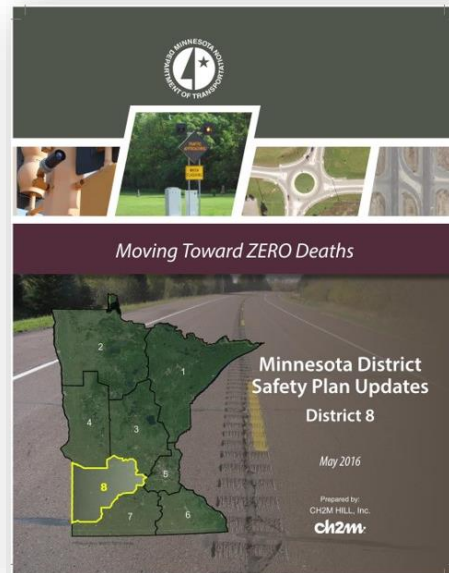
## District Safety Plan

Segments identified as being high priority in MnDOT's District 8 Safety Plan received a safety score. This plan is not available online, but it can be requested from District 8 staff. Segments were identified in the Safety Plan as being high priority if at least three of the following risk factors were present:

- ADT Range (greater than 3,500)
- Severe Lane Departure Density (greater than the statewide average)
- Access Density (Greater than 8 accesses per mile)
- Critical Radius Curve Density (Greater than 0.1 critical radius curves per mile)
- Edge Risk Assessment (Edge risk of 2 or 3, based on roadway edge and clear zone)
- Shoulder Width (Less than or equal to 4 feet)

Scoring was as follows:

- Segments that had **four or more of the risk factors** present **received the highest score.**
- Segments **not identified as high priority** in the District Safety Plan **received the lowest score.**



## Mobility

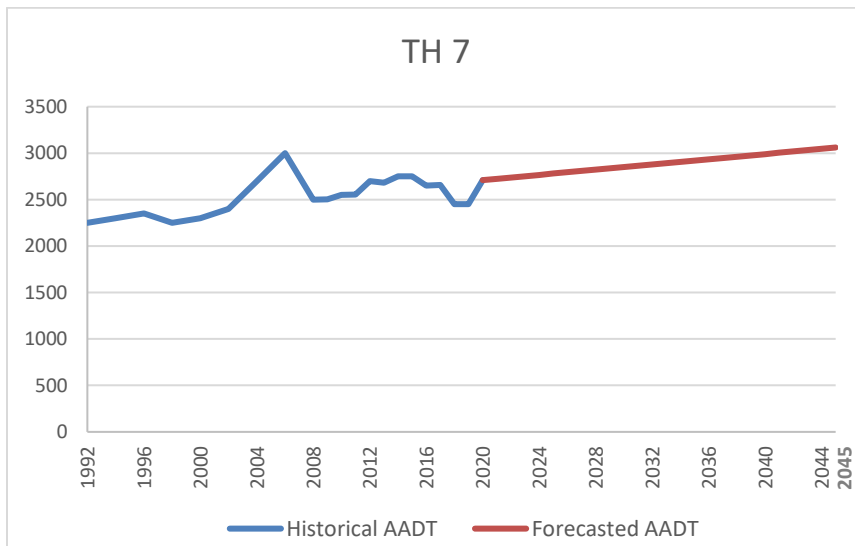
Mobility also relates to project need. Segments with high projected future traffic volumes and operational issues were identified. Segments received a mobility score based on the following evaluation criteria:

### Future Year AADT

Future year 2045 traffic volume projections were developed using a historical trendline analysis (see Figure 4) of daily traffic volumes provided by MnDOT<sup>6</sup>:

- Segments with the **highest projected traffic volumes** received the **highest score** because a higher number of users will benefit from shoulder widening;
- Segments with the **lowest projected traffic volumes** received the **lowest score** because a smaller number of users will benefit from shoulder widening;

Figure 4. Trendline Analysis Example



### Future Year Corridor Operations

Future year level of service (LOS) was calculated for each segment using Highway Capacity Manual (HCM) methodology<sup>7</sup>. This methodology considers peak hour traffic volumes, shoulder width, access density, heavy commercial vehicles, and passing/no passing opportunities:

- Segments with the **worst LOS** for any given direction or peak period **received the highest score**.

<sup>6</sup>MnDOT Traffic Forecasting & Analysis: <https://www.dot.state.mn.us/traffic/data/>

<sup>7</sup>FHWA Highway Capacity Manual: <http://www.trb.org/Main/Blurbs/175169.aspx>

## Multimodal Accommodations

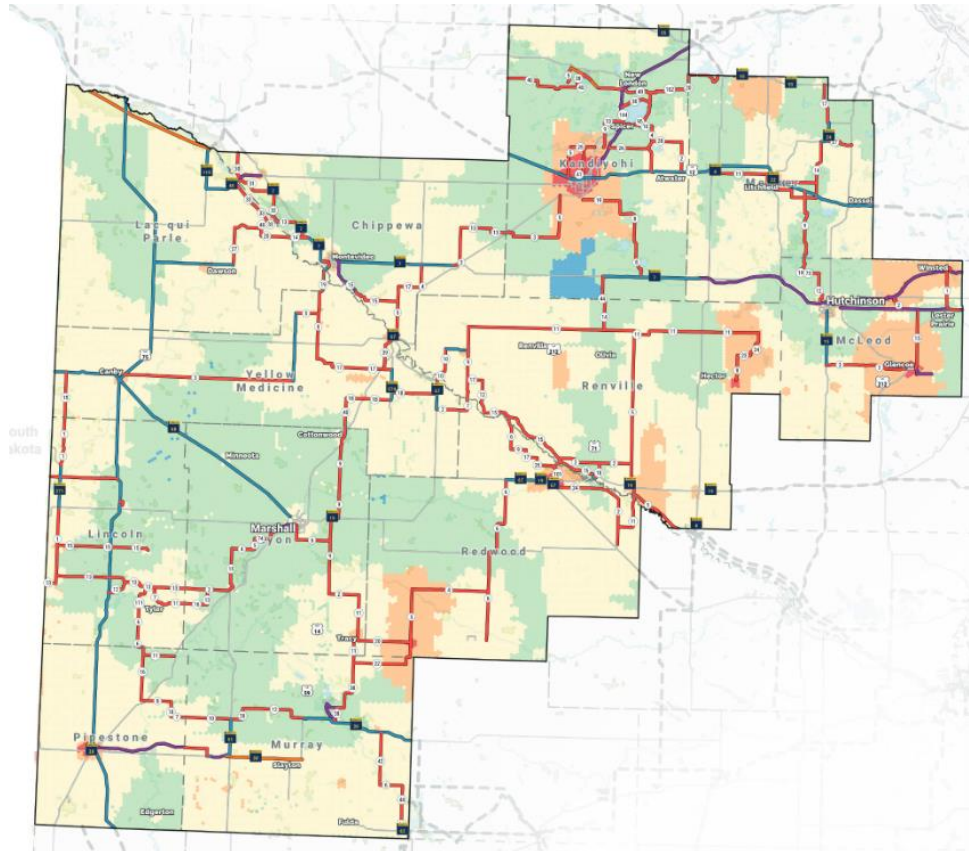
This objective identifies roadway segments that experience multiple modes of transportation. Segments with multiple modes were prioritized for shouldering widening as the widening would benefit unique and/or non-motorized users. Segments received a multimodal use score based on the following evaluation criteria:

### Bicycle Corridors

Segments that have been identified as being part of a bicycle investment route in MnDOT's District 8 Bicycle Plan<sup>8</sup> were identified. The plan prioritized routes and grouped them into five tiers and for this study:

- Segments **identified as being part of a route and grouped into Tier 1** received the **highest score**.
- Segments that were **not identified as being part of a route** received the **lowest score**.

**Figure 5. District Bicycle Plan – Bicycle Investment Routes**



<sup>8</sup>MnDOT District Bicycle Plans: <https://www.dot.state.mn.us/bike/documents/planning-research/district-8-bicycle-plan.pdf>

## Heavy Commercial Route

Heavy commercial truck average annual daily traffic (HCAADT) volumes were collected for each study segment using published HCAADT<sup>9</sup>:

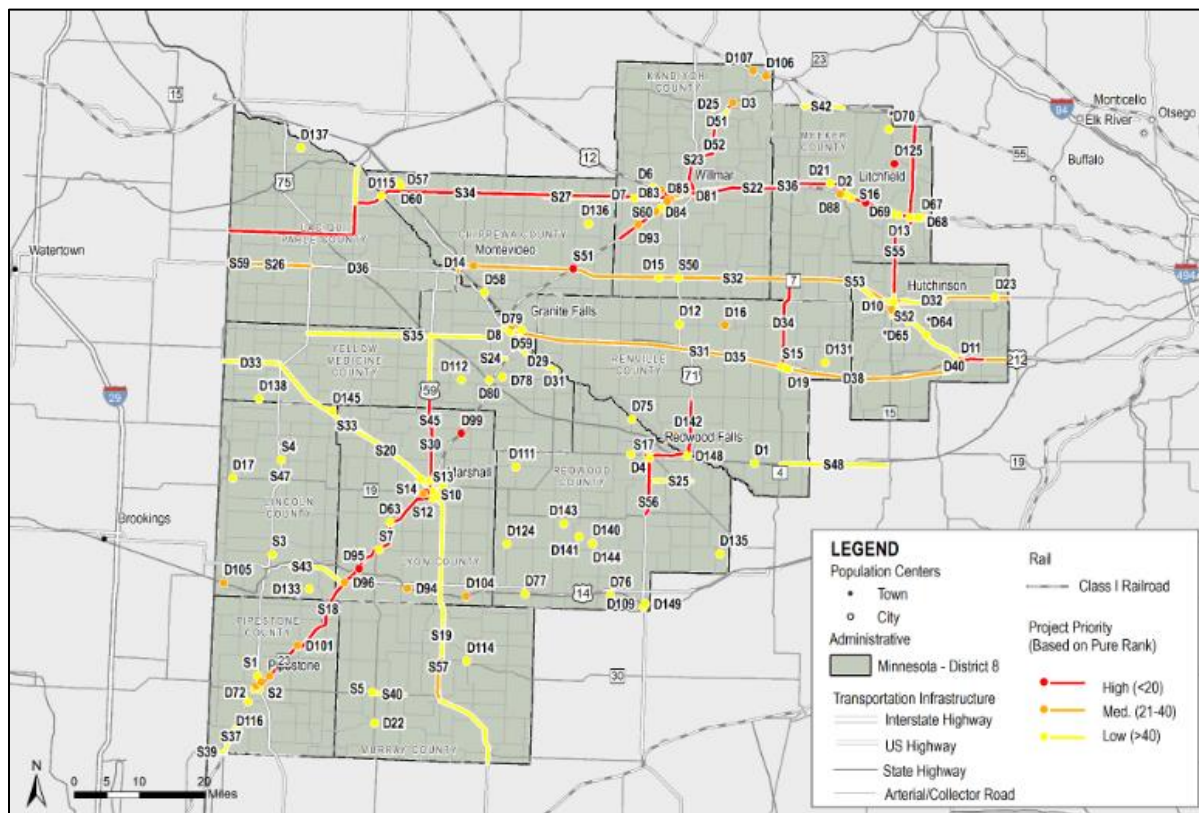
- Segments with the **highest HCAADT** received the **highest score**.
- Segments with the **lowest HCAADT** received the **lowest score**.

## District 8 Freight Plan

Segments identified in the District 8 Freight Plan as “unaddressed needs” were identified as project gaps. Project gaps were given a project priority score as part of the Plan<sup>10</sup> and for this study:

- Segments with a **project priority score of “high”** received the **highest score**.
- Segments with a **project priority score of “low”** received the **lowest score**.

Figure 6. District 8 Freight Plan – Map of Pure Ranked “Gaps”



<sup>9</sup>MnDOT Traffic Forecasting & Analysis: <https://www.dot.state.mn.us/traffic/data/>

<sup>10</sup>MnDOT District 8 Freight Plan: <http://www.dot.state.mn.us/ofrw/freight/PDF/d8plan/freight-plan.pdf>

## Unique Travel Corridors

Segments identified by District 8 staff as unique travel corridors (i.e., agricultural, recreational, high pedestrian corridors, etc.) that would benefit from wider paved shoulders were mapped:

- Segments that were **identified as a unique travel corridor** received the **highest score**.
- Segments that were **not identified as a unique travel corridor** received the **lowest score**.

## System Preservation

The system preservation contributes to the project need. This objective involved identifying roadway segments that have planned or programmed improvements or have maintenance issues. The segments received a system preservation score based on the following evaluation criteria:

### Candidate for Reclaim

Segments identified by District 8 staff as a candidate for reclaim were identified and were mapped:

- These segments have already been **identified as high priority**; therefore, these segments received the **highest score**.
- Segments that **have not been identified as a candidate for reclaim** received the **lowest score**.

### Maintenance Issues

District 8 staff provided a list of segments with maintenance issues and segments with the following issues were identified:

- Steep slopes
- Narrow shoulders
- Loose shoulder material
- Shoulders prone to erosion

Shoulders improve lateral support and drainage for pavement so:

- Segments with **identified maintenance issues** received the **highest score**.
- Segments **without identified maintenance issues** received the **lowest score**.



## Environmental Impacts

Environmental impacts also relate to project delivery. This objective identified locations that are at risk for environmental implications such as having risks to overall project development and delays. The segments received an environmental impact score based on the following criteria:

### Impacted Wetlands

The number of potential acres of impacted wetlands was calculated for each segment. Wetlands data were obtained from the U.S. Fish & Wildlife Service's National Wetlands Inventory<sup>11</sup> and were mapped along with the study segments. Wetlands that are within 150 feet of the roadway centerline were assumed to be potentially impacted.

- Segments with the **largest number of potentially impacted wetlands** received the **lowest score**.
- Segments with the **lowest number of potentially impacted wetlands** received the **highest score**.

### Potentially Contaminated Sites

All sites that were identified by the Minnesota Pollution Control Agency as potentially contaminated<sup>12</sup> were mapped along with the study segments. Potentially contaminated sites that are within 150 feet of the roadway centerline were assumed to be potentially impacted.

- Segments with the **largest number of potentially contaminated sites** received the **lowest score**.
- Segments with the **lowest number of potentially contaminated sites** received the **highest score**.

### MCBS Biodiversity Sites

Sites that have been identified as biodiversity significant<sup>13</sup> by the Minnesota County Biological Survey (MCBS) were mapped along with the study segments. Sites of biodiversity significance that are within 150 feet of the roadway centerline were assumed to be potentially impacted.

- Segments with the **highest number of potentially impacted biodiversity significant sites** received the **lowest score**.
- Segments with the **lowest number of potentially impacted biodiversity significant sites** received the **highest score**.

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<sup>11</sup>U.S. Fish and Wildlife National Wetlands Inventory: <https://www.fws.gov/wetlands/data/data-download.html>

<sup>12</sup>MN PCA Potentially Contaminated Sites: <https://www.pca.state.mn.us/data/contaminated-sites-data>

<sup>13</sup>Biological Survey Sites of Biodiversity Significance: <https://gisdata.mn.gov/dataset/biota-mcbs-sites-of-biodiversity>

## Wildlife Management Area

All locations identified as Wildlife Management Areas<sup>14</sup> (WMA) by the Minnesota Department of Natural Resources were mapped along with the study segments. WMAs within 150 feet of the roadway centerline were assumed to be potentially impacted.

- Segments with the **largest number of potentially impacted WMA acres** received the **lowest score**.
- Segments with the **lowest number of potentially impacted WMA acres** received the **highest score**.

## Other Cultural Resources

Segments were reviewed by MnDOT staff from the Office of Environmental Stewardship to identify any that may contain Other Cultural Resources (e.g., burial grounds) that may potentially be impacted.

- Segments **near these resources** received the **lowest score**.
- Segments that are **not near these resources** received the **highest score**.

## Constructability

This objective identified construction risks associated with project delivery. The segments received a constructability score based on the following evaluation criteria:

### Bridge Density

All bridges identified in MnDOT's bridge database (not available online) that are located along study segments were mapped:

- Segments with the **lowest number of bridges per mile** were assumed to be the easiest to deliver and received the **highest score**.
- Segments with the **highest number of bridges per mile** were assumed to be the most difficult to deliver and received the **lowest score**.



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<sup>14</sup>MN Department of Natural Resources WMAs: <https://gisdata.mn.gov/dataset/bdry-dnr-wildlife-mgmt-areas-pub>

## Culvert Density

MnDOT's hydraulic infrastructure (HydInfra) information (not available online) application was used to map all culverts located along the study segments:

- Segments with the **lowest number of culverts per mile** were assumed to be the easiest to deliver and received the **highest score**.
- Segments with the **highest number of culverts per mile** were assumed to be the most difficult to deliver and received the **lowest score**.

## Building Density

All building located within 150 feet of the study segments were identified and were mapped (not available online):

- Segments with the **lowest number of buildings per mile** were assumed to be the easiest to deliver and received the **highest score**.
- Segments with the **highest number of buildings per mile** were assumed to be the most difficult to deliver and received the **lowest score**.

## Right of Way

District 8 staff provided a list of segments with prescriptive right of way. Prescriptive right of way occurs in an area or property when MnDOT assumes to have an easement but it is not a recorded easement.

- Segments **without prescriptive right of way** were assumed to present the least risk for right of way acquisition and received the **highest score**.
- Segments **with prescriptive right of way** were assumed to present the greatest risk for right of way acquisition and received the **lowest score**.

## Functionality

Functionality contributes to the project need so this objective identified locations that are at-risk based on the functionality of the roadway. The segments received a functionality score based on the following evaluation criteria:

## Access Density

Access density was obtained from MnDOT's District 8 Safety Plan (not available online):

- Segments with the **highest access density** received the largest safety benefit from shoulder widening; therefore, they received the **highest score**.
- Segments with the **lowest access density** received the **lowest score**.



## Gaps in Existing Shoulder

Segments with existing gaps in shoulder width were identified using data received from District 8 and were mapped:

- Segments **with an existing gap in shoulder width** received the **highest score**.
- Segments **without a gap in shoulder width** received the **lowest score**.

## Summary of Evaluation Criteria & Objectives

Table 1 includes a summary of the above evaluation criteria and objectives.

**Table 1. Summary of Evaluation Criteria and Objectives**

Objectives	Criteria	Measure	Prioritization
Safety	Existing Crash Rate	Comparison to Average and Critical Crash Rates	Safety improvement
	Fatal and Serious Injury Crash Rate	Comparison to Average and Critical Crash Rates	
	Run Off Road Right Crashes	Crashes per Mile	
	Future Predicted Crash Rate	Reduction in Crash Rate	
	District Safety Plan	Ranking from District Plan	
Mobility	Future Year AADT	AADT	Number of users and their mobility experience
	Future Year Corridor Operations	Level of Service	
Multimodal Accommodations	Bicycle Corridors	D8 Bicycle Plan Prioritization Score	Unique segments or segments with non-motorized users
	Heavy Commercial Route	Percentage of Heavy Commercial Vehicles	
	District 8 Freight Plan	Rating in Freight Plan	
	Unique Travel Corridors	Yes or No	
System Preservation	Candidate for Reclaim	Yes or No	Existing priority
	Maintenance Issues	Yes or No	
Environmental Impacts	Impacted Wetlands	Impacted Acres	Potential risk to deliver project – need to scope appropriately
	Potentially Contaminated Sites	Impacted Sites	
	Biodiversity Significant Sites	Impacted Sites	
	Wildlife Management Areas	Impacted Acres	
	Other Cultural Resources	Yes or No	
Constructability	Bridges	Number of Bridges per Mile	Potential risk to deliver project – need to scope appropriately
	Culverts	Number of Culverts per Mile	
	Buildings	Number of Buildings per Mile	
	Right of Way	Prescriptive or Usual	
Functionality	Access Density	Number of Accesses per Mile	User benefits
	Gaps in Existing Shoulders	Yes or No	

## Prioritization Scenarios

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While it would be desirable to implement shoulder widening on all segments in which a need has been identified, other factors play a role in delivering a project such as funding; therefore, three prioritization scenarios were considered to identify the most important corridors to address:

1. **Project Need:** Prioritizes segments by emphasizing safety and multimodal accommodations while also considering mobility benefits.
2. **Project Delivery:** Prioritizes segments by emphasizing minimal environmental impacts and constructability issues while also considering mobility benefits.
3. **Benefit-Cost:** Prioritizes segments based on their benefits relative to cost.

For the first two scenarios, each objective was scored as previously described but each evaluation criterion was given a weight. This was to ensure that the evaluation criterion was not artificially being prioritized based on having more objectives within it. See Figure 7 and Figure 8 for the weighting used for both the Project Need and the Project Delivery scenarios, respectively. For the third scenario, segments were ranked based on their cost-effectiveness, which is detailed on Page 18.

## Project Need

Figure 7. Project Need Prioritization Weighting

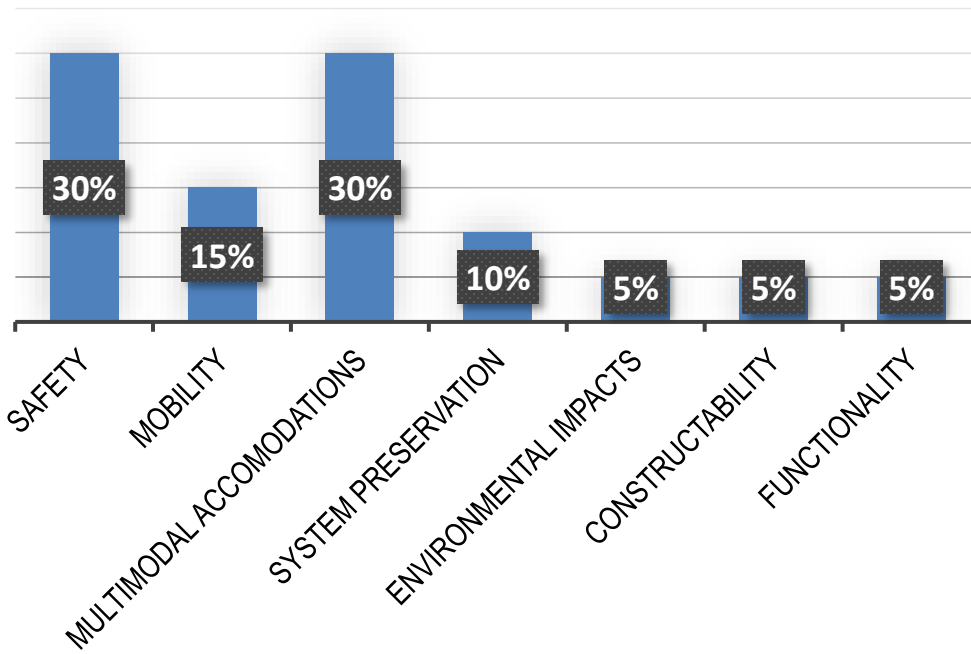
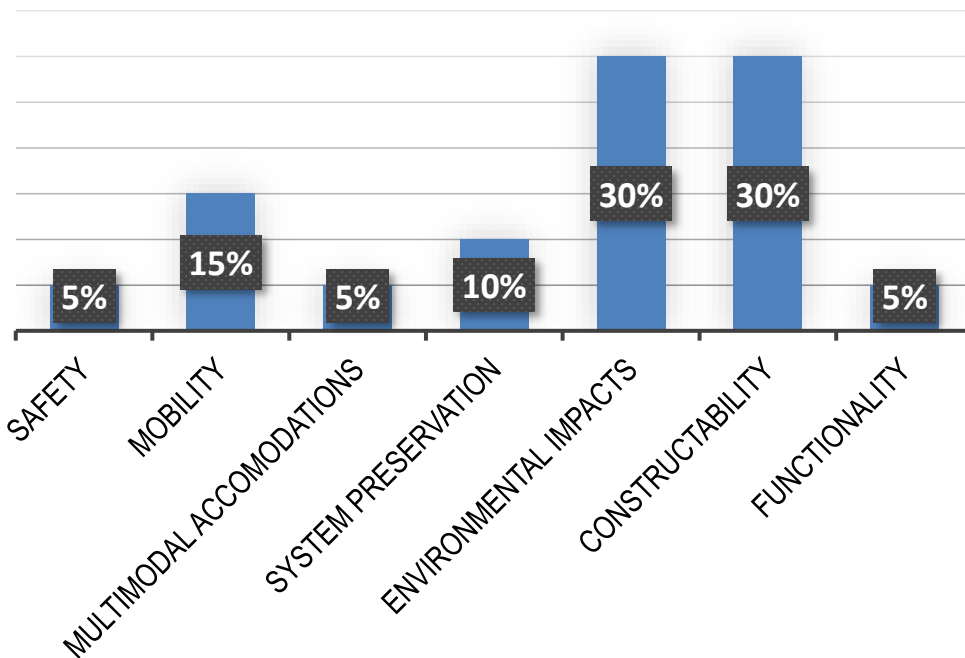


Figure 8. Project Delivery Prioritization Weighting



## Benefit-Cost Analysis

The Benefit-Cost Analysis (BCA) brings all the direct effects of a transportation investment into a common measure (dollars) and to allow for the fact that benefits accrue over a long period while costs are incurred primarily in the initial years. The BCA provides an indication of the economic desirability of a project, but decision-makers must weigh the results against other considerations, effects, and impacts of the project. Projects are considered cost-effective if the benefit-cost ratio is greater than 1.0. The larger the ratio number, the greater the benefits per unit cost.

For this study, primary factors included crash reduction, travel time savings, and initial construction costs. For the crash reduction, the future and existing crash rates were determined as previously detailed. To determine the estimated cost of a crash event, the district-wide distribution of crash severities was combined with MnDOT estimates for crash event costs to determine the cost of an “average” crash event. This cost, combined with existing and forecasted AADTs, segment lengths, and crash rates for each segment, were used to estimate the net reduction in crash costs. The estimated travel time savings were determined based on predicted average travel speeds with and without shoulder widening. Using the segment length and an assumed value-of-time for an average user of each segment, the value of the decrease in travel time for each segment was estimated.

Construction costs for shoulder widening were estimated based on the existing shoulder material, width, and length. This cost was adjusted to account for components of the initial capital cost that have value beyond the lifetime of the roadway. For example, materials can be salvaged when the roadway is replaced and grading would not need to be redone in the future, etc. For this study, costs were estimated at a high-level and do not account for segment-specific costs that could occur such as reconstruction of culverts, wetland impacts, additional right-of-way needed, or poor or contaminated soils. Assumptions for estimated construction costs are provided in Appendix B.

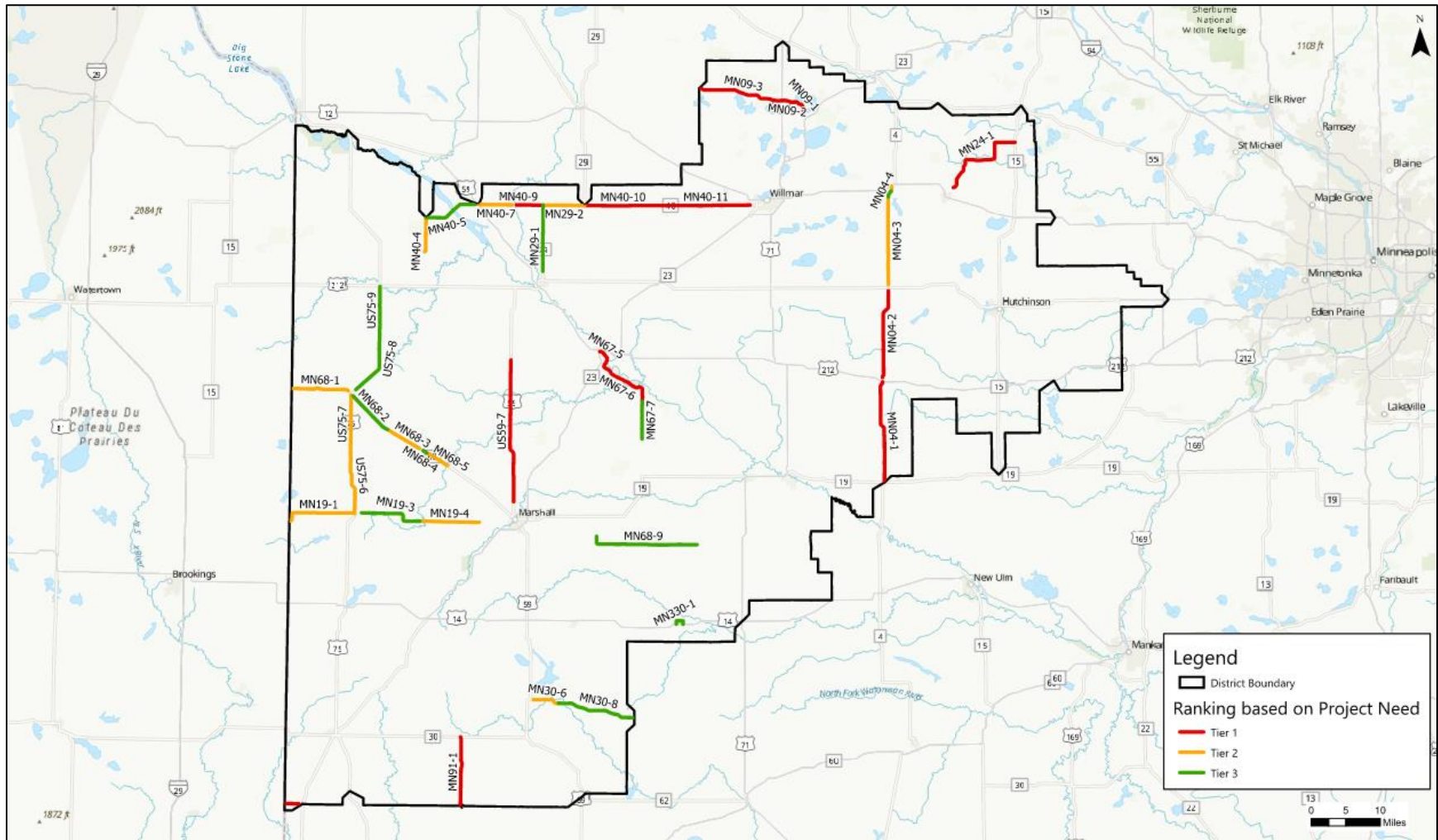
## Recommendations

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Based on discussions with District 8 staff, improvements for safety and non-motorized users were identified as key in the decision-making process to prioritize segments for shoulder widening. Therefore, the project need prioritization scenario was recommended to be used as the basis for determining the order in which to implement shoulder widening projects in District 8. This scenario ranks all rural two-lane segments with existing shoulder widths that are less than six feet and do not meet standards by need using evaluation criteria that has been developed based on national and local research and characteristics unique to District 8.

The rankings for project need were divided into three tiers (Tiers 1-3) with Tier 1 including the top 14 scoring segments. Project prioritization based on project need is included in Figure 1. Tier 1 segments are detailed in Table 2. The rankings for project delivery were also divided into three tiers (Tiers 1-3) with Tier 1 including the top 14 segments. For benefit-cost, the numerical BCA result is provided. Appendix C includes the ranking for each prioritization scenario for all segments.

**Figure 9. Prioritized Segments**



**Table 2. Recommended Tier 1 Segments**

Rank	Route	From	To	Score
1	MN 09	1000 Feet West of CSAH 33	Glenoaks Dr	70.00
2	MN 40	CSAH 6/1st Ave N	1000 Feet East of CSAH 2	69.50
3	MN 40	1000 Feet East of CSAH 2	CSAH 55	67.92
4	MN 09	US 71	1000 Feet West of CSAH 33	64.17
5	MN 67	1 Mile East of MN 23	1000 Feet South of CSAH 18	63.42
6	MN 04	MN 19 (South Border of D8)	US 212	62.25
7	MN 67	MN 23	0	61.00
8	MN 04	100 North of Dupont Ave NE	Southern Cross Ave	59.33
9	MN 91	1st St (South Boundary of D8)	MN 30	57.92
10	MN 09	MN 104 (Western Boundary of D8)	US 71	56.58
11	US 59	300th St	Clarkfield Municipal Boundary	56.08
12	MN 24	CSAH 34	MN 15	55.50
13	MN 269	South Dakota State Border	Driveway on South Side of Road Before Split	55.33
14	MN 40	200 Feet East of 100th Ave NW	Intersection of MN 40/MN 29/CSAH 8	53.83



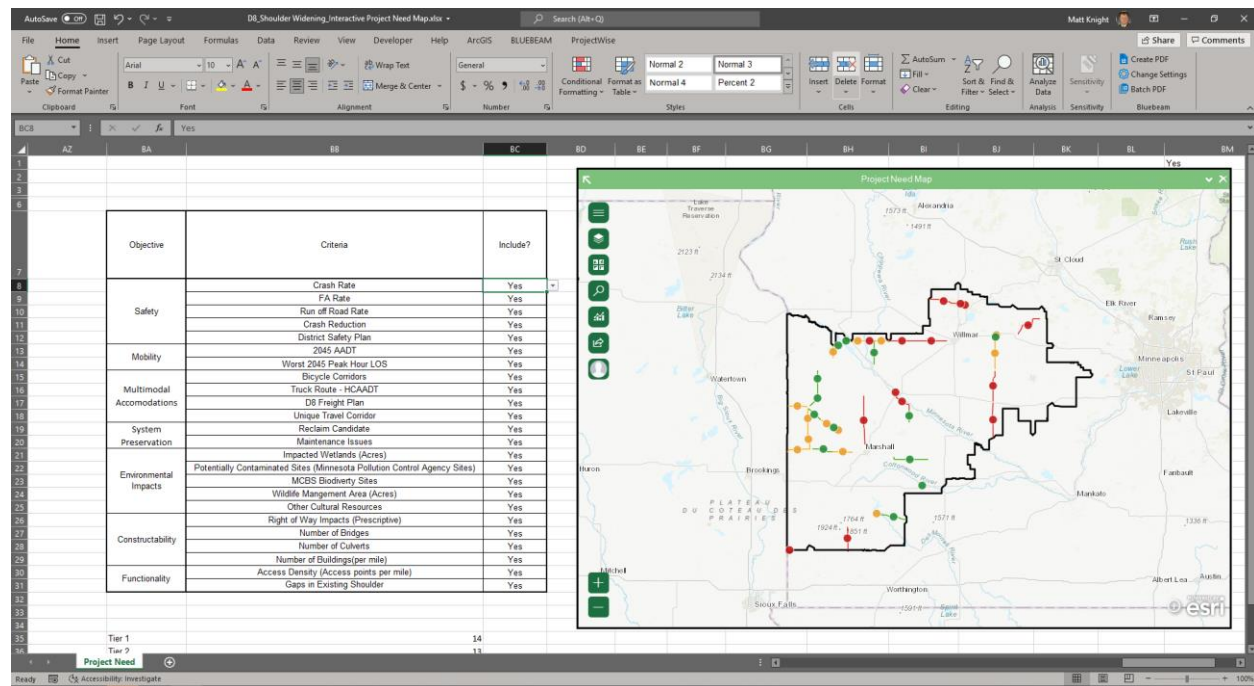
# District 8 Shoulder Widening Prioritization Study Project Mapping

The results of the Shoulder Widening Prioritization Study have been mapped using the ArcGIS for Office add-in and a project dashboard. These tools will allow District 8 staff to visualize the results of the study.

## ArcGIS for Office Add-In

Dynamic maps have been included in the Microsoft Excel spreadsheet. These maps were created using the ArcGIS for Office add-in. The ArcGIS add-in is a tool that allows users to put Excel data in the context of location. The Project Need and Project Delivery scenarios were mapped using the tool. Figure 10 illustrates how the evaluation criteria can be included or removed from the scoring.

Figure 10. ArcGIS for Office Map



The ArcGIS for Office add-in can be downloaded using the following link:

<https://www.esri.com/en-us/arcgis/products/arcgis-for-office/download>

Once the add-in is downloaded, open Microsoft Excel and click on the ArcGIS for Office tab in the ribbon. Then, sign into your ArcGIS Enterprise or ArcGIS online organizational account.

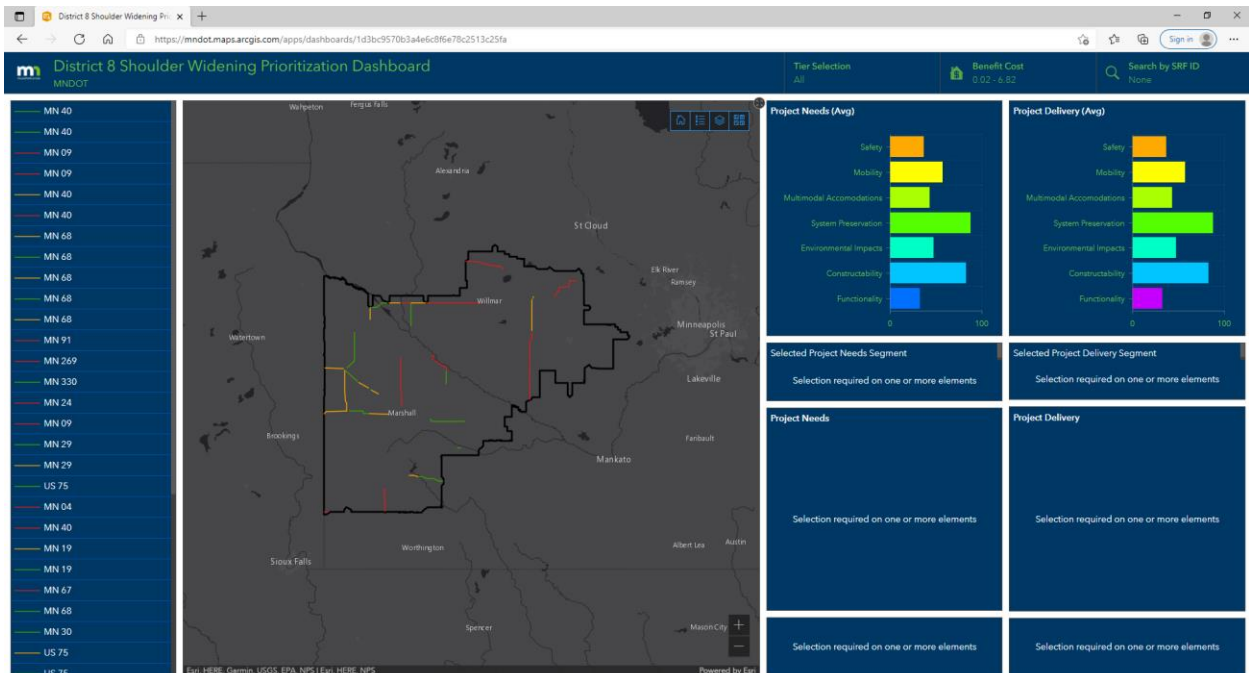
## Project Dashboard

In addition to the ArcGIS add-in, a dashboard has been developed to allow District 8 staff to visualize the results of the study. The dashboard can be accessed using the following link:

[District 8 Shoulder Widening Prioritization Dashboard \(arcgis.com\)](https://mndot.maps.arcgis.com/apps/dashboards/1d3bc9570b34e6c8f6e78c2513c25fa)

The dashboard displays segment evaluation scoring and ranking for the Project Need and Project Delivery scenarios as well as the segment benefit-cost ratio. A screenshot of the dashboard is shown in Figure 11.

**Figure 11. Project Dashboard Screenshot**



**Appendix A**  
**Scoring Thresholds**



**District 8 Shoulder Widening Prioritization Study  
Scoring Thresholds**

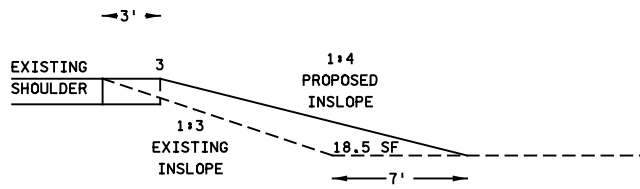
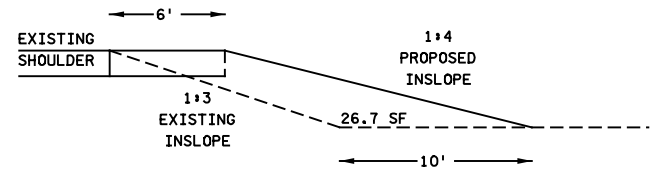
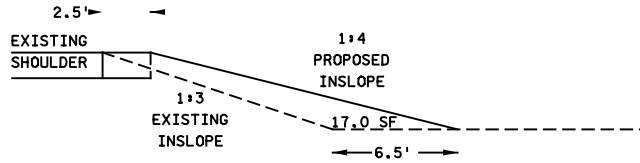
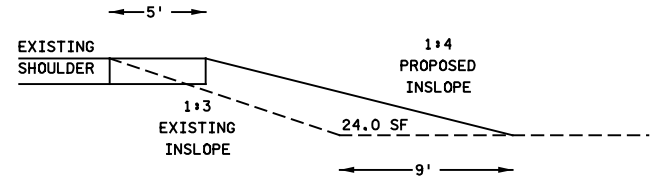
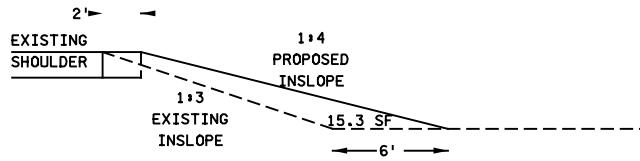
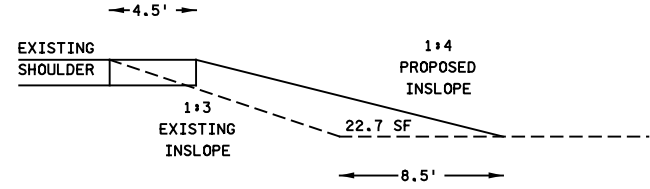
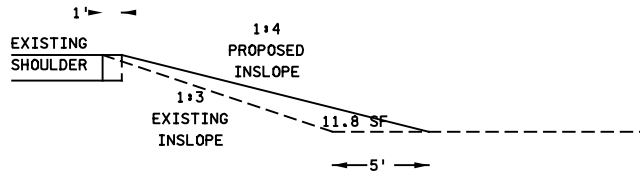
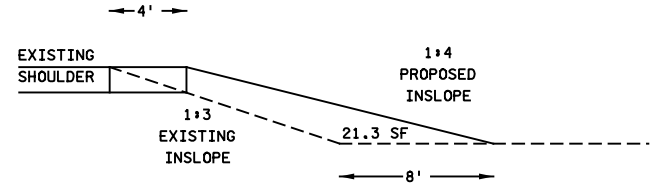
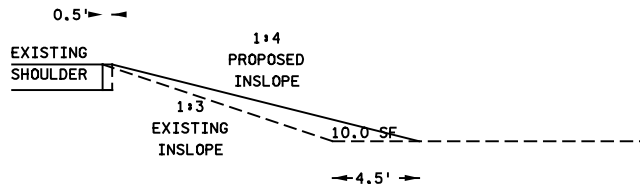
Safety	Existing Crash Rate	Criteria	Less Than Average	Between Average and Critical		Above Critical
		Score	0	2		3
	Fatal and Serious Injury Crash Rate	Criteria	Less Than Average	Between Average and Critical		Above Critical
		Score	0	2		3
	Run Off Road Right Crashes per Mile per Year	Criteria	0-0.05	0.05-0.1	0.1-0.15	>=0.15
		Score	0	1	2	3
Future Predicted Crash Rate (Reduction)	Criteria	0	0-.05	0.05-0.10	>=0.10	
	Score	0	1	2	3	
District Safety Plan (Ranking)	Criteria	Not Identified as High Priority		3 Stars	4 Stars	
	Score	0		2	3	
Mobility	Future Year AADT	Criteria	<150	150-800	800-1500	>=1500
		Score	0	1	2	3
Future Year Corridor Operations (LOS)	Criteria	A	B	C	D	
	Score	0	1	2	3	
Multimodal Accommodations	Bicycle Corridor	Criteria	No	Tier 4 & Tier 5	Tier 2 & Tier 3	Tier 1
		Score	0	1	2	3
	Heavy Commercial Route (HCAADT)	Criteria	<10%	10-15%	15-20%	>=20%
		Score	0	1	2	3
	D8 Freight Plan	Criteria	None	Low	Medium	High
		Score	0	1	2	3
Unique Travel Corridor	Criteria	No			Yes	
	Score	0			3	
System Preservation	Candidate for Reclaim	Criteria	No		Yes	
		Score	0		3	
Maintenance Issues	Criteria	No			Yes	
	Score	0			3	
Environmental Impacts	Impacted Wetlands (Acres)	Criteria	0-5 acres	5-8 acres	8-10 acres	>=10 acres
		Score	3	2	1	0
	Potentially Contaminated (Sites)	Criteria	0	1	2	3
		Score	3	2	1	0
	MCBS Biodiversity Sites (Sites)	Criteria	0 sites	0-3 sites	3-5 sites	>=5 sites
		Score	3	2	1	0
Wildlife Management Area (Acres)	Criteria	0-10 acres	10-30 acres	30-50 acres	>=50 acres	
	Score	3	2	1	0	
Other Cultural Resources	Criteria	No			Yes	
	Score	3			0	
Constructability	Right of Way Impacts (Prescriptive)	Criteria	Usual			Prescriptive
		Score	3			0
	Number of Bridges per Mile	Criteria	0 - 0.1	0.1 - 0.3	0.3 - 0.5	>= 0.5
		Score	3	2	1	0
	Number of Culverts per Mile	Criteria	0-3	3-6	6-9	>=9
		Score	3	2	1	0
Number of Buildings per Mile	Criteria	0-1	1-3	3-5	>=5	
	Score	3	2	1	0	
Functionality	Access Density	Criteria	<5	5-8	8-10	>=10
		Score	0	1	2	3
	Gaps in Existing Shoulder	Criteria	No			Yes
		Score	0			3

## **Appendix B**

### **Cost Estimate Assumptions**

## Cost Estimate Assumptions

- Topsoil stripping and restoration is 1:1 (no cost)
- Removal of 4-inch excavation aggregate shoulder depth for paving is negligible
- 4-foot ditch depth
- No ditch widening
- 1:3 existing inslope
- 1:4 proposed inslope
- Proposed section: 4-inch shoulder pavement (bituminous or aggregate) and 12-inch aggregate base
- Existing section: 4-inch surface gravel and 12-inch aggregate base
- Extend three culvert pipes per mile on widened roadways only
- Relocate three signs per mile on widened roadways only
- Turf establishment assumes 10% of roadway construction cost
- Mobilization assumes 10% of subtotal construction cost
- Traffic control cost assumes 3% of subtotal construction cost
- Based on 2020 average bid price information:
  - Added paved shoulder cost: \$1.65/sf
  - Aggregate shoulder cost: \$0.70/sf
  - 12-inch aggregate base cost: \$2.00/sf of widening
  - Culvert extension cost: \$55/ft
  - F&I new sign cost: \$378/each



## **Appendix C**

### **Evaluation and Prioritization Results**





Segment Information				Safety				Mobility		Multimodal Accommodations			System Preservation		Environmental Impacts					Constructability			Functionality					
Segment ID	Route Name	From	To	Length	Crash rate less than average, or greater than critical.	Fatal and Serious Injury Crash Rate	Run Off Road Right Crashes per Mile per Year	Difference between 2045 Build and 2045 No Build predicted crash rate	District Safety Plan Risk Assessment	2045 AADT	Worst 2045 Peak Hour LOS	Bicycle Corridors	HCAAADT	D8 Freight Plan	Unique Travel Corridor	Reclaim Candidate	Maintenance Issues	Impacted Wetlands (Acres)	Potentially Contaminated Sites - Minnesota Pollution Control Agency (Site)	MCBS Biodiversity Sites (Sites)	Wildlife Management Area (Acres)	Other Cultural Resources	Right of Way Impacts (Acres)	Number of Bridges per Mile	Number of Culverts per Mile	Number of Buildings per mile	Access Density (Access Points per mile)	Gaps in Existing Shoulder (Miles)
MN04-1	MN 04	MN 19 (South Border of DB)	US 212	14.8	Between Average and Critical	Above Critical	0.06	0.08	3	2000	B	3	25.0%	None	No	Yes	Yes	2.2	6.0	0.0	0.0	no	Usual	0.1	2.7	1.0	10.5	No
MN04-2	MN 04	100 North of DuPont Ave NE	Southern Cross Ave	12.9	Less Than Average	Less Than Average	0.03	0.05	4	1100	B	4	22.7%	High	Yes	Yes	3.1	2.0	1.0	0.0	no	Usual	0.2	2.6	1.2	9.3	No	
MN04-3	MN 04	Northern Cross Ave (Cosmos Municipal Boundary)	1000 Feet North of 260th St	12.7	Less Than Average	Less Than Average	0.05	0.05	No	1050	B	4	20.0%	None	Yes	Yes	20.2	2.0	0.0	0.0	no	Usual	0.0	3.0	0.4	9.3	No	
MN04-4	MN 04	1000 Feet North of 260th St	CSAH 11	1.0	Less Than Average	Less Than Average	0.10	0.00	No	1250	B	4	17.4%	None	No	Yes	1.0	2.0	0.0	0.0	yes	Usual	0.0	4.2	0.0	9.3	No	
MN04-5	MN 04	CSAH 11	US 12	0.8	Between Average and Critical	Less Than Average	0.00	0.14	No	2200	B	4	13.9%	None	Yes	Yes	2.7	1.0	0.0	0.0	no	Usual	0.0	5.3	5.3	9.3	No	
MN09-1	MN 09	1000 Feet West of CSAH 33	Glenoks Dr	2.4	Between Average and Critical	Above Critical	0.34	0.27	4	2600	C	4	10.6%	None	Yes	Yes	9.6	3.0	1.0	0.0	yes	Prescriptive	0.0	2.1	10.6	17.7	No	
MN09-2	MN 09	US 71	1000 Feet West of CSAH 33	1.8	Between Average and Critical	Above Critical	0.16	0.07	3	1750	B	4	10.3%	None	Yes	Yes	8.8	1.0	0.0	0.0	no	Prescriptive	0.0	3.2	3.8	12.3	No	
MN09-3	MN 09	MN 104 (Western Boundary of DB)	US 71	12.4	Between Average and Critical	Less Than Average	0.08	0.24	3	2100	B	4	13.8%	None	Yes	Yes	27.7	4.0	7.0	0.0	yes	Usual	0.0	5.2	0.6	12.3	No	
MN19-1	MN 19	South Dakota State Border	US 75	10.4	Between Average and Critical	Less Than Average	0.07	0.11	3	1200	B	4	15.0%	None	No	Yes	47.4	0.0	8.0	20.6	yes	Usual	0.3	2.6	0.5	8.3	No	
MN19-3	MN 19	CSAH 5	2300 Feet East of Lyon Lincoln County Rd/290th Ave	9.3	Less Than Average	Less Than Average	0.09	0.06	3	1550	B	4	11.5%	None	No	Yes	Yes	15.5	3.0	7.0	6.7	no	Usual	0.0	3.0	0.4	7.7	No
MN19-4	MN 19	2300 Feet East of Lyon Lincoln County Rd/290th Ave	CSAH 5	8.6	Between Average and Critical	Less Than Average	0.07	0.22	No	2050	B	4	13.8%	None	No	Yes	Yes	6.9	0.0	3.0	2.9	no	Usual	0.3	3.5	1.2	9.1	No
MN24-1	MN 24	CSAH 34	MN 15	14.1	Between Average and Critical	Above Critical	0.06	0.23	No	2250	B	3	10.8%	None	Yes	No	Yes	28.5	9.0	2.0	0.0	yes	Usual	0.1	3.5	1.8	9.9	No
MN269-1	MN 269	South Dakota State Border	Driveway on South Side of Road Before Split	2.1	Less Than Average	Less Than Average	0.14	0.15	No	1750	B	3	17.2%	None	Yes	Yes	0.5	0.0	0.0	0.0	no	Prescriptive	0.0	1.4	1.4	6.2	No	
MN29-1	MN 29	Montevideo-Chippewa Airport Entrance	MN 40	9.6	Less Than Average	Above Critical	0.04	0.05	No	1250	B	4	8.3%	None	No	Yes	Yes	11.8	1.0	1.0	10.0	yes	Usual	0.1	2.2	0.8	8.6	No
MN29-2	MN 29	MN 40	CSAH 6	6.0	Less Than Average	Between Average and Critical	0.02	0.04	No	800	B	4	12.5%	High	Yes	Yes	1.2	1.0	0.0	0.0	no	Usual	0.0	2.2	0.5	7.5	No	
MN30-6	MN 30	3000 Feet West of 170th Ave	200 Feet East of Main St/CSAH 38	3.8	Between Average and Critical	Above Critical	0.03	0.04	3	950	B	4	13.3%	None	No	Yes	Yes	1.8	2.0	1.0	6.3	yes	Usual	0.3	7.1	2.6	8.8	No
MN30-8	MN 30	200 Feet East of Main St/CSAH 38	Davis Ave (East Boundary of DB)	11.4	Less Than Average	Less Than Average	0.04	0.05	No	1450	B	3	13.6%	None	Yes	Yes	27.7	3.0	3.0	13.6	no	Usual	0.1	7.4	0.9	7.2	No	
MN330-1	MN 330	US 14	US 14 (UMN Southwest Research)	2.0	Between Average and Critical	Less Than Average	0.00	0.01	No	50	B	3	100.0%	None	No	Yes	No	0.1	0.0	0.0	0.0	no	Prescriptive	0.0	1.0	2.0	8.0	No
MN40-10	MN 40	CSAH 9/1st Ave N	1000 Feet East of CSAH 2	11.2	Between Average and Critical	Above Critical	0.08	0.10	3	1050	B	3	11.8%	High	Yes	Yes	1.6	0.0	1.0	2.6	no	Usual	0.1	7.4	0.3	8.9	No	
MN40-11	MN 40	1000 Feet East of CSAH 2	CSAH 55	12.5	Between Average and Critical	Between Average and Critical	0.07	0.16	3	1700	B	4	11.1%	High	Yes	Yes	16.0	3.0	1.0	0.0	no	Usual	0.0	8.6	1.1	10.6	No	
MN40-4	MN 40	CR 20	MN 119	5.0	Less Than Average	Less Than Average	0.06	0.07	No	1750	B	3	18.5%	High	No	Yes	Yes	9.6	3.0	0.0	0.0	no	Usual	0.2	2.4	0.6	8.0	No
MN40-5	MN 40	MN 119	1000 Feet East of CSAH 33	4.3	Less Than Average	Less Than Average	0.00	0.04	No	400	B	3	12.5%	High	No	Yes	Yes	13.3	0.0	1.0	7.0	yes	Usual	0.0	2.8	0.9	8.0	No
MN40-6	MN 40	1000 Feet East of CSAH 33	500 Feet West of 5th St	3.5	Less Than Average	Less Than Average	0.09	0.07	No	750	B	3	7.7%	High	No	Yes	Yes	26.5	2.0	3.0	52.0	yes	Usual	0.3	2.6	0.9	8.3	No
MN40-7	MN 40	MN 7	250 Feet West 103rd Ave NW	4.8	Less Than Average	Between Average and Critical	0.02	0.12	No	1300	B	3	9.5%	High	No	Yes	Yes	13.8	1.0	3.0	15.8	no	Usual	0.0	1.9	1.5	8.6	No
MN40-9	MN 40	200 Feet East of 100th Ave NW	Intersection of MN 40/MN 29/CSAH 8	3.9	Between Average and Critical	Above Critical	0.05	0.08	No	850	B	4	7.1%	High	No	Yes	Yes	4.7	0.0	0.0	0.0	no	Usual	0.0	1.8	0.0	8.6	No
MN67-5	MN 67	MN 23	0	0.8	Between Average and Critical	Less Than Average	0.39	0.05	3	1050	B	3	14.3%	Low	Yes	Yes	4.5	1.0	1.0	0.0	yes	Usual	0.0	5.2	2.6	11.8	No	
MN67-6	MN 67	1 Mile East of MN 23	1000 Feet South of CSAH 18	10.6	Between Average and Critical	Above Critical	0.08	0.04	4	800	B	3	18.8%	Low	Yes	Yes	14.0	2.0	7.0	0.0	no	Usual	0.4	5.2	3.2	9.7	No	
MN67-7	MN 67	1000 Feet South of CSAH 18	MN 19	5.5	Less Than Average	Less Than Average	0.00	0.04	No	850	B	3	17.6%	None	No	Yes	Yes	2.8	1.0	0.0	0.0	no	Usual	0.2	2.4	0.6	10.6	No
MN68-1	MN 68	South Dakota State Border	300 Feet West of Carby Municipal Boundary	8.3	Less Than Average	Between Average and Critical	0.05	0.06	4	1550	B	3	15.4%	Low	No	Yes	Yes	15.9	4.0	6.0	0.0	no	Usual	0.1	3.4	0.8	8.3	No
MN68-2	MN 68	2000 Feet West of 200th St	Prairie St N	7.0	Less Than Average	Less Than Average	0.06	0.30	No	2300	B	3	10.0%	Low	No	Yes	Yes	10.3	4.0	1.0	0.0	no	Usual	1.6	1.3	2.4	6.3	No
MN68-3	MN 68	300 Feet East of N Sunrise Ave	500 Feet West of CSAH 1	5.0	Less Than Average	Less Than Average	0.12	0.31	No	2300	B	4	10.0%	Low	No	Yes	Yes	9.3	1.0	3.0	1.2	no	Usual	1.8	0.8	2.6	7.4	No
MN68-4	MN 68	N Adams St	Taunton Municipal Boundary	0.6	Less Than Average	Less Than Average	0.00	0.29	No	2250	B	4	9.3%	Low	No	Yes	Yes	0.5	0.0	0.0	0.0	no	Usual	1.6	1.6	0.0	5.7	No
MN68-5	MN 68	Taunton Municipal Boundary	N Washington St	3.5	Less Than Average	Less Than Average	0.11	0.29	No	2250	B	4	11.1%	Low	No	Yes	Yes	5.3	0.0	3.0	0.0	no	Usual	0.3	2.8	1.4	5.7	No
MN68-9	MN 68	Oak St	200 Feet East of Barr St	15.6	Less Than Average	Less Than Average	0.04	0.06	No	1650	B	4	15.6%	None	No	Yes	Yes	3.0	3.0	0.0	0.0	no	Usual	0.1	2.9	0.5	6.8	Yes
MN91-1	MN 91	1st St (South Boundary of DB)	MN 30	10.2	Between Average and Critical	Between Average and Critical	0.06	0.06	No	1600	B	3	19.2%	None	Yes	Yes	31.5	8.0	7.0	5.0	yes	Usual	0.2	5.0	1.9	8.3	No	
US59-7	US 59	300th St	Clarkfield Municipal Boundary	20.7	Between Average and Critical	Between Average and Critical	0.04	0.14	No	1700	B	4	12.9%	High	Yes	Yes	No	19.4	4.0	0.0	0.0	no	Usual	0.2	2.0	0.4	7.1	No
US75-6	US 75	600 Feet South of MN 19	1000 Feet South of CSAH 19	8.9	Between Average and Critical	Above Critical	0.06	0.00	No	850	B	4	23.5%	None	No	Yes	Yes	20.3	1.0	3.0	0.0	no	Usual	0.1	3.6	0.4	8.1	No
US75-7	US 75	1000 Feet South of CSAH 19	300 Feet South of St. Olaf Ave S	8.5	Less Than Average	Less Than Average	0.07	0.00	No	1300	B	3	19.2%	None	Yes	Yes	10.4	4.0	3.0	7.3	no	Usual	0.1	1.9	2.4	8.3	No	
US75-8	US 75	CSAH 3	120th St N	9.5	Less Than Average	Between Average and Critical	0.03	0.00	No	1250	B	3	20.8%	None	No	No	No	8.2	3.0	0.0	0.0	no	Usual	0.2	2.3	0.7	7.9	No
US75-9	US 75	120th St N	500 Feet South of US 212	6.9	Less Than Average	Less Than Average	0.03	0.00	No	950	B	4	21.1%	None	No	No	No	10.5	0.0	1.0	0.0	no	Usual	0.0	2.3	0.6	7.7	No



Segment Information				Safety					Mobility		Multimodal Accommodations				System Preservation		Environmental Impacts					Constructability			Functionality			
Segment ID	Route Name	From	To	Length	Crash rate less than expected, between expected and critical, or greater than critical	Fatal and Injury crash rate less than expected, between expected and critical, or greater than critical	Run Off Road Crashes per Mile per Year	Difference between 2045 Build and 2045 No Build predicted crash rate	District Safety Plan - Risk Assessment	2045 AADT	Worst 2045 Peak Hour LOS	Bicycle Corridors	Truck Route - HCAADT	D8 Freight Plan	Unique Travel Corridor	Reclaim Candidate	Maintenance Issues	Impacted Wetlands (Acres)	Potentially Contaminated Sites (Minnesota Pollution Control Agency Sites)	MCBS Biodiversity Sites	Wildlife Mangement Area (Acres)	Other Cultural Resources	Right of Way Impacts (Prescriptive)	Number of Bridges	Number of Culverts	Number of Buildings (per mile)	Access Density (Access points per mile)	Gaps in Existing Shoulder
MN04-1	MN 04	MN 19 (South Border of D8)	US 212	14.79	2	3	1	2	3	1	2	3	0	0	3	3	3	0	2	3	0	3	3	3	2	3	0	
MN04-2	MN 04	100 North of Dupont Ave NE	Southern Cross Ave	12.86	0	0	0	1	3	2	1	3	3	3	3	3	3	1	2	3	0	3	2	3	2	2	0	
MN04-3	MN 04	Northern Cross Ave (Cosmos Municipal Boundary)	1000 Feet North of 260th St	12.68	0	0	0	1	0	2	1	1	3	0	3	3	0	1	2	3	0	3	3	3	3	2	0	
MN04-4	MN 04	1000 Feet North of 260th St	CSAH 11	0.96	0	0	2	0	0	2	1	1	2	0	0	3	0	3	1	2	3	0	3	3	2	3	2	0
MN04-5	MN 04	CSAH 11	US 12	0.76	2	0	0	3	0	3	1	1	1	0	3	0	3	2	2	3	0	3	3	2	0	2	0	
MN09-1	MN 09	1000 Feet West of CSAH 33	Glenoaks Dr	2.35	2	3	3	3	3	2	1	1	0	3	3	3	1	0	2	3	0	0	3	3	0	3	0	
MN09-2	MN 09	US 71	1000 Feet West of CSAH 33	1.85	2	3	3	2	3	1	1	1	0	3	3	3	1	2	2	3	0	0	3	2	1	3	0	
MN09-3	MN 09	MN 104 (Western Boundary of D8)	US 71	12.42	2	0	1	3	2	3	1	1	0	3	3	3	0	0	0	3	0	3	3	2	3	3	0	
MN19-1	MN 19	South Dakota State Border	US 75	10.40	2	0	1	3	2	2	1	1	2	0	3	0	0	3	0	2	0	3	2	3	3	2	0	
MN19-3	MN 19	CSAH 5	2300 Feet East of Lyon Lincoln County Rd/290th Ave	9.29	0	0	1	2	2	3	1	1	0	0	3	3	0	0	0	3	0	3	3	2	3	1	0	
MN19-4	MN 19	2300 Feet East of Lyon Lincoln County Rd/290th Ave	CSAH 5	8.59	2	0	1	3	0	3	1	1	1	0	3	3	2	3	1	3	0	3	1	2	2	2	0	
MN24-1	MN 24	CSAH 34	MN 15	14.11	2	3	1	3	0	3	1	2	1	0	3	0	0	0	2	3	0	3	3	2	2	2	0	
MN269-1	MN 269	South Dakota State Border	Driveway on South Side of Road Before Split	2.09	0	0	2	3	0	3	1	2	2	0	3	3	3	3	2	3	0	0	3	3	3	2	1	0
MN29-1	MN 29	Montevideo-Chippewa Airport Entrance	MN 40	9.57	0	3	0	2	0	2	1	0	0	0	3	3	0	2	2	3	0	3	2	3	3	2	0	
MN29-2	MN 29	MN 40	CSAH 6	6.01	0	2	0	1	0	2	1	1	3	3	3	3	3	2	2	3	0	3	3	3	3	1	0	
MN30-6	MN 30	3000 Feet West of 170th Ave	200 Feet East of Main St/CSAH 38	3.82	2	3	0	1	2	2	1	1	1	0	3	3	3	1	2	3	0	3	2	1	2	2	0	
MN30-8	MN 30	200 Feet East of Main St/CSAH 38	Davis Ave (East Boundary of D8)	11.45	0	0	0	2	0	2	1	2	1	0	3	3	0	0	1	2	0	3	3	1	3	1	0	
MN330-1	MN 330	US 14	US 14 (UMN Southwest Research)	2.00	2	0	0	1	0	0	1	2	3	0	0	3	3	3	2	3	0	0	3	3	2	1	0	
MN40-10	MN 40	CSAH 6/1st Ave N	1000 Feet East of CSAH 2	11.17	2	3	1	2	2	2	1	2	1	3	3	3	3	3	2	3	0	3	3	1	3	2	0	
MN40-11	MN 40	1000 Feet East of CSAH 2	CSAH 55	12.80	2	2	1	3	2	3	1	1	3	3	3	0	0	2	3	0	3	3	1	2	3	0	0	
MN40-4	MN 40	CR 20	MN 119	4.99	0	0	1	2	0	3	1	2	2	3	0	3	1	0	2	3	0	3	2	3	3	2	0	
MN40-5	MN 40	MN 119	1000 Feet East of CSAH 33	4.32	0	0	0	1	0	1	1	2	1	3	0	3	0	3	2	3	0	3	3	3	3	2	0	
MN40-6	MN 40	1000 Feet East of CSAH 33	500 Feet West of 5th St	3.53	0	0	1	2	0	1	1	2	0	3	0	3	0	1	1	0	0	3	2	3	3	2	0	
MN40-7	MN 40	MN 7	250 Feet West 103rd Ave NW	4.82	0	2	0	3	0	2	1	2	0	3	0	3	0	2	1	2	0	3	3	3	2	2	0	
MN40-9	MN 40	200 Feet East of 100th Ave NW	Intersection of MN 40/MN 29/CSAH 8	3.87	2	3	1	2	0	2	1	1	0	3	3	3	3	2	3	3	0	3	3	3	3	2	0	
MN67-5	MN 67	MN 23	0	0.77	2	0	3	1	2	2	1	2	1	1	3	3	3	2	2	3	0	3	3	2	2	3	0	
MN67-6	MN 67	1 Mile East of MN 23	1000 Feet South of CSAH 18	10.61	2	3	1	1	3	2	1	2	2	1	3	3	0	1	0	3	0	3	1	2	1	2	0	
MN67-7	MN 67	1000 Feet South of CSAH 18	MN 19	5.45	0	0	0	1	0	2	1	2	2	0	3	3	2	2	3	0	3	2	3	3	3	0	0	
MN68-1	MN 68	South Dakota State Border	300 Feet West of Canby Municipal Boundary	8.26	0	2	0	2	3	3	1	2	2	1	0	3	0	0	0	3	0	3	2	2	3	2	0	
MN68-2	MN 68	2000 Feet West of 200th St	Prairie St N	6.97	0	0	1	3	0	3	1	2	1	1	0	3	0	0	2	3	0	3	0	3	2	1	0	
MN68-3	MN 68	300 Feet East of N Sunrise Ave	500 Feet West of CSAH 1	5.03	0	0	2	3	0	3	1	1	1	1	3	3	1	2	1	3	0	3	0	3	2	1	0	
MN68-4	MN 68	N Adams St	Taunton Municipal Boundary	0.62	0	0	0	3	0	3	1	1	0	1	3	3	3	2	3	0	3	0	3	3	3	1	0	
MN68-5	MN 68	Taunton Municipal Boundary	N Washington St	3.54	0	0	2	3	0	3	1	1	1	1	0	3	3	2	3	1	3	0	3	2	3	2	0	
MN68-9	MN 68	Oak St	200 Feet East of Barr St	15.55	0	0	0	2	0	3	1	1	2	0	3	3	3	0	2	3	0	3	3	3	3	1	3	
MN91-1	MN 91	1st St (South Boundary of D8)	MN 30	10.16	2	2	1	2	0	3	1	2	2	0	3	3	0	0	0	3	0	3	2	2	2	2	0	
US59-7	US 59	300th St	Clarkfield Municipal Boundary	20.68	2	2	0	3	0	3	1	1	3	3	3	0	0	2	2	3	0	3	2	3	3	1	0	
US75-6	US 75	600 Feet South of MN 19	1000 Feet South of CSAH 19	8.89	2	3	1	0	0	2	1	1	3	0	3	3	0	2	1	3	0	3	2	2	3	2	0	
US75-7	US 75	1000 Feet South of CSAH 19	300 Feet South of St. Olaf Ave S	8.47	0	0	1	0	0	2	1	2	2	0	3	3	0	0	1	3	0	3	2	3	2	2	0	
US75-8	US 75	CSAH 3	120th St N	9.51	0	2	0	0	0	2	1	2	3	0	0	0	1	0	2	3	0	3	2	3	3	1	0	
US75-9	US 75	120th St N	500 Feet South of US 212	6.91	0	0	0	0	0	2	1	1	3	0	0	0	0	3	2	3	0	3	3	3	3	1	0	



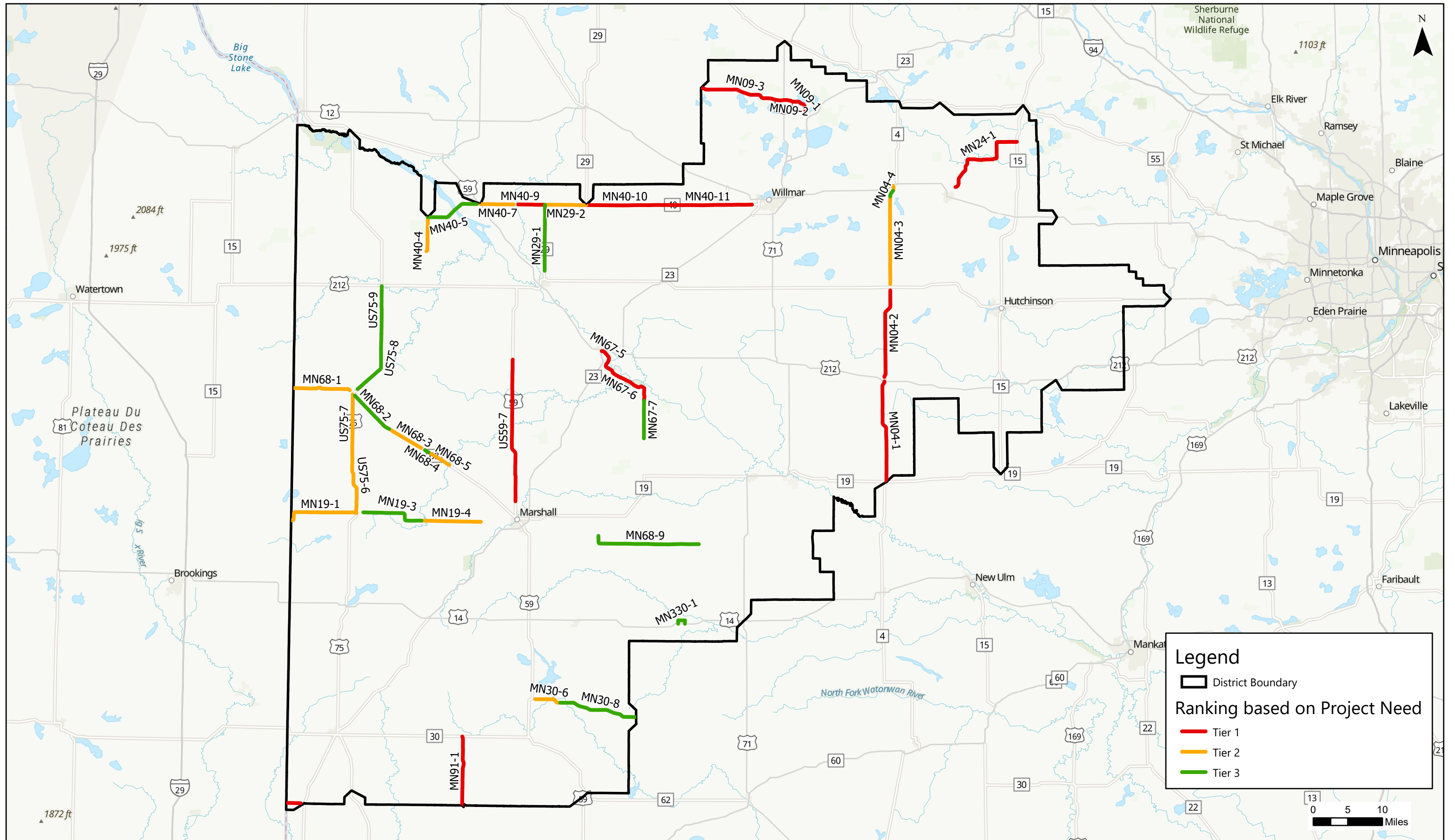
District 8 Shoulder Widening Prioritization Study  
Benefit-Cost Analysis

Segment Information					Travel Time -Build	Safety	Costs	Ratio		
Segment ID	Route Name	From	To	Length	Net Travel Time Savings	Predicted Crash Cost savings	Total Costs (Less Remaining Capital Value)	Total Benefits	Total Costs	B/C Ratio
MN04-1	MN 04	MN 19 (South Border of D8)	US 212	14.8	\$ 3,461,317	\$ 4,269,433	\$ 1,831,716	\$ 7,730,750	\$ 1,831,716	4.22
MN04-2	MN 04	100 North of Dupont Ave NE	Southern Cross Ave	12.9	\$ 1,734,066	\$ 1,377,456	\$ 1,592,818	\$ 3,111,522	\$ 1,592,818	1.95
MN04-3	MN 04	Northern Cross Ave (Cosmos Municipal Boundary)	1000 Feet North of 260th St	12.7	\$ 1,571,852	\$ 1,225,115	\$ 1,570,035	\$ 2,796,967	\$ 1,570,035	1.78
MN04-4	MN 04	1000 Feet North of 260th St	CSAH 11	1.0	\$ 139,165	\$ -	\$ 104,467	\$ 139,165	\$ 104,467	1.33
MN04-5	MN 04	CSAH 11	US 12	0.8	\$ 184,927	\$ 441,450	\$ 148,908	\$ 626,377	\$ 148,908	4.21
MN09-1	MN 09	1000 Feet West of CSAH 33	Glenoaks Dr	2.4	\$ 994,959	\$ 3,216,428	\$ 617,166	\$ 4,211,386	\$ 617,166	6.82
MN09-2	MN 09	US 71	1000 Feet West of CSAH 33	1.8	\$ 478,816	\$ 448,189	\$ 253,786	\$ 927,005	\$ 253,786	3.65
MN09-3	MN 09	MN 104 (Western Boundary of D8)	US 71	12.4	\$ 2,803,256	\$ 11,002,830	\$ 2,585,544	\$13,806,086	\$ 2,585,544	5.34
MN19-1	MN 19	South Dakota State Border	US 75	10.4	\$ 1,754,300	\$ 2,490,764	\$ 2,165,512	\$ 4,245,063	\$ 2,165,512	1.96
MN19-3	MN 19	CSAH 5	2300 Feet East of Lyon Lincoln County Rd/290th Ave	9.3	\$ 1,526,345	\$ 1,593,995	\$ 1,150,629	\$ 3,120,340	\$ 1,150,629	2.71
MN19-4	MN 19	300 Feet East of Lyon Lincoln County Rd/290th Ave	CSAH 5	8.6	\$ 1,841,750	\$ 6,904,762	\$ 1,788,905	\$ 8,746,512	\$ 1,788,905	4.89
MN24-1	MN 24	CSAH 34	MN 15	14.1	\$ 3,440,622	\$ 13,489,708	\$ 6,001,254	\$16,930,330	\$ 6,001,254	2.82
MN269-1	MN 269	South Dakota State Border	Driveway on South Side of Road Before Split	2.1	\$ 531,225	\$ 1,025,206	\$ 987,623	\$ 1,556,431	\$ 987,623	1.58
MN29-1	MN 29	Montevideo-Chippewa Airport Entrance	MN 40	9.6	\$ 1,321,891	\$ 1,229,518	\$ 2,427,902	\$ 2,551,409	\$ 2,427,902	1.05
MN29-2	MN 29	MN 40	CSAH 6	6.0	\$ 709,783	\$ 351,568	\$ 2,049,568	\$ 1,061,351	\$ 2,049,568	0.52
MN30-6	MN 30	3000 Feet West of 170th Ave	200 Feet East of Main St/CSAH 38	3.8	\$ 494,356	\$ 280,599	\$ 1,304,142	\$ 774,954	\$ 1,304,142	0.59
MN30-8	MN 30	200 Feet East of Main St/CSAH 38	Davis Ave (East Boundary of D8)	11.4	\$ 2,217,796	\$ 1,643,785	\$ 3,903,329	\$ 3,861,582	\$ 3,903,329	0.99
MN330-1	MN 330	US 14	US 14 (UMN Southwest Research)	2.0	\$ 19,807	\$ 2,793	\$ 948,713	\$ 22,600	\$ 948,713	0.02
MN40-10	MN 40	CSAH 6/1st Ave N	1000 Feet East of CSAH 2	11.2	\$ 1,599,035	\$ 2,144,715	\$ 4,751,383	\$ 3,743,750	\$ 4,751,383	0.79
MN40-11	MN 40	1000 Feet East of CSAH 2	CSAH 55	12.8	\$ 3,019,025	\$ 6,501,541	\$ 5,441,433	\$ 9,520,565	\$ 5,441,433	1.75
MN40-4	MN 40	CR 20	MN 119	5.0	\$ 1,221,998	\$ 1,037,837	\$ 1,487,004	\$ 2,259,834	\$ 1,487,004	1.52
MN40-5	MN 40	MN 119	1000 Feet East of CSAH 33	4.3	\$ 327,417	\$ 130,909	\$ 2,069,185	\$ 458,326	\$ 2,069,185	0.22
MN40-6	MN 40	1000 Feet East of CSAH 33	500 Feet West of 5th St	3.5	\$ 358,753	\$ 343,488	\$ 1,500,597	\$ 702,241	\$ 1,500,597	0.47
MN40-7	MN 40	MN 7	250 Feet West 103rd Ave NW	4.8	\$ 843,787	\$ 1,342,852	\$ 2,049,845	\$ 2,186,639	\$ 2,049,845	1.07
MN40-9	MN 40	200 Feet East of 100th Ave NW	Intersection of MN 40/MN 29/CSAH 8	3.9	\$ 436,465	\$ 474,178	\$ 1,646,154	\$ 910,643	\$ 1,646,154	0.55
MN67-5	MN 67	MN 23	0	0.8	\$ 95,938	\$ 81,866	\$ 195,517	\$ 177,804	\$ 195,517	0.91
MN67-6	MN 67	1 Mile East of MN 23	1000 Feet South of CSAH 18	10.6	\$ 1,019,133	\$ 670,746	\$ 2,690,670	\$ 1,689,879	\$ 2,690,670	0.63
MN67-7	MN 67	1000 Feet South of CSAH 18	MN 19	5.5	\$ 558,514	\$ 393,525	\$ 1,382,849	\$ 952,038	\$ 1,382,849	0.69
MN68-1	MN 68	South Dakota State Border	300 Feet West of Canby Municipal Boundary	8.3	\$ 1,812,808	\$ 1,446,601	\$ 2,818,233	\$ 3,259,409	\$ 2,818,233	1.16
MN68-2	MN 68	2000 Feet West of 200th St	Prairie St N	7.0	\$ 2,210,283	\$ 9,172,913	\$ 4,124,102	\$11,383,197	\$ 4,124,102	2.76
MN68-3	MN 68	300 Feet East of N Sunrise Ave	500 Feet West of CSAH 1	5.0	\$ 1,614,030	\$ 6,853,886	\$ 2,980,031	\$ 8,467,916	\$ 2,980,031	2.84
MN68-4	MN 68	N Adams St	Taunton Municipal Boundary	0.6	\$ 195,298	\$ 816,040	\$ 366,253	\$ 1,011,338	\$ 366,253	2.76
MN68-5	MN 68	Taunton Municipal Boundary	N Washington St	3.5	\$ 1,155,955	\$ 4,795,890	\$ 2,095,046	\$ 5,951,845	\$ 2,095,046	2.84
MN68-9	MN 68	Oak St	200 Feet East of Barr St	15.6	\$ 2,928,173	\$ 3,113,498	\$ 3,944,402	\$ 6,041,671	\$ 3,944,402	1.53
MN91-1	MN 91	1st St (South Boundary of D8)	MN 30	10.2	\$ 1,989,145	\$ 1,948,506	\$ 3,062,475	\$ 3,937,651	\$ 3,062,475	1.29
US59-7	US 59	300th St	Clarkfield Municipal Boundary	20.7	\$ 5,019,687	\$ 9,828,729	\$ 8,642,738	\$14,848,416	\$ 8,642,738	1.72
US75-6	US 75	600 Feet South of MN 19	1000 Feet South of CSAH 19	8.9	\$ 918,162	\$ -	\$ 1,426,522	\$ 918,162	\$ 1,426,522	0.64
US75-7	US 75	1000 Feet South of CSAH 19	300 Feet South of St. Olaf Ave S	8.5	\$ 1,316,233	\$ -	\$ 1,359,281	\$ 1,316,233	\$ 1,359,281	0.97
US75-8	US 75	CSAH 3	120th St N	9.5	\$ 1,402,693	\$ -	\$ 1,526,407	\$ 1,402,693	\$ 1,526,407	0.92
US75-9	US 75	120th St N	500 Feet South of US 212	6.9	\$ 784,579	\$ -	\$ 1,108,901	\$ 784,579	\$ 1,108,901	0.71



**District 8 Shoulder Widening Prioritization Study**  
**Ranking of Segments Based on Project Need**

Segment ID	Rank	Route Name	From	To	Include in Study	Length	30%	15%	30%	10%	5%	5%	5%	Score	Tier
							Safety	Mobility	Multimodal Accommodations	System Preservation	Environmental Impacts	Constructability	Functionality		
MN09-1	1	MN 09	1000 Feet West of CSAH 33	Glenoaks Dr	Yes	2.35	93.33	83.33	41.67	100.00	40.00	50.00	50.00	70.00	Tier 1
MN40-10	2	MN 40	CSAH 6/1st Ave N	1000 Feet East of CSAH 2	Yes	11.17	66.67	50.00	75.00	100.00	73.33	83.33	33.33	69.50	Tier 1
MN40-11	3	MN 40	1000 Feet East of CSAH 2	CSAH 55	Yes	12.80	66.67	66.67	66.67	100.00	33.33	75.00	50.00	67.92	Tier 1
MN09-2	4	MN 09	US 71	1000 Feet West of CSAH 33	Yes	1.85	80.00	66.67	41.67	100.00	53.33	50.00	50.00	64.17	Tier 1
MN67-6	5	MN 67	1 Mile East of MN 23	1000 Feet South of CSAH 18	Yes	10.61	66.67	50.00	66.67	100.00	26.67	58.33	33.33	63.42	Tier 1
MN04-1	6	MN 04	MN 19 (South Border of D8)	US 212	Yes	14.79	66.67	66.67	41.67	100.00	53.33	91.67	50.00	62.25	Tier 1
MN67-5	7	MN 67	MN 23	0	Yes	0.77	53.33	50.00	58.33	100.00	66.67	83.33	50.00	61.00	Tier 1
MN04-2	8	MN 04	100 North of Dupont Ave NE	Southern Cross Ave	Yes	12.86	26.67	50.00	83.33	100.00	60.00	83.33	33.33	59.33	Tier 1
MN91-1	9	MN 91	1st St (South Boundary of D8)	MN 30	Yes	10.16	46.67	66.67	58.33	100.00	20.00	75.00	33.33	57.92	Tier 1
MN09-3	10	MN 09	MN 104 (Western Boundary of D8)	US 71	Yes	12.42	53.33	66.67	41.67	100.00	20.00	91.67	50.00	56.58	Tier 1
US59-7	11	US 59	300th St	Clarkfield Municipal Boundary	Yes	20.68	46.67	66.67	66.67	50.00	33.33	91.67	16.67	56.08	Tier 1
MN24-1	12	MN 24	CSAH 34	MN 15	Yes	14.11	60.00	66.67	50.00	50.00	33.33	83.33	33.33	55.50	Tier 1
MN269-1	13	MN 269	South Dakota State Border	Driveway on South Side of Road Before Split	Yes	2.09	33.33	66.67	58.33	100.00	73.33	66.67	16.67	55.33	Tier 1
MN40-9	14	MN 40	200 Feet East of 100th Ave NW	Intersection of MN 40/MN 29/CSAH 8	Yes	3.87	53.33	50.00	33.33	100.00	73.33	100.00	33.33	53.83	Tier 1
MN68-1	15	MN 68	South Dakota State Border	300 Feet West of Canby Municipal Boundary	Yes	8.26	46.67	66.67	41.67	100.00	20.00	83.33	33.33	53.33	Tier 2
MN29-2	16	MN 29	MN 40	CSAH 6	Yes	6.01	20.00	50.00	66.67	100.00	66.67	100.00	16.67	52.67	Tier 2
MN40-4	17	MN 40	CR 20	MN 119	Yes	4.99	20.00	66.67	58.33	100.00	40.00	91.67	33.33	51.75	Tier 2
MN40-7	18	MN 40	MN 7	250 Feet West 103rd Ave NW	Yes	4.82	33.33	50.00	41.67	100.00	33.33	91.67	33.33	47.92	Tier 2
US75-6	19	US 75	600 Feet South of MN 19	1000 Feet South of CSAH 19	Yes	8.89	40.00	50.00	33.33	100.00	40.00	83.33	33.33	47.33	Tier 2
MN30-6	20	MN 30	3000 Feet West of 170th Ave	200 Feet East of Main St/CSAH 38	Yes	3.82	53.33	50.00	16.67	100.00	60.00	66.67	33.33	46.50	Tier 2
MN04-5	21	MN 04	CSAH 11	US 12	Yes	0.76	33.33	66.67	41.67	50.00	66.67	66.67	33.33	45.83	Tier 2
MN04-3	22	MN 04	Northern Cross Ave (Cosmos Municipal Boundary)	1000 Feet North of 260th St	Yes	12.68	6.67	50.00	58.33	100.00	40.00	100.00	33.33	45.67	Tier 2
MN68-5	23	MN 68	Taunton Municipal Boundary	N Washington St	Yes	3.54	33.33	66.67	25.00	100.00	60.00	83.33	16.67	45.50	Tier 2
MN19-4	24	MN 19	2300 Feet East of Lyon Lincoln County Rd/290th Ave	CSAH 5	Yes	8.59	40.00	66.67	16.67	100.00	60.00	66.67	33.33	45.00	Tier 2
US75-7	25	US 75	1000 Feet South of CSAH 19	300 Feet South of St. Olaf Ave S	Yes	8.47	6.67	50.00	58.33	100.00	26.67	83.33	33.33	44.17	Tier 2
MN68-3	26	MN 68	300 Feet East of N Sunrise Ave	500 Feet West of CSAH 1	Yes	5.03	33.33	66.67	25.00	100.00	46.67	66.67	16.67	44.00	Tier 2
MN19-1	27	MN 19	South Dakota State Border	US 75	Yes	10.40	53.33	50.00	25.00	50.00	33.33	91.67	33.33	43.92	Tier 2
MN68-2	28	MN 68	2000 Feet West of 200th St	Prairie St N	Yes	6.97	26.67	66.67	33.33	100.00	33.33	66.67	16.67	43.83	Tier 3
MN68-9	29	MN 68	Oak St	200 Feet East of Barr St	Yes	15.55	13.33	66.67	25.00	100.00	53.33	100.00	66.67	42.50	Tier 3
MN30-8	29	MN 30	200 Feet East of Main St/CSAH 38	Davis Ave (East Boundary of D8)	Yes	11.45	13.33	50.00	50.00	100.00	20.00	83.33	16.67	42.50	Tier 3
MN19-3	31	MN 19	CSAH 5	2300 Feet East of Lyon Lincoln County Rd/290th Ave	Yes	9.29	33.33	66.67	16.67	100.00	20.00	91.67	16.67	41.42	Tier 3
MN40-5	32	MN 40	MN 119	1000 Feet East of CSAH 33	Yes	4.32	6.67	33.33	50.00	100.00	53.33	100.00	33.33	41.33	Tier 3
MN40-6	33	MN 40	1000 Feet East of CSAH 33	500 Feet West of 5th St	Yes	3.53	20.00	33.33	41.67	100.00	13.33	91.67	33.33	40.42	Tier 3
MN67-7	34	MN 67	1000 Feet South of CSAH 18	MN 19	Yes	5.45	6.67	50.00	33.33	100.00	66.67	91.67	50.00	39.92	Tier 3
MN68-4	35	MN 68	N Adams St	Taunton Municipal Boundary	Yes	0.62	20.00	66.67	16.67	100.00	73.33	75.00	16.67	39.25	Tier 3
MN29-1	36	MN 29	Montevideo-Chippewa Airport Entrance	MN 40	Yes	9.57	33.33	50.00	8.33	100.00	46.67	91.67	33.33	38.58	Tier 3
MN330-1	37	MN 330	US 14	US 14 (UMN Southwest Research)	Yes	2.00	20.00	16.67	41.67	50.00	73.33	66.67	16.67	33.83	Tier 3
MN04-4	38	MN 04	1000 Feet North of 260th St	CSAH 11	Yes	0.96	13.33	50.00	25.00	50.00	60.00	91.67	33.33	33.25	Tier 3
US75-8	39	US 75	CSAH 3	120th St N	Yes	9.51	13.33	50.00	41.67	0.00	40.00	91.67	16.67	31.42	Tier 3
US75-9	40	US 75	120th St N	500 Feet South of US 212	Yes	6.91	0.00	50.00	33.33	0.00	53.33	100.00	16.67	26.00	Tier 3



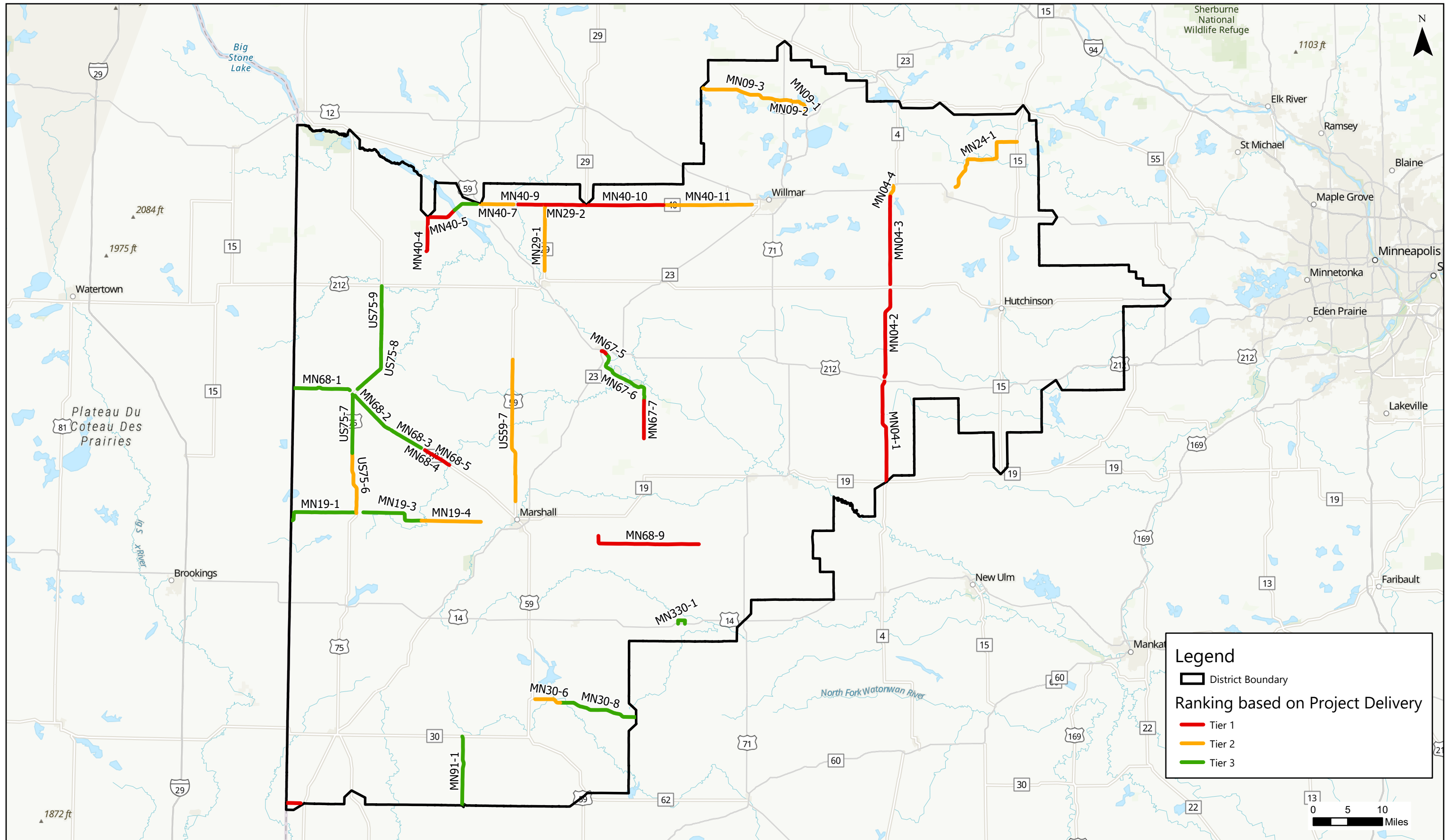
**Project Prioritization Based on Project Need**

District 8 - Shoulder Widening Prioritization Study  
MnDOT



**District 8 Shoulder Widening Prioritization Study**  
**Ranking of Segments Based on Project Delivery**

Segment ID	Rank	Route Name	From	To	Include in Study	Length	10%	10%	5%	10%	30%	30%	5%	Score	Tier
							Safety	Mobility	Multimodal Accomodations	System Preservation	Environmental Impacts	Constructability	Functionality		
MN40-9	1	MN 40	200 Feet East of 100th Ave NW	Intersection of MN 40/MN 29/CSAH 8	Yes	3.87	53.33	50.00	33.33	100.00	73.33	100.00	33.33	75.67	Tier 1
MN40-10	2	MN 40	CSAH 6/1st Ave N	1000 Feet East of CSAH 2	Yes	11.17	66.67	50.00	75.00	100.00	73.33	83.33	33.33	74.08	Tier 1
MN04-1	3	MN 04	MN 19 (South Border of D8)	US 212	Yes	14.79	66.67	66.67	41.67	100.00	53.33	91.67	50.00	71.42	Tier 1
MN29-2	4	MN 29	MN 40	CSAH 6	Yes	6.01	20.00	50.00	66.67	100.00	66.67	100.00	16.67	71.17	Tier 1
MN67-5	5	MN 67	MN 23	0	Yes	0.77	53.33	50.00	58.33	100.00	66.67	83.33	50.00	70.75	Tier 1
MN68-9	6	MN 68	Oak St	200 Feet East of Barr St	Yes	15.55	13.33	66.67	25.00	100.00	53.33	100.00	66.67	68.58	Tier 1
MN67-7	7	MN 67	1000 Feet South of CSAH 18	MN 19	Yes	5.45	6.67	50.00	33.33	100.00	66.67	91.67	50.00	67.33	Tier 1
MN04-2	8	MN 04	100 North of Dupont Ave NE	Southern Cross Ave	Yes	12.86	26.67	50.00	83.33	100.00	60.00	83.33	33.33	66.50	Tier 1
MN269-1	9	MN 269	South Dakota State Border	Driveway on South Side of Road Before Split	Yes	2.09	33.33	66.67	58.33	100.00	73.33	66.67	16.67	65.75	Tier 1
MN68-5	10	MN 68	Taunton Municipal Boundary	N Washington St	Yes	3.54	33.33	66.67	25.00	100.00	60.00	83.33	16.67	65.08	Tier 1
MN68-4	11	MN 68	N Adams St	Taunton Municipal Boundary	Yes	0.62	20.00	66.67	16.67	100.00	73.33	75.00	16.67	64.83	Tier 1
MN40-5	12	MN 40	MN 119	1000 Feet East of CSAH 33	Yes	4.32	6.67	33.33	50.00	100.00	53.33	100.00	33.33	64.17	Tier 1
MN40-4	13	MN 40	CR 20	MN 119	Yes	4.99	20.00	66.67	58.33	100.00	40.00	91.67	33.33	62.75	Tier 1
MN04-3	14	MN 04	Northern Cross Ave (Cosmos Municipal Boundary)	1000 Feet North of 260th St	Yes	12.68	6.67	50.00	58.33	100.00	40.00	100.00	33.33	62.25	Tier 1
MN29-1	15	MN 29	Montevideo-Chippewa Airport Entrance	MN 40	Yes	9.57	33.33	50.00	8.33	100.00	46.67	91.67	33.33	61.92	Tier 2
MN40-11	16	MN 40	1000 Feet East of CSAH 2	CSAH 55	Yes	12.80	66.67	66.67	66.67	100.00	33.33	75.00	50.00	61.67	Tier 2
MN19-4	17	MN 19	2300 Feet East of Lyon Lincoln County Rd/290th Ave	CSAH 5	Yes	8.59	40.00	66.67	16.67	100.00	60.00	66.67	33.33	61.17	Tier 2
MN30-6	18	MN 30	3000 Feet West of 170th Ave	200 Feet East of Main St/CSAH 38	Yes	3.82	53.33	50.00	16.67	100.00	60.00	66.67	33.33	60.83	Tier 2
MN09-2	19	MN 09	US 71	1000 Feet West of CSAH 33	Yes	1.85	80.00	66.67	41.67	100.00	53.33	50.00	50.00	60.25	Tier 2
MN09-3	20	MN 09	MN 104 (Western Boundary of D8)	US 71	Yes	12.42	53.33	66.67	41.67	100.00	20.00	91.67	50.00	60.08	Tier 2
MN04-4	21	MN 04	1000 Feet North of 260th St	CSAH 11	Yes	0.96	13.33	50.00	25.00	50.00	60.00	91.67	33.33	59.75	Tier 2
MN40-7	22	MN 40	MN 7	250 Feet West 103rd Ave NW	Yes	4.82	33.33	50.00	41.67	100.00	33.33	91.67	33.33	59.58	Tier 2
US75-6	23	US 75	600 Feet South of MN 19	1000 Feet South of CSAH 19	Yes	8.89	40.00	50.00	33.33	100.00	40.00	83.33	33.33	59.33	Tier 2
MN09-1	24	MN 09	1000 Feet West of CSAH 33	Glenoaks Dr	Yes	2.35	93.33	83.33	41.67	100.00	40.00	50.00	50.00	59.25	Tier 2
MN04-5	25	MN 04	CSAH 11	US 12	Yes	0.76	33.33	66.67	41.67	50.00	66.67	66.67	33.33	58.75	Tier 2
US59-7	26	US 59	300th St	Clarkfield Municipal Boundary	Yes	20.68	46.67	66.67	66.67	50.00	33.33	91.67	16.67	58.00	Tier 2
MN24-1	27	MN 24	CSAH 34	MN 15	Yes	14.11	60.00	66.67	50.00	50.00	33.33	83.33	33.33	56.83	Tier 2
MN68-1	28	MN 68	South Dakota State Border	300 Feet West of Canby Municipal Boundary	Yes	8.26	46.67	66.67	41.67	100.00	20.00	83.33	33.33	56.08	Tier 3
MN68-3	28	MN 68	300 Feet East of N Sunrise Ave	500 Feet West of CSAH 1	Yes	5.03	33.33	66.67	25.00	100.00	46.67	66.67	16.67	56.08	Tier 3
MN19-1	30	MN 19	South Dakota State Border	US 75	Yes	10.40	53.33	50.00	25.00	50.00	33.33	91.67	33.33	55.75	Tier 3
MN19-3	31	MN 19	CSAH 5	2300 Feet East of Lyon Lincoln County Rd/290th Ave	Yes	9.29	33.33	66.67	16.67	100.00	20.00	91.67	16.67	55.17	Tier 3
MN91-1	32	MN 91	1st St (South Boundary of D8)	MN 30	Yes	10.16	46.67	66.67	58.33	100.00	20.00	75.00	33.33	54.42	Tier 3
MN330-1	33	MN 330	US 14	US 14 (UMN Southwest Research)	Yes	2.00	20.00	16.67	41.67	50.00	73.33	66.67	16.67	53.58	Tier 3
US75-9	34	US 75	120th St N	500 Feet South of US 212	Yes	6.91	0.00	50.00	33.33	0.00	53.33	100.00	16.67	53.50	Tier 3
US75-7	35	US 75	1000 Feet South of CSAH 19	300 Feet South of St. Olaf Ave S	Yes	8.47	6.67	50.00	58.33	100.00	26.67	83.33	33.33	53.25	Tier 3
MN67-6	36	MN 67	1 Mile East of MN 23	1000 Feet South of CSAH 18	Yes	10.61	66.67	50.00	66.67	100.00	26.67	58.33	33.33	52.17	Tier 3
MN68-2	37	MN 68	2000 Feet West of 200th St	Prairie St N	Yes	6.97	26.67	66.67	33.33	100.00	33.33	66.67	16.67	51.83	Tier 3
MN30-8	38	MN 30	200 Feet East of Main St/CSAH 38	Davis Ave (East Boundary of D8)	Yes	11.45	13.33	50.00	50.00	100.00	20.00	83.33	16.67	50.67	Tier 3
MN40-6	39	MN 40	1000 Feet East of CSAH 33	500 Feet West of 5th St	Yes	3.53	20.00	33.33	41.67	100.00	13.33	91.67	33.33	50.58	Tier 3
US75-8	40	US 75	CSAH 3	120th St N	Yes	9.51	13.33	50.00	41.67	0.00	40.00	91.67	16.67	48.75	Tier 3



**Project Prioritization Based on Project Delivery**

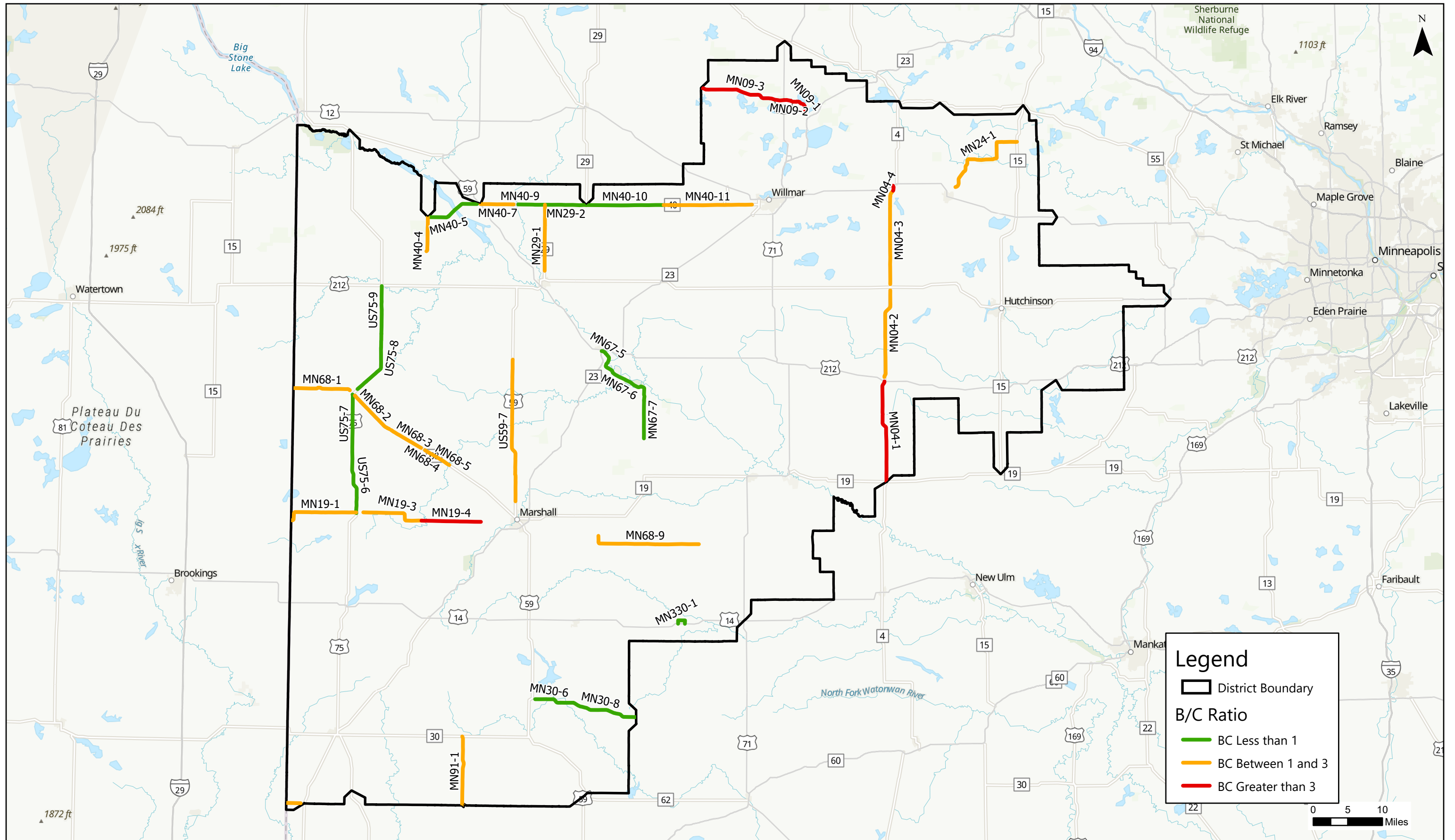
District 8 - Shoulder Widening Prioritization Study  
MnDOT



**District 8 Shoulder Widening Prioritization Study  
Ranking of Segments Based on Benefit-Cost**

Segment ID	Rank	Route Name	From	To	Length	B/C Ratio
MN09-1	1	MN 09	1000 Feet West of CSAH 33	Glenoaks Dr	2.35	6.82
MN09-3	2	MN 09	MN 104 (Western Boundary of D8)	US 71	12.42	5.34
MN19-4	3	MN 19	2300 Feet East of Lyon Lincoln County Rd/290th Ave	CSAH 5	8.59	4.89
MN04-1	4	MN 04	MN 19 (South Border of D8)	US 212	14.79	4.22
MN04-5	5	MN 04	CSAH 11	US 12	0.76	4.21
MN09-2	6	MN 09	US 71	1000 Feet West of CSAH 33	1.85	3.65
MN68-3	7	MN 68	300 Feet East of N Sunrise Ave	500 Feet West of CSAH 1	5.03	2.84
MN68-5	8	MN 68	Taunton Municipal Boundary	N Washington St	3.54	2.84
MN24-1	9	MN 24	CSAH 34	MN 15	14.11	2.82
MN68-4	10	MN 68	N Adams St	Taunton Municipal Boundary	0.62	2.76
MN68-2	11	MN 68	2000 Feet West of 200th St	Prairie St N	6.97	2.76
MN19-3	12	MN 19	CSAH 5	2300 Feet East of Lyon Lincoln County Rd/290th Ave	9.29	2.71
MN19-1	13	MN 19	South Dakota State Border	US 75	10.40	1.96
MN04-2	14	MN 04	100 North of Dupont Ave NE	Southern Cross Ave	12.86	1.95
MN04-3	15	MN 04	Northern Cross Ave (Cosmos Municipal Boundary)	1000 Feet North of 260th St	12.68	1.78
MN40-11	16	MN 40	1000 Feet East of CSAH 2	CSAH 55	12.80	1.75
US59-7	17	US 59	300th St	Clarkfield Municipal Boundary	20.68	1.72
MN269-1	18	MN 269	South Dakota State Border	Driveway on South Side of Road Before Split	2.09	1.58
MN68-9	19	MN 68	Oak St	200 Feet East of Barr St	15.55	1.53
MN40-4	20	MN 40	CR 20	MN 119	4.99	1.52
MN04-4	21	MN 04	1000 Feet North of 260th St	CSAH 11	0.96	1.33
MN91-1	22	MN 91	1st St (South Boundary of D8)	MN 30	10.16	1.29
MN68-1	23	MN 68	South Dakota State Border	300 Feet West of Canby Municipal Boundary	8.26	1.16
MN40-7	24	MN 40	MN 7	250 Feet West 103rd Ave NW	4.82	1.07
MN29-1	25	MN 29	Montevideo-Chippewa Airport Entrance	MN 40	9.57	1.05
MN30-8	26	MN 30	200 Feet East of Main St/CSAH 38	Davis Ave (East Boundary of D8)	11.45	0.99
US75-7	27	US 75	1000 Feet South of CSAH 19	300 Feet South of St. Olaf Ave S	8.47	0.97
US75-8	28	US 75	CSAH 3	120th St N	9.51	0.92
MN67-5	29	MN 67	MN 23	0	0.77	0.91
MN40-10	30	MN 40	CSAH 6/1st Ave N	1000 Feet East of CSAH 2	11.17	0.79
US75-9	31	US 75	120th St N	500 Feet South of US 212	6.91	0.71
MN67-7	32	MN 67	1000 Feet South of CSAH 18	MN 19	5.45	0.69
US75-6	33	US 75	600 Feet South of MN 19	1000 Feet South of CSAH 19	8.89	0.64
MN67-6	34	MN 67	1 Mile East of MN 23	1000 Feet South of CSAH 18	10.61	0.63
MN30-6	35	MN 30	3000 Feet West of 170th Ave	200 Feet East of Main St/CSAH 38	3.82	0.59
MN40-9	36	MN 40	200 Feet East of 100th Ave NW	Intersection of MN 40/MN 29/CSAH 8	3.87	0.55
MN29-2	37	MN 29	MN 40	CSAH 6	6.01	0.52
MN40-6	38	MN 40	1000 Feet East of CSAH 33	500 Feet West of 5th St	3.53	0.47
MN40-5	39	MN 40	MN 119	1000 Feet East of CSAH 33	4.32	0.22
MN330-1	40	MN 330	US 14	US 14 (UMN Southwest Research)	2.00	0.02





**Project Prioritization Based on Benefit Cost**

District 8 - Shoulder Widening Prioritization Study  
MnDOT