

Greater Minnesota Mobility Study

Final Report

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Contents

Executive Summary

1	<i>Introduction.....</i>	<i>1</i>
1.1	Study Goal and Need.....	1
1.2	Study Organization.....	1
1.3	Study Approach and Outcomes.....	3
2	<i>Identify and Prioritize Mobility Locations</i>	<i>4</i>
2.1	Methodology	4
2.1.1	Data Sources	4
2.1.2	Evaluation Criteria	4
2.1.3	Scoring	11
2.1.4	Problem Area Identification.....	11
2.2	Identify and prioritize mobility problem locations	12
2.2.1	District Scoring Results	12
2.2.2	District Workshops.....	13
3	<i>Documentation of High-Priority Locations.....</i>	<i>15</i>
3.1	High-Priority Locations	15
3.2	Study Results by District	16
3.2.1	District 1 Study Results	17
	District 1 Location Fact Sheets.....	20
3.2.2	District 2 Study Results	21
	District 2 Location Fact Sheets.....	24
3.2.5	District 6 Study Results	34
3.2.6	District 7 Study Results	38
3.2.7	District 8 Study Results	42
4	<i>Toolbox of Solutions</i>	<i>46</i>
5	<i>Study Limitations.....</i>	<i>47</i>
6	<i>Role of the Study in Future Planning</i>	<i>48</i>
6.1	Incorporate Study Findings into Transportation Policy and Investment Plans.....	48
6.2	Support Project Funding Decisions.....	48
6.2.1	Use of Funding	48



6.2.2	Distribution of Funds	48
6.2.3	Project Selection	49
6.3	Provide a Reference for Local and Regional Planning.....	49
6.4	Future Updates to the Study’s Analysis and Priority Locations	49

Tables

Table 1	LOTTR and Speed Index Statistics	6
Table 2	Evaluation Criteria Weighting	10
Table 3	Detailed Criteria Scoring	11
Table 4	Example of D1 Scoring Results Table	13
Table 5	District 1 Scoring List.....	18
Table 6	District 2 Scoring List.....	22
Table 7	District 3 Scoring List.....	26
Table 8	District 4 Scoring List.....	31
Table 9	District 6 Scoring List.....	35
Table 10	District 7 Scoring List.....	39
Table 11	District 8 Scoring List.....	43
Table 12	Greater Minnesota Mobility Funds Distribution.....	49

Figures

Figure ES-1	High-Priority Locations.....	ES-3
Figure 1	Study Area	2
Figure 2	Study Approach.....	3
Figure 3	Segments Meeting LOTTR Threshold.....	7
Figure 4	Segments Meeting Speed Index Threshold.....	8
Figure 5	Segments Meeting Both LOTTR and Speed Index Thresholds	9
Figure 6	High-Priority Locations.....	15
Figure 7	District 1 Scoring Results Map	19
Figure 8	District 2 Scoring Results Map	23
Figure 9	District 3 Scoring Results Map	28
Figure 10	District 4 Scoring Results Map	32
Figure 11	District 6 Scoring Results Map	36
Figure 12	District 7 Scoring Results Map	40
Figure 13	District 8 Scoring Results Map	44
Figure 14	Solutions Toolbox Flow Chart	47



Location Fact Sheets

District 1 Fact Sheets.....	20
District 2 Fact Sheets.....	24
District 3 Fact Sheets.....	29
District 4 Fact Sheets.....	33
District 6 Fact Sheets.....	37
District 7 Fact Sheets.....	41
District 8 Fact Sheets.....	45

Appendices

Appendix A Advisory Committee Minutes	50
Appendix B Solutions Toolbox.....	51



Executive Summary

The Greater Minnesota Mobility Study considered vehicle and freight mobility investment needs on the National Highway System (NHS) throughout Greater Minnesota. The NHS consists of roadways important to the nation's economy, defense and mobility. As such, the priority and importance placed on this system is high, supported by both federal performance measures and investment direction in the Minnesota State Highway Investment Plan.

The primary goal of the Greater Minnesota Mobility Study was to identify locations on the NHS in Greater Minnesota with the greatest mobility or reliability issues and develop a toolbox of low-cost, high-benefit solutions for future investment consideration.

Study Approach and Process

This study represents MnDOT's first statewide planning and prioritization process to incorporate third party speed data and is the first study to evaluate Greater Minnesota mobility and reliability issues since 2010. Following MnDOT's [Congestion Management Planning Study \(CMSP\)](#) model, the Greater Minnesota Mobility Study developed a methodology to identify and prioritize mobility and reliability issues on the NHS in Greater MN. An evaluation process was developed to screen all NHS routes down to high-priority locations that can be considered for low-cost, high-benefit mobility solutions. Where possible, investment needs at high-priority locations were categorized as standalone projects, inputs to programmed or planned projects, or as needing additional study. MnDOT currently has \$13 million in the Greater Minnesota Mobility Investment Category funding in both 2022 and 2023. High-priority locations identified through this study will be eligible for this funding.

Study Results and Priority Locations

Overview

Figure ES-1 is an overview of the project locations identified based on the analysis and feedback from Greater Minnesota MnDOT District representatives. Each of these locations were given a fact sheet with additional details on how it scored with each of the evaluation criteria and its overall weighted score. The fact sheets also provide a summary of District input. Any weighted scores that exceeded 5 are classified as high priority for mobility and reliability needs and are eligible for Greater Minnesota Mobility Investment funding.

Role of the Study in Future Planning

The key inputs from this Study for future planning will be to:

- **Incorporate Study Findings into Transportation Policy and Investment Plans** – The results of this study will be used to select projects on the state highway system and will inform the next update of MnSHIP. Locations identified as part of this study, and locations identified in MPO long-range plans,



are eligible for these investments. This study's methodology will be the basis for the greater Minnesota mobility needs assessment in MnSHIP when the plan is updated in 2022 or 2023.

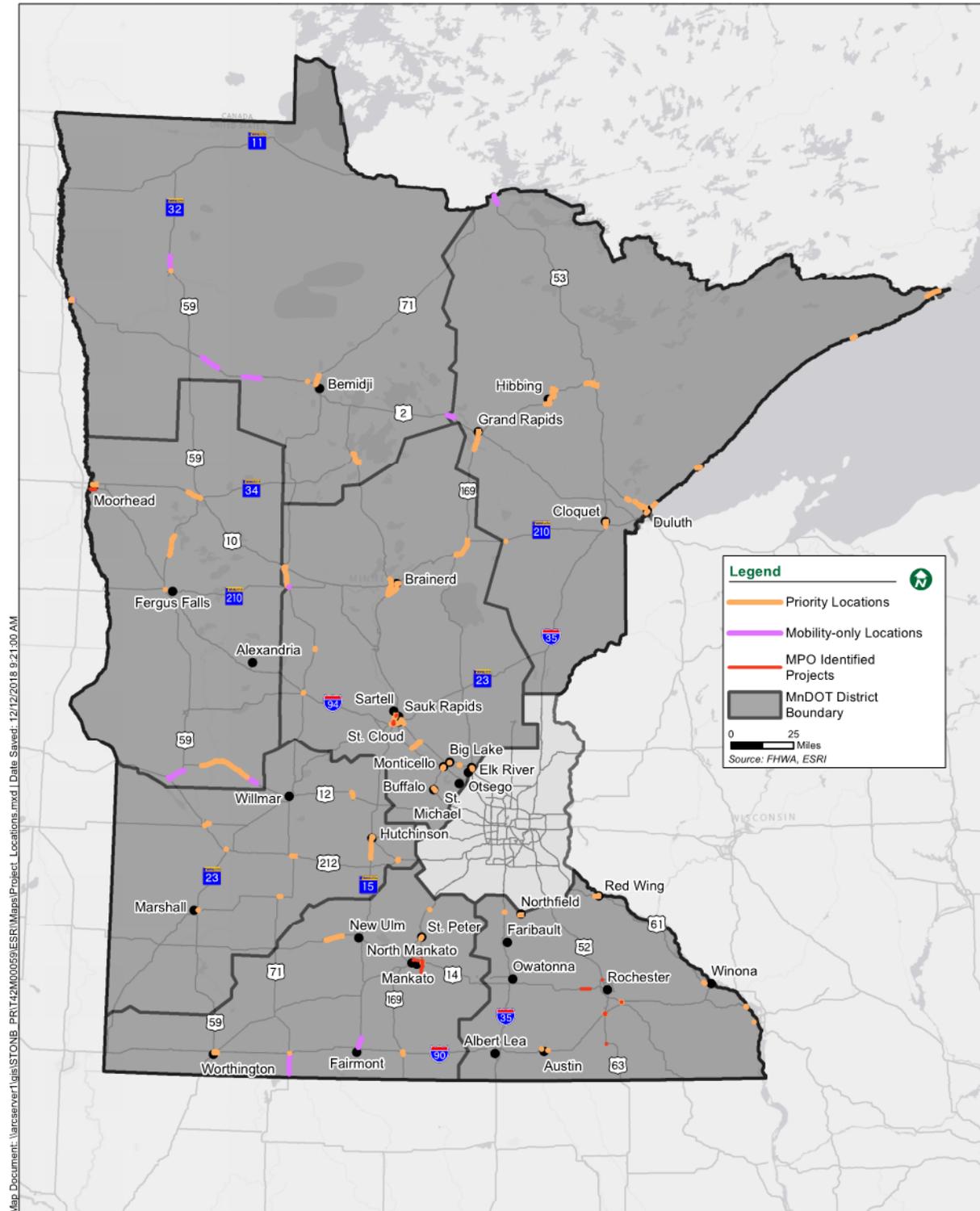
- **Support Project Funding Decisions** – As a part of MnSHIP, MnDOT created the Greater Minnesota mobility investment category. However, the plan did not define eligible locations or uses of that investment category. The Greater Minnesota Mobility Study was used to answer these questions, as well as how the funds would be distributed and the project selection and scoring process.
- **Provide a Reference for Local Planning** – The Study may be used as a basis for local transportation and corridor planning. It may also be referenced to support general transportation planning and strategies used by RDO's, MPO's, counties and cities in local transportation or comprehensive plans.

Updating the Study's Analysis and Priority Locations

The Greater Minnesota Mobility Study was developed in a way that allows the process to be repeated periodically in whole or in part. The study's Advisory Committee preferred to treat the two years of funding (2022-2023) as pilots for implementing this study. After these projects have been selected and programmed, MnDOT will look at updating the study with new data. At a minimum, MnDOT will update the study data prior to the MnSHIP update.



Figure ES-1. High-Priority Locations



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1 Introduction

1.1 Study Goal and Need

The Greater Minnesota Mobility Study considered highway mobility investment needs on the National Highway System (NHS) throughout Greater Minnesota. Figure 1 shows the current NHS system which includes about 4,750 centerline miles of NHS on MnDOT Trunk Highway outside of MnDOT's 8-county Twin Cities Metro District.

The NHS consists of roadways important to the nation's economy, defense and mobility. These routes are the centerpiece of FHWA's and MnDOT's commitment to provide a safe, modern, and efficient transportation system. NHS routes make up 4% of the nation's roads, carry 40% of the nation's highway traffic, 75% of heavy truck traffic and 90% of tourist traffic. The priority and importance placed on maintaining mobility and reliability on the NHS is high and, as such, is supported by both federal performance measures and the investment direction in the Minnesota State Highway Investment Plan (MnSHIP).

Despite the availability of funding programs supporting the NHS, there has not been a statewide planning and prioritization process to guide Greater Minnesota NHS mobility investment decisions since the retirement of the IRC system. The goal of the Greater Minnesota Mobility Study was to identify locations with the greatest mobility or reliability issues using consistent, quantifiable criteria and a transparent process with stakeholder buy-in. In addition, the study developed a toolbox of low-cost, high-benefit mobility solutions for future consideration as locations are selected for investment.

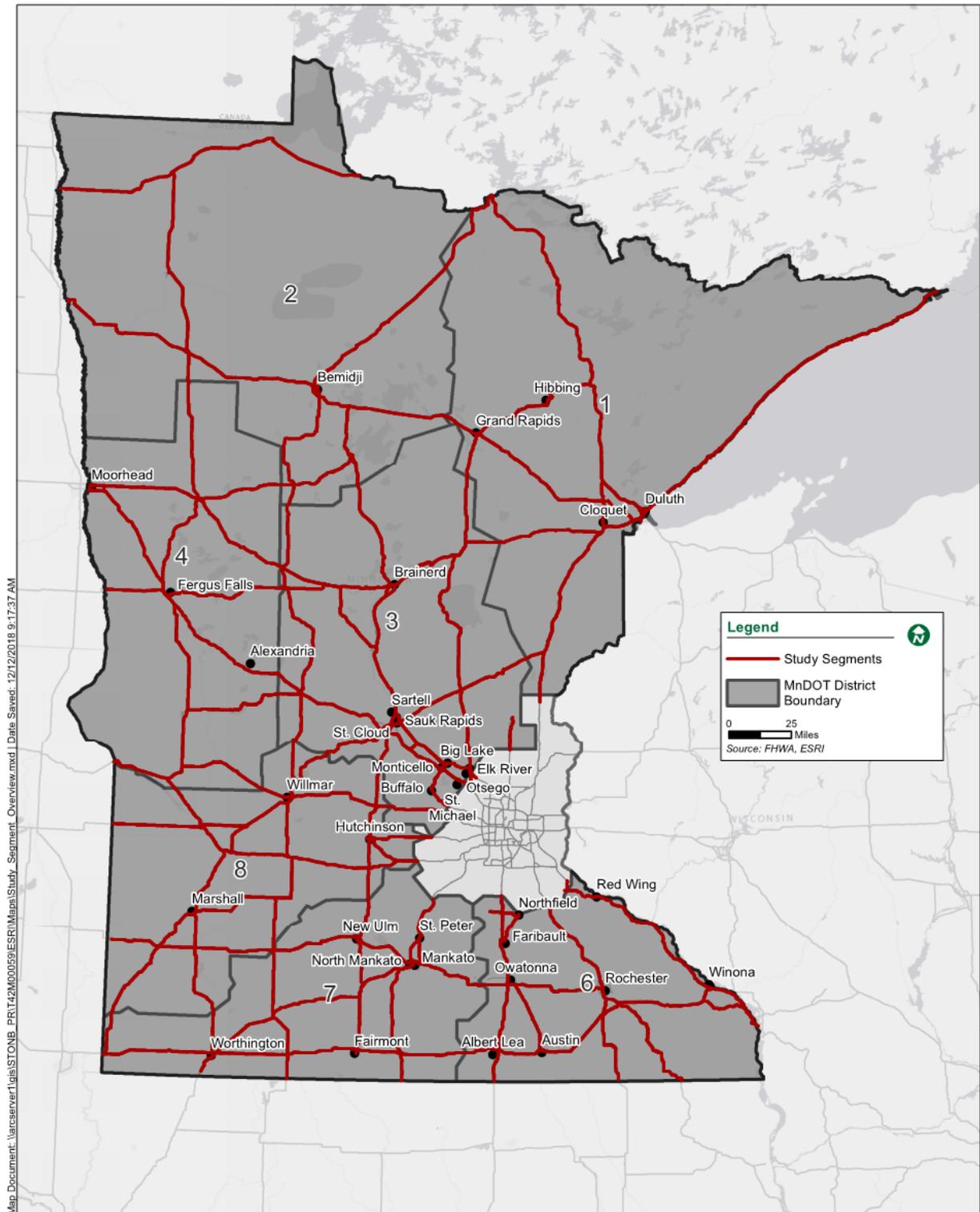
1.2 Study Organization

A Project Management Team (PMT) consisting of representation from MnDOT Central Office and Project Consultants was established from the project's inception and through the final deliverable. The PMT served as the primary contact for study progression and technical support.

An Advisory Committee was established and consisted of representation from all MnDOT District offices and one representative from a Regional Development Organization (RDO), a Metropolitan Planning Organization (MPO), and a County. The Advisory Committee's role was to provide input on the technical analysis to guide the study's direction and recommendations. All technical considerations for the study were relayed from the Advisory Committee to the PMT. **Appendix A** includes meeting minutes from each of the four Advisory Committee meetings.



Figure 1. National Highway System Study Segments



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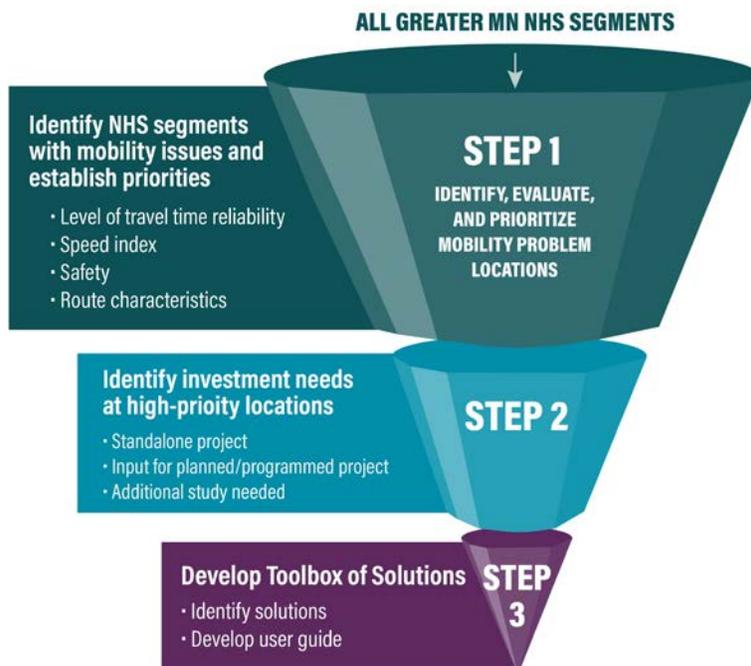


1.3 Study Approach and Outcomes

Given the current and anticipated funding climate, there is broad recognition of the need to ensure transportation investments reflect sound analysis, effective local/regional collaboration, and strategic prioritization to target system needs and maximize the value of investments. Greater Minnesota Mobility is one of the 14 investment categories of MnSHIP. The goal of Greater Minnesota Mobility investments is to enhance the movement of vehicles and freight in Greater Minnesota on the NHS since these routes account for a majority of vehicle and freight traffic on Minnesota’s highway system.

Following MnDOT’s [Congestion Management Safety Plan](#) (CMSP) model, the Greater Minnesota Mobility Study developed a methodology to identify and prioritize mobility and reliability issues on the NHS in Greater MN. **Figure 2** provides an overview of the study’s approach and anticipated outcomes, to screen all NHS routes down to high-priority mobility locations that can be considered for low-cost, high-benefit mobility solutions. Where possible, investment needs at high-priority locations were categorized as standalone projects, inputs to programmed or planned projects, or as needing additional study. Finally, a toolbox of solutions with emphasis on smaller-scope, lower-cost solutions was developed for future consideration. Ultimately, the study identified the highest priorities for mobility investments and recommended potential next steps at those locations that could be funded through MnSHIP investment direction and/or any priorities for new funding. MnDOT currently has \$26 million in the Greater Minnesota Mobility investment category funding. High-priority locations identified through this study will be eligible for this funding.

Figure 2. Study Approach



2 Identify and Prioritize Mobility Locations

2.1 Methodology

This section describes the overall methodology used to identify and prioritize mobility and reliability issues on the Greater Minnesota NHS system. The information below summarizes data sources, evaluation criteria, scoring results, and District input.

2.1.1 Data Sources

The following data sources were used as part of the study:

- National Performance Measurement Research Data Set (NPMRDS) – Travel speed data obtained for 3,248 Traffic Message Channel (TMC) Segments (2015-2017) on the NHS
- StreetLight – Used to fill gaps in NPMRDS data. Travel speed data obtained for over 722 segments (2015-2017)
- MnDOT – GIS base mapping, speed limit data, crash data (2015-2017), Annual Average Daily Traffic (AADT), Heavy Commercial Annual Average Daily Traffic (HCAADT), train volumes
- MnDNR – State and National Park datasets

At the direction of the Advisory Committee, the following elements were addressed regarding the study's data sources:

- Confirm speed limit data is accurate
- Remove data on TMCs associated with projects included in the STIP to avoid construction impacts on mobility results
- Remove winter months (November – April) to avoid winter impacts on speeds and the influence of seasonal peaks such as summer tourism

2.1.2 Evaluation Criteria

The PMT developed evaluation criteria to identify NHS segments that exhibit mobility and reliability issues. The PMT recommended using a travel time reliability measure consistent with the Federal Highway Administration (FHWA) and United States DOT Rule 23 CFR 490 Subpart E which defines Level of Travel Time Reliability (LOTTR) as the measure to assess reliability of the NHS. The LOTTR was used to identify locations with high variabilities in travel time and was calculated as follows:



$$LOTTR = \frac{80th\ percentile\ travel\ time}{50th\ percentile\ travel\ time}$$

Time Periods Analyzed:

- Weekday: 6a-10a, 10a-4p, 4p-8p
- Weekend: 6a-8p

Consistent with the federal performance measure, a TMC segment was considered unreliable if **LOTTR > 1.50 in any time period.**

The PMT also developed a measure to identify a mobility issue called the Speed Index. While not a federal measure like LOTTR, it was used to identify locations with consistent mobility issues. These are areas where travel speeds are consistently below the speed limit, or reliably slow. The Speed Index is calculated by comparing historic average speed to posted speed as outlined below:

$$Speed\ Index\ (SI) = \frac{Historic\ Average\ Speed}{Posted\ Speed}$$

Time Periods Analyzed:

- Weekday: 6a-10a, 10a-4p, 4p-8p
- Weekend: 6a-8p

TMC segment considered to have consistent mobility issue if **SI < 90% in all time periods**

The LOTTR and Speed Index statistics were summarized for each district as well as the total for Greater Minnesota. Overall, each district has less than 10% of the total analyzed mileage exceeding the LOTTR threshold. Similarly, less than 20% of mileage fell below the threshold for Speed Index. **Table 1** and **Figures 3-5** display the results of this analysis.

Table 1. LOTTR and Speed Index (SI) Statistics

District	Miles Analyzed	Miles (LOTTR >1.50)	% Miles (LOTTR > 1.50)	Miles (SI < 90%)	% Miles (SI < 90%)	Total Miles Exceeding Thresholds	Total % Miles Exceeding Thresholds
District 1	1,456.4	70.7	4.8%	153.6	10.5%	50.8	3.4%
District 2	1,238.5	59.4	4.8%	141.4	11.4%	35.9	2.9%
District 3	1,716.9	80.4	4.6%	324.0	18.8%	60.0	3.5%
District 4	1,194.7	91.0	7.6%	174.2	14.5%	71.5	5.9%
District 6	1,172.0	7.8	0.6%	80.9	6.9%	6.5	0.5%
District 7	1,197.0	55.6	4.6%	128.5	10.7%	35.0	2.9%
District 8	1,477.1	25.9	1.7%	153.1	10.3%	23.8	1.6%
Total	9,452.9	391.0	4.1%	1,156.2	12.2%	283.8	3.0%

Initially, the LOTTR and Speed Index were used as the only measures for the first phase of screening to identify the locations where mobility and reliability problems exist on the NHS. The Advisory Committee was asked to verify the results of the initial screening and confirm the list of locations to move forward into more detailed screening. The Advisory Committee felt they did not have enough information to objectively verify the initial screening results and what should or should not move into the next, more detailed phase of screening. The committee felt there are other influences on mobility and reliability, such as safety and a segment’s characteristics or role—that would have merit to measure and include in an overall weighted score for each of the NHS segments studied. Based on this discussion, the Advisory Committee recommended to move away from the initial screening and instead evaluate and score all NHS segments together. The following evaluation criteria resulted from that process:

- **Mobility and Reliability** — *Prioritize locations with high variability in travel times and consistent mobility issues.*
 - Level of Travel Time Reliability (LOTTR) – Exhibits a reliability issue based on the 80th percentile travel time/50th percentile travel time factored by the square root of AADT.¹
 - Speed Index – Exhibits a mobility issue based on historic average speed/posted speed factored by the square root of AADT.
 - Mobility Bonus – LOTTR greater than 1.5 and Speed Index less than 0.90

¹ In previous scoring iterations, AADT was a factor by itself with a low weight. The Advisory Committee made the decision to combine this with LOTTR and Speed Index to provide a higher weight or importance to higher volume roadways. The square root tempers the influence of volume due to a wide range of AADT on Greater Minnesota NHS roadways (large gap between smallest and highest volume).



Figure 3. Segments Meeting LOTTR Threshold

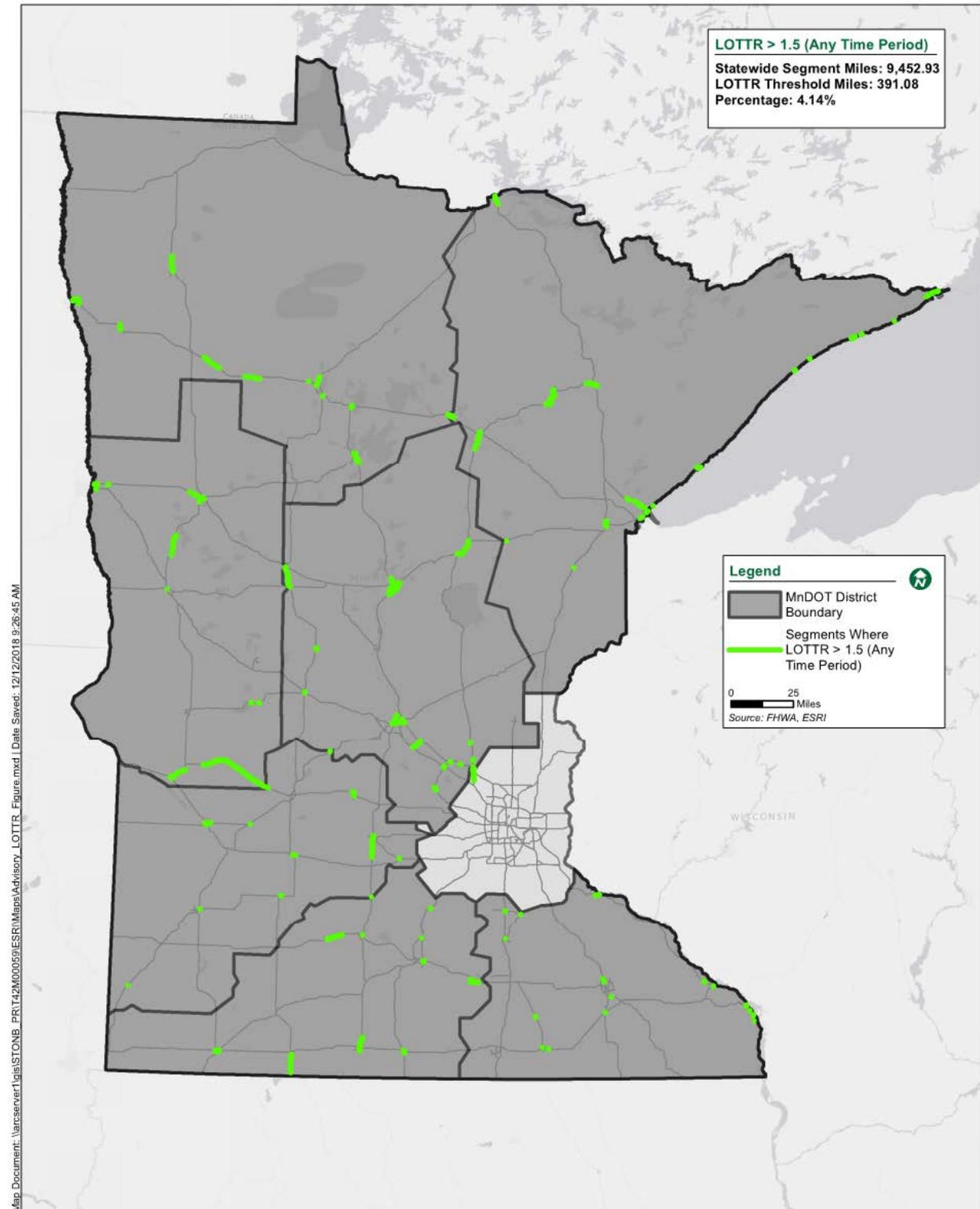


Figure 4. Segments Meeting Speed Index Threshold

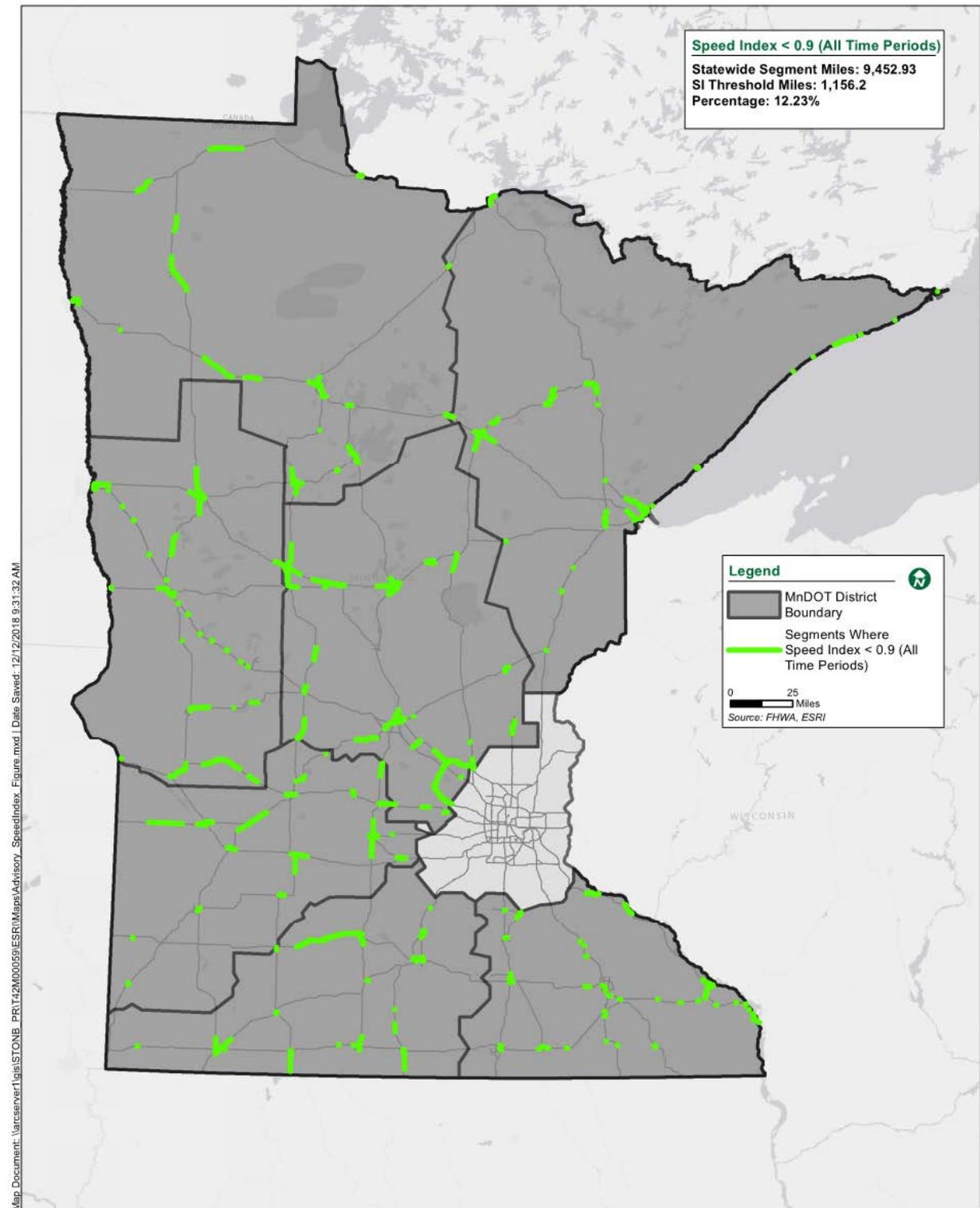
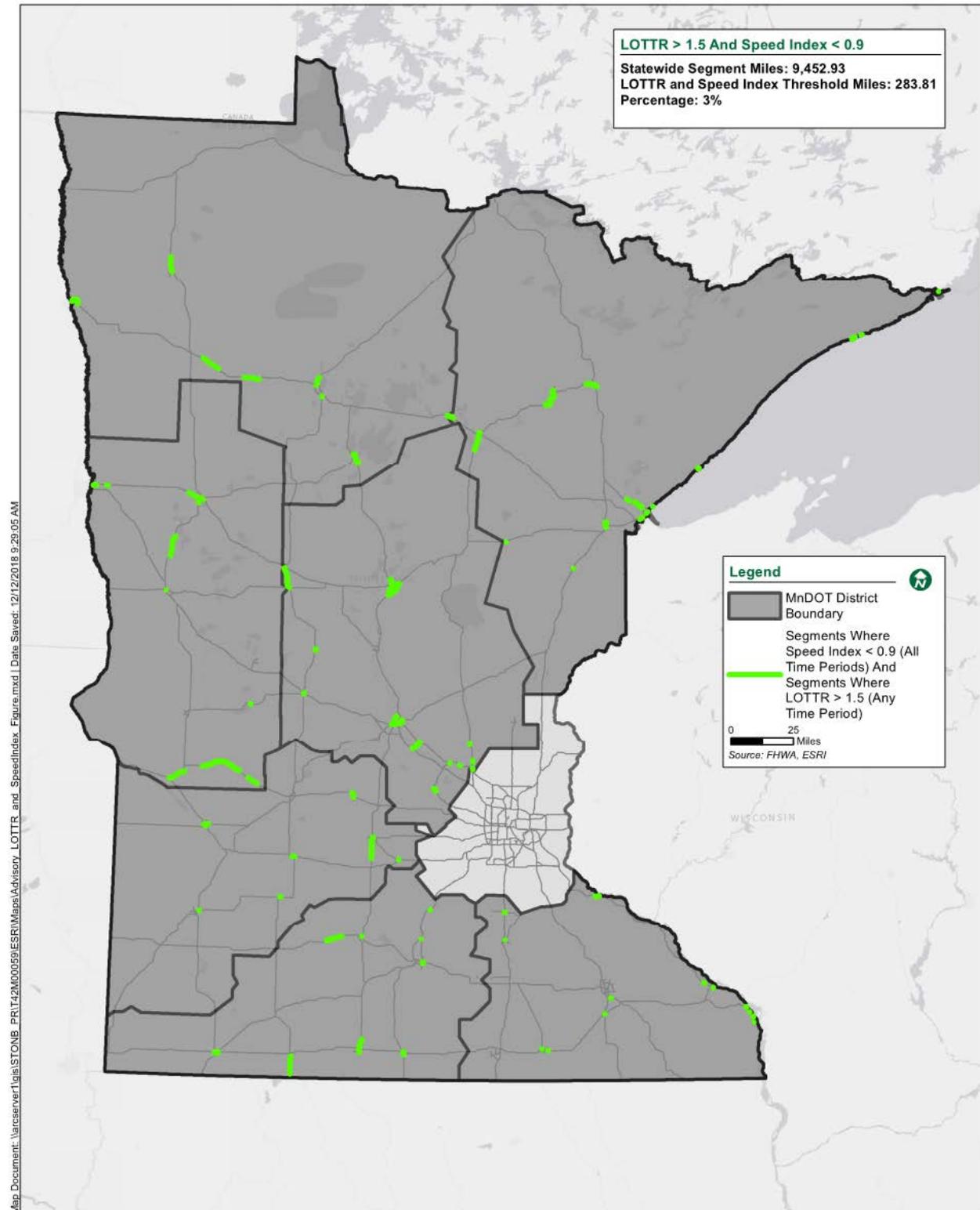


Figure 5. Segments Meeting Both LOTTR and Speed Index Thresholds



- **Safety** — *Prioritize locations that have a high frequency of crashes (crashes correlate to potential mobility and reliability issues).*
 - Critical Crash Rate – Provides a relative score based on the number of crashes and traffic volume for a segment
 - Fatal and Serious Crash Rate – Provides a relative score based on the number of fatal and serious injury crashes and traffic volume for a segment
- **System Role and Route Characteristics** — *Prioritize locations that serve the greatest amount of regional trips, freight traffic, and tourism.*
 - HCAADT – Number of heavy commercial vehicles
 - Trip Length – Average trip length
 - Rail – Number of trains per day
 - Tourism – Within five miles of a state/national park or casino

Several evaluation criteria weighting options were presented to the Advisory Committee for consideration. **Table 2** outlines the recommended weighting scenario.

Table 2. Evaluation Criteria Weighting

General Criteria	Detailed Criteria	Recommended Weighting Scenario
Mobility and Reliability	$LOTTR * \sqrt{AADT}$	20%
Mobility and Reliability	$Speed\ Index * \sqrt{AADT}$	20%
Mobility and Reliability	Mobility Bonus (LOTTR > 1.5, SI < 0.90)	20%
Mobility and Reliability	Subtotal	60%
Safety	Critical Crash Rate	15%
Safety	Fatal and Serious Crash Rate	15%
Safety	Subtotal	30%
System Role/Route Characteristics	HCAADT	6%
System Role/Route Characteristics	Trip Length	2%
System Role/Route Characteristics	Rail	1%
System Role/Route Characteristics	Tourism	1%
System Role/Route Characteristics	Subtotal	10%
	Total	100%



2.1.3 Scoring

Scores were determined for each roadway segment (TMC) based on the criteria selected and revised by the PMT and Advisory Committee. Scoring consisted of criteria scores based on the raw data and an overall weighted score based on a weighting breakdown determined by the Advisory Committee (Table 2).

Each detailed criterion was scored with a maximum score of ten and a minimum score of zero or one. The distribution of the actual data for each criterion was used in determining the breakpoints in criteria value corresponding to the numerical score. See **Table 3** for the ranges of criteria values associated with the scoring. Weighting percentages and score values for each criterion were combined to formulate an overall weighted score for each TMC.

Table 3. Detailed Criteria Scoring

General Criteria	Detailed Criteria	Score Range	Min Score Value	Max Score Value
Mobility and Reliability	$LOTTR * \sqrt{AADT}$	0 - 10	<25	>250
Mobility and Reliability	$Speed\ Index * \sqrt{AADT}$	0 - 10	>250	<25
Mobility and Reliability	Mobility Bonus (LOTTR > 1.5, SI < 0.90)	0 or 10	No	Yes
Safety	Critical Crash Rate	0 - 10	<1	>5
Safety	Fatal and Serious Crash Rate	0 - 10	<1	>5
System Role & Route Characteristics	HCAADT	1 - 10	<500	>3000
System Role & Route Characteristics	Trip Length	0 - 10	<50	>300
System Role & Route Characteristics	Rail	0 - 10	<5	>50
System Role & Route Characteristics	Tourism (within 5 miles of destination)	0 or 10	No	Yes

2.1.4 Problem Area Identification

Through discussion with the PMT, it was determined that a threshold of 5.0/10 was used to consider a roadway segment “high scoring”. Many TMCs are adjacent to others that score highly, constituting larger problem areas. In most cases, TMCs were considered to be in the same problem segment if they are on the same route and are contiguous. Each problem area was then given a single score based on the maximum TMC score within it. For example, if three TMCs on route A are contiguous and had individual weighted scores of 5.0 or above (5.3, 6.8, and 5.4), they were combined into one problem area and given the score of the highest TMC (6.8).

Additionally, an analysis was completed to look for potential projects that appeared to have mobility issues but did not score highly using the weight and scoring criteria discussed above. In these instances, the areas had LOTTR values greater than 1.50 and Speed Index values less than 0.90 (achieving the full

score for Mobility Bonus) but had low scores due to other criteria such as safety or system role and route characteristics. These TMCs were identified and grouped together assuming all had a Mobility Bonus of 10, were on the same route, and were contiguous.

2.2 Identify and prioritize mobility problem locations

2.2.1 District Scoring Results

Each district was provided a list of locations with an overall weighted score of 5 or above created from applying the evaluation criteria and scoring process to all NHS routes in their District. The PMT recommended only considering locations with overall weighted scores of 5 and above since that seemed to be a general break point in the scoring results. This gave each district a list of approximately 6-25 locations for consideration which seemed to be a reasonable number given the limited Greater Minnesota Investment funding available. **Table 4** shows an example of the scoring results for District 1. Tables for each of the seven Greater Minnesota MnDOT Districts are included in Section 3 of this report.

Table 4. Example of District 1 Scoring Results Table

District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	LOTR Score (20%)	Speed Index Score (20%)	Mobility Bonus (20%)	Crash Rate Score (15%)	Fatal & Serious Crash Rate Score	HCAADT Score (6%)	Average Trip Length Score (2%)	Railroad Crossing Score (1%)	Tourism Score (1%)	Overall Weighted Score (100%)
D1-1	US 53	MN 194	CSAH 48	005+00.624	009+00.41	3.8	10	8	10	10	10	2	1	0	10	8.84
D1-2	US 169	MN 73 (Hibbing)	MN 73 (Chisholm)	337+00.349	346+00.045	8.7	10	9	10	10	9	2	0	0	0	8.77
D1-3	MN 33	Cloquet Ave	I 35	000+00.495	002+00.362	1.9	10	8	10	10	4	2	1	0	10	7.94
D1-4	US 169	US 2	CSAH 17	297+00.858	305+00.241	7.4	8	8	10	8	7	2	0	1	0	7.58
D1-5	I 35	MN 61	MN 61	259+00.473	259+00.544	0.1	10	8	10	10	0	6	1	0	10	7.58
D1-8	MN 61	Grand Marais	Grand Marais	109+00.209	110+00.712	1.5	8	9	10	10	0	2	1	0	10	7.14
D1-9	I 35	Downtown Duluth	Downtown Duluth	255+00.574	256+00.600	1.0	10	5	10	10	0	8	0	0	10	7.08
D1-10	MN 61	Two Harbors	Two Harbors	25+00.183	26+00.783	1.6	8	8	10	10	0	4	1	0	10	7.06



District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	LOTTR Score (20%)	Speed Index Score (20%)	Mobility Bonus (20%)	Crash Rate Score (15%)	Fatal & Serious Crash Rate Score	HCAADT Score (6%)	Average Trip Length Score (2%)	Railroad Crossing Score (1%)	Tourism Score (1%)	Overall Weighted Score (100%)
D1-11	US 2	US 169	US 169	183+00.707	184+00.152	0.5	8	8	10	10	0	2	1	0	0	6.84
D1-12	MN 210	MN 65	MN 65	175+00.627	175+00.736	0.1	7	9	10	10	0	1	2	0	0	6.80
D1-13	US 53	MN 135	US 169	063+00.444	065+00.685	2.2	9	8	10	7	0	4	1	0	0	6.71
D1-14	MN 194	US 53	CSAH 90	013+00.666	014+00.727	1.1	8	6	10	8	3	1	0	0	10	6.61
D1-15	US 53	MN 194	CSAH 13	011+00.464	012+00.720	1.3	7	7	10	3	4	4	1	0	0	6.11
D1-18	US 169	US 53	CSAH 102	360+00.322	363+00.166	2.8	6	8	10	3	0	2	0	0	0	5.37
D1-20	MN 61	MSAS 166 (N 40 th Ave)	MSAS 165 (N 43 rd Ave)	002+00.776	003+00.037	0.3	5	5	0	8	10	6	1	0	10	5.18
D1-21	US 169	CSAH 67	CSAH 67	347+00.288	347+00.342	0.1	4	7	0	9	10	1	0	0	0	5.11
D1-22	MN 61	I 35	I 35	001+00.469	001+00.635	0.2	5	4	0	8	10	8	0	0	10	5.08

2.2.2 District Workshops

The PMT conducted workshops with each of the MnDOT Districts to review the initial evaluation and scoring results. Representatives from MnDOT District were asked to invite other local area technical stakeholders from agencies such as counties, cities, MPOs and RDCs as desired. Workshops were conducted in April and May of 2018.

The project team facilitated a discussion with workshop attendees to review each location on the scoring list and provide additional details if possible about the mobility and/or reliability issue. General input from these workshops included directing the project team to remove a location from the scoring list if it has been addressed or is not an issue (e.g., error in data) and requesting the PMT consider a location not currently on the list and report back on its scoring. The project team made note of these requested changes and also provided a written response to questions and comments. If possible, workshop attendees were also asked to categorize locations into one of the following potential next steps for investment:

- **Standalone project** – District feels this is an issue that can be addressed as a standalone project such as signal timing or an intersection improvement, etc.

- **Input for a programmed or planned project** – District has a planned or programmed project near the mobility problem location that will address the problem or could be expanded to include the problem location
- **Additional study needed** – District feels not enough is known about the problem to determine a potential next step at this time.

All workshop input on the scoring results, locations recommended to be removed from the scoring list, potential next steps, and District comments on the scoring results are documented in **Tables 5-11** in **Section 3** of this report.



3.2 Study Results by District

A location fact sheet was developed for each location with an overall weighted score of 5 or greater. The purpose of this was to clearly document for future reference the location characteristics, scoring results, and District Workshop input provided for each location.

The sections below are organized by Greater Minnesota MnDOT District and include a copy of the District scoring results table, map and location fact sheets for those locations with overall scores greater than 5. Also noted in the District tables are projects on NHS routes listed in an MPO Plan. The MPO project locations were scored using the study's evaluation criteria and included in the tables for reference.



3.2.1 District 1 Study Results



District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	LOTTR Score (20%)	Speed Index Score (20%)	Mobility Bonus (20%)	Crash Rate Score (15%)	Fatal & Serious Crash Rate Score (15%)	HCAADT Score (6%)	Average Trip Length Score (2%)	Railroad Crossing Score (1%)	Tourism Score (1%)	Overall Weighted Score (100%)	Standalone Project	Input for Planned Project	Additional Study Needed	Potential Solution	Notes
D1-1	US 53	MN 194	CSAH 48	005+00.624	009+00.41	3.786	10	8	10	10	10	2	1	0	10	8.84					Review data next year to see if recent improvements addressed issues.
D1-2	US 169	MN 73 (Hibbing)	MN 73 (Chisholm)	337+00.349	346+00.045	8.696	10	9	10	10	9	2	0	0	0	8.77	x			Signal modifications - flashing yellow	2018 signal timing project and will add signal back plates. Crash history. Potential additional future opportunity for signal modifications.
D1-3	MN 33	Cloquet Ave	I 35	000+00.495	002+00.362	1.867	10	8	10	10	4	2	1	0	10	7.94	x			Signal timing/modifications	
D1-4	US 169	US 2	CSAH 17	297+00.858	305+00.241	7.383	8	8	10	8	7	2	0	1	0	7.58	x		x	Signal modifications - flashing yellow	2018 signal timing project and will add signal back plates. Crash history. Potential additional future opportunity for signal modifications.
D1-5	I 35	MN 61	MN 61	259+00.473	259+00.544	0.071	10	8	10	10	0	6	1	0	10	7.58	x		x	Multi-lane roundabout at 26th Avenue; Additional study for corridor	Issue is actually on I-35/MN 61 from 26th to 40th Avenue. Traffic signal at I-35/26th Avenue queues to I-35. MN 61 reliably slow from 26th to 40th Avenue.
D1-8	MN 61	Grand Marais	Grand Marais	109+00.209	110+00.712	1.503	8	9	10	10	0	2	1	0	10	7.14		x		2019 Project	2019 project will add turn lanes.
D1-9	I 35	Downtown Duluth	Downtown Duluth	255+00.574	256+00.600	1.026	10	5	10	10	0	8	0	0	10	7.08			x	Additional Study Needed	Complex issues. Not likely a low-cost solution.
D1-10	MN 61	Two Harbors	Two Harbors	25+00.183	26+00.783	1.6	8	8	10	10	0	4	1	0	10	7.06			x	Additional Study Needed	Upcoming project to interconnect signals and add turn lanes. Comprehensive long term fix still needed.
D1-11	US 2	US 169	US 169	183+00.707	184+00.152	0.445	8	8	10	10	0	2	1	0	0	6.84			x	Roundabouts. Reduced conflict intersections.	Recently reconstructed (new signals, dual left turn lanes). Need additional study for signal timing, potential roundabouts, reduced conflicts, access management.
D1-12	MN 210	MN 65	MN 65	175+00.627	175+00.736	0.109	7	9	10	10	0	1	2	0	0	6.8	x			Roundabout	Problem is located at all-way stop.
D1-13	US 53	MN 135	US 169	063+00.444	065+00.685	2.241	9	8	10	7	0	4	1	0	0	6.71				Review data next year to see if recent improvements addressed issues.	
D1-14	MN 194	US 53	CSAH 90	013+00.666	014+00.727	1.061	8	6	10	8	3	1	0	0	10	6.61		x		2024 Project	2024 reconstruction planned
D1-15	US 53	MN 194	CSAH 13	011+00.464	012+00.720	1.256	7	7	10	3	4	4	1	0	0	6.11				Review data next year to see if recent improvements addressed issues.	
D1-18	US 169	US 53	CSAH 102	360+00.322	363+00.166	2.844	6	8	10	3	0	2	0	0	0	5.37				Location was not reviewed at workshop.	
D1-20	MN 61	MSAS 166 (N 40th Ave)	MSAS 165 (N 43rd Ave)	002+00.776	003+00.037	0.261	5	5	0	8	10	6	1	0	10	5.18					
D1-21	US 169	CSAH 67	CSAH 67	347+00.288	347+00.342	0.054	4	7	0	9	10	1	0	0	0	5.11					
D1-22	MN 61	I 35	I 35	001+00.469	001+00.635	0.166	5	4	0	8	10	8	0	0	10	5.08					

$$LOTTR = \frac{80th\ Percentile\ TT}{50th\ Percentile\ TT}$$

$$Speed\ Index = \frac{Historic\ Average\ Speed}{Posted\ Speed}$$

Removed Projects

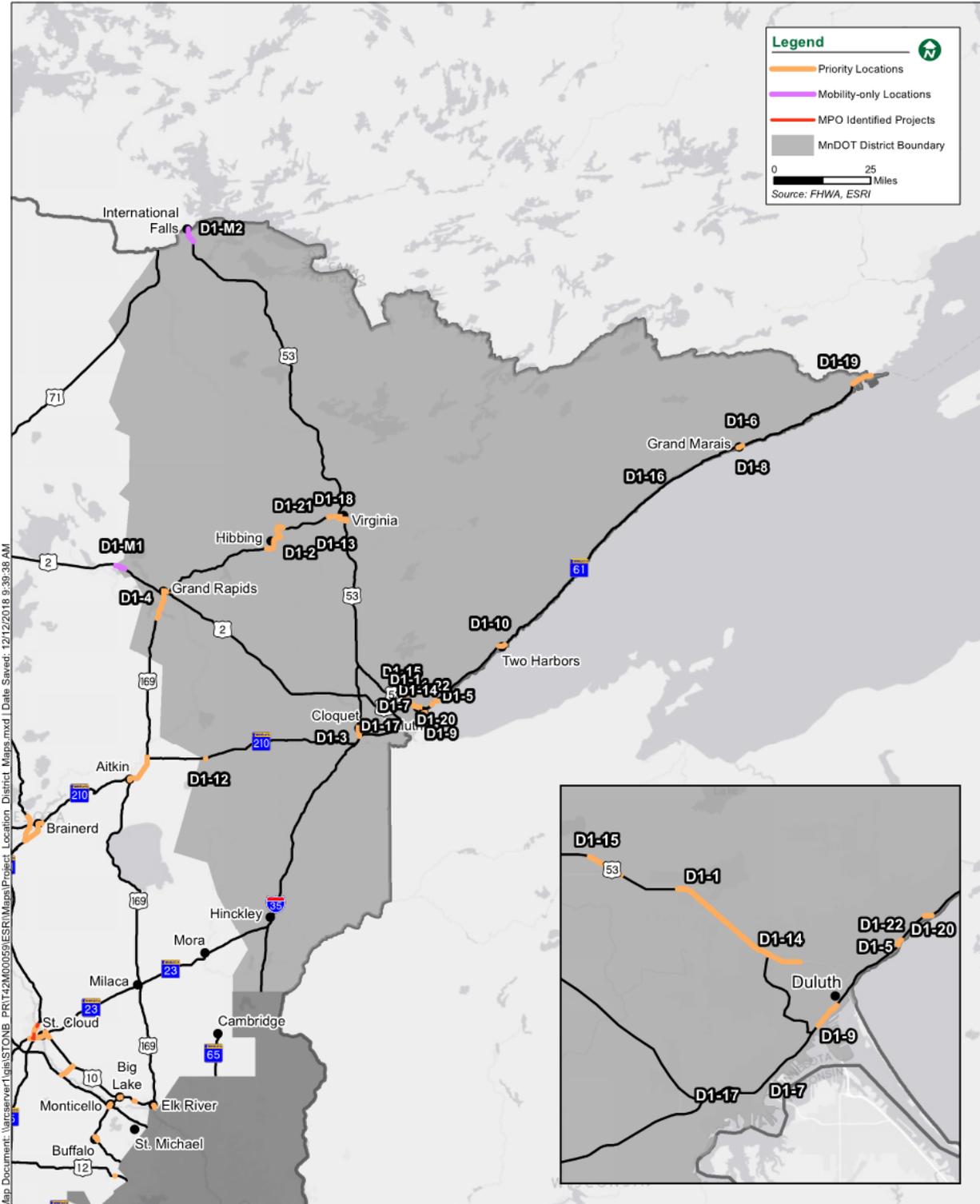
District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	Reason Removed
-	MN 53	CSAH 54	Skyline Pkwy	002+00.949	003+00.045	0.096	Updated Scoring
-	MN 194	I 35	CSAH 4	015+00.896	017+00.107	1.211	Updated Scoring
-	I 35	US 2	US 2	250+00.383	250+00.691	0.308	Updated Scoring
-	MN 210	I 35	I 35	215+00.965	216+00.134	0.169	Updated Scoring
-	I 35	MN 48	MN 48	182+00.808	183+00.301	0.493	Updated Scoring
-	I 35	MN 23	MN 23	180+00.145	180+00.585	0.44	Updated Scoring
D1-6	MN 61	CR 87	CR 58	113+00.232	113+00.727	0.495	District Feedback
D1-7	I 35	US 2/Bong Mem. Bridge	US 2/Bong Mem. Bridge	252+00.810	253+00.573	0.763	District Feedback
D1-16	MN 61	Tofte	Tofte	82+00.169	82+00.506	0.337	District Feedback
D1-17	I 35	MN 23	MN 23	252+00.038	252+00.044	0.006	District Feedback
D1-19	MN 61	CSAH 23	Canada	145+00.404	150+00.870	5.466	District Feedback
D1-M1	US 2	MN 6	CSAH 11	169+00.042	171+00.607	2.565	District Feedback
D1-M2	US 53	CSAH 332	Downtown Int. Falls	160+00.220	163+00.968	3.748	District Feedback

Figure 7. District 1 Scoring Results Map



Greater Minnesota Mobility Study
Minnesota Department of Transportation

D1: Project Locations
December 2018



Map Document: \\arcserve1\gis\STONB_PRT\42M0005\ESRI\Mapa\Project_Location_District1_Maps.mxd | Date Saved: 12/12/2018 9:39:38 AM

District 1 Location Fact Sheets



Location Map – Project D1-1 Duluth, St Louis County



Overall Weighted Score: **8.84**

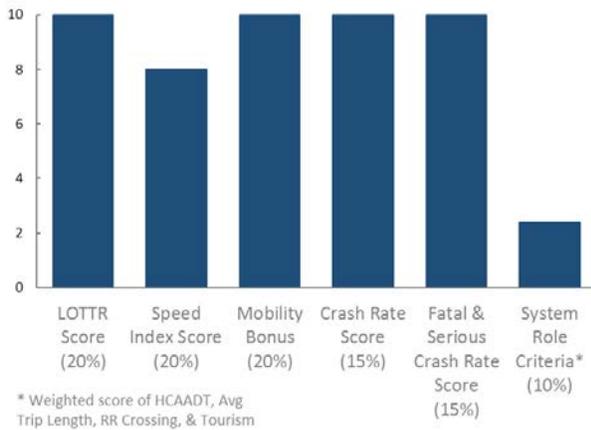
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

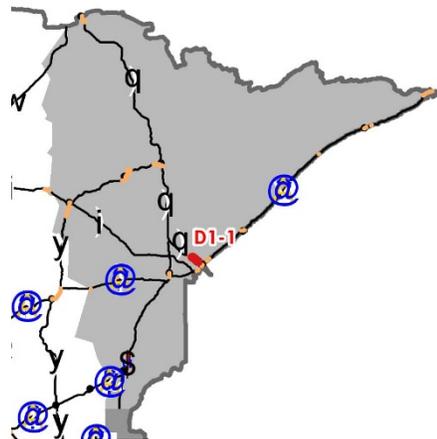


Location Description:

Divided four lane highway with many accesses. There is one access on a curve. Only the intersections with MN 194 and CSAH 48 have stop signs. There are large shoulders which are utilized as turn lanes to each access.

District Input: None

Potential Follow-Up: None





Location Map – Project D1-2 Hibbing, St Louis County



Overall Weighted Score: **8.77**

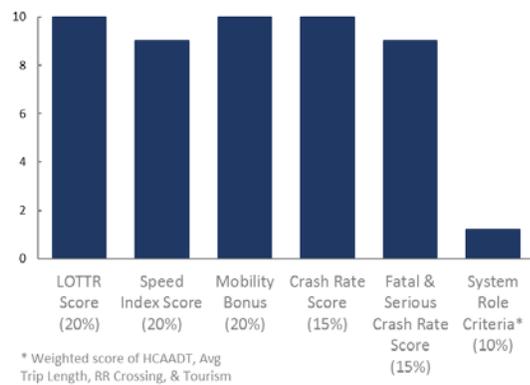
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



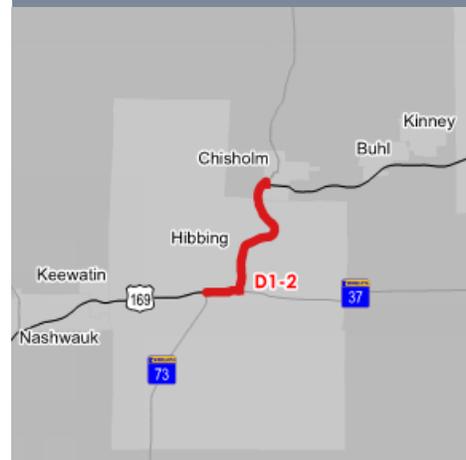
Location Description:

Divided four-lane highway with wide shoulders and many accesses.

District Input:

2018 signal timing project and will add signal back plates. Crash history. Potential additional future opportunity for signal modifications.

Potential Follow-Up: None





Location Map – Project D1-3 Cloquet, Carlton County



Overall Weighted Score: **7.94**

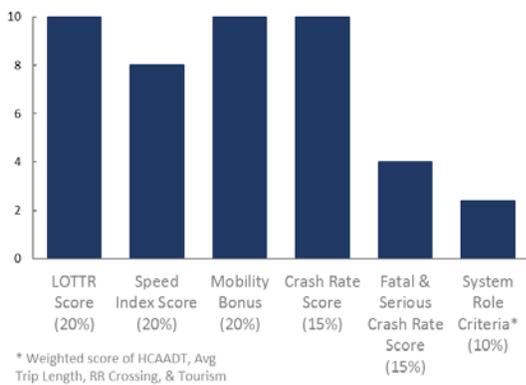
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	OK
Weekday	10a-4p	Unreliable	OK
Weekday	4p-8p	Unreliable	OK
Weekend	6a-8p	Unreliable	OK

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

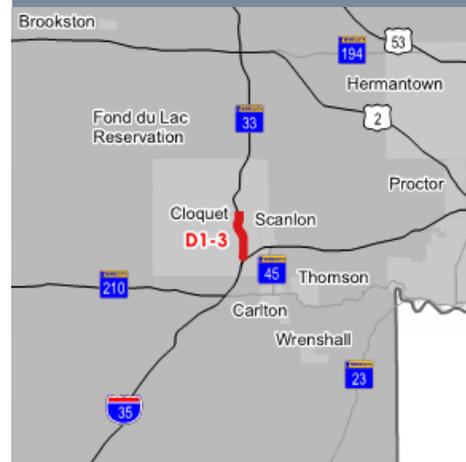


Location Description:

Divided four lane highway with many accesses, accesses on curves, and signalized intersections. Shoulders are medium when in between access turnoffs.

District Input: None

Potential Follow-Up: None





Location Map – Project D1-4 Grand Rapids, Itasca County



Overall Weighted Score: **7.58**

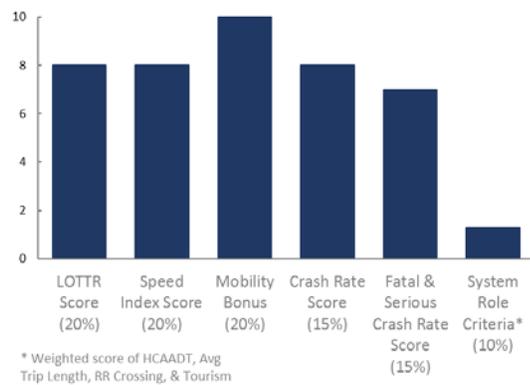
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



Location Description:

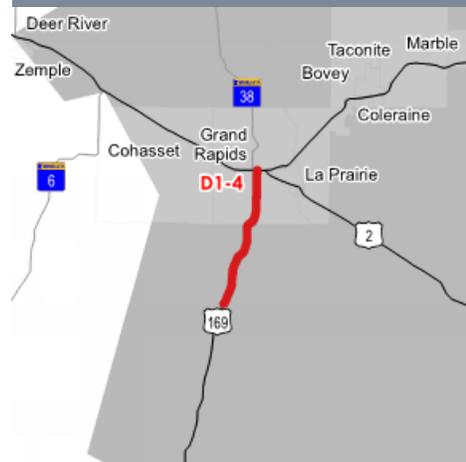
Four-lane highway with wide shoulders and many accesses on curves.

District Input:

Recently reconstructed (new signals, dual left turn lanes). Need additional study for signal timing, potential roundabouts, reduced conflicts, and access management.

Potential Follow-Up:

Additional study needed





Location Map – Project D1-5 Duluth, St Louis County



Overall Weighted Score: **7.58**

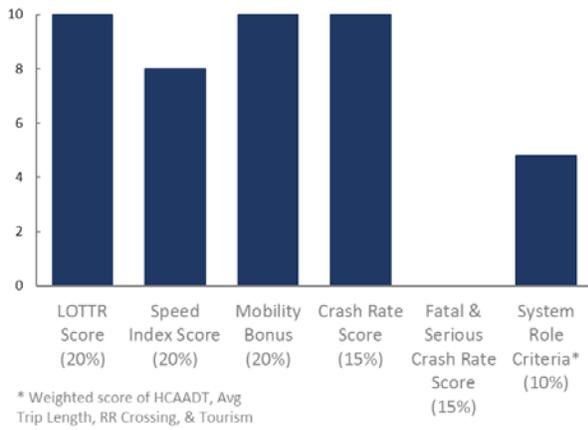
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



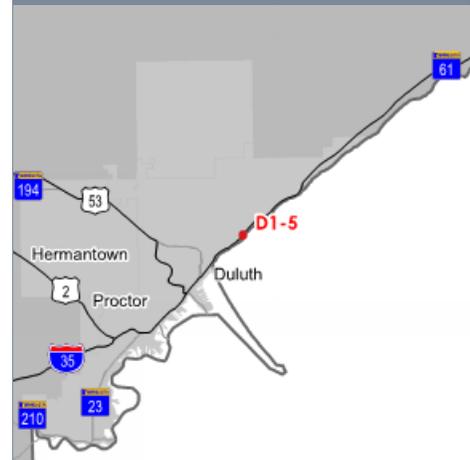
Location Description:

East leg access of signalized intersection of a freeway (end/start of) and an urban highway.

District Input:

Issue is actually on I-35/MN 61 from 26th to 40th Avenue. Traffic signal at I-35/26th Avenue queues to I-35. MN 61 reliably slow from 26th to 40th Avenue.

Potential Follow-Up: Additional Study Needed





Location Map – Project D1-8 Grand Marais, Cook County



Overall Weighted Score: **7.14**

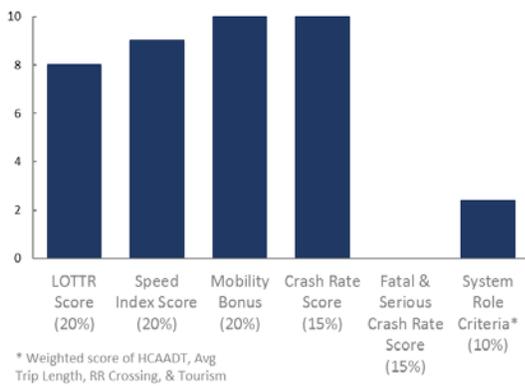
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

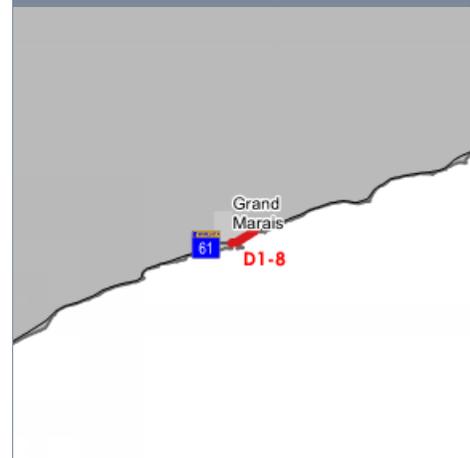
Figure 2: Evaluation Criteria Scores



Location Description:
Two lane highway with residential access every block.

District Input: 2019 project will add turn lanes.

Potential Follow-Up: Input for Planned Project





Location Map – Project D1-9 Duluth, St Louis County



Overall Weighted Score: **7.08**

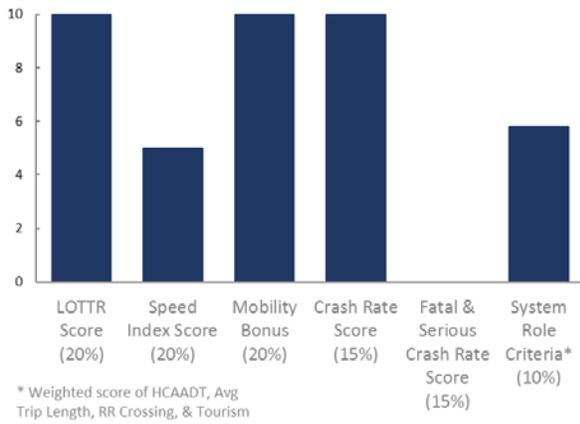
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



Location Description:

Divided four lane freeway with no accesses.

District Input: Complex issues. Not likely a low-cost solution.

Potential Follow-Up: Additional Study Needed





Location Map – Project D1-10 Two Harbors, Lake County



Overall Weighted Score: **7.06**

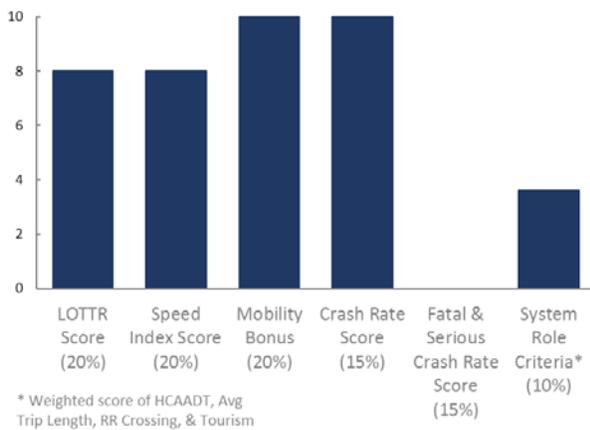
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



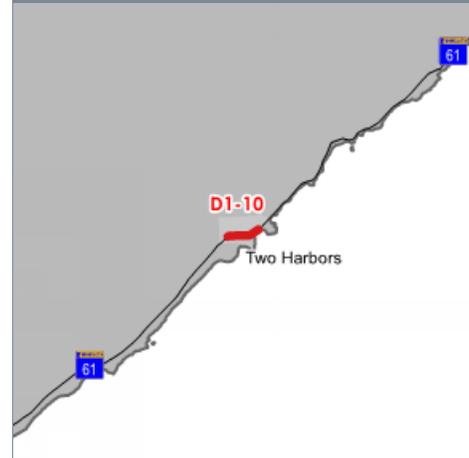
Location Description:

Two lane highway through city. Has a center turn lane and no shoulder. Many accesses including signalized accesses and accesses on turns.

District Input:

Upcoming project to interconnect signals and add turn lanes. A comprehensive long-term solution is still needed.

Potential Follow-Up: None





Location Map – Project D1-11 Grand Rapids, Itasca County



Overall Weighted Score: **6.84**

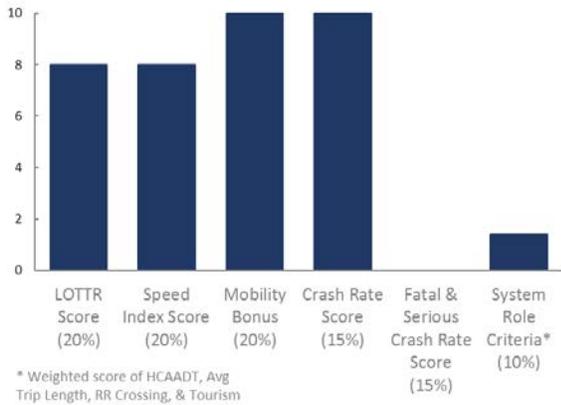
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

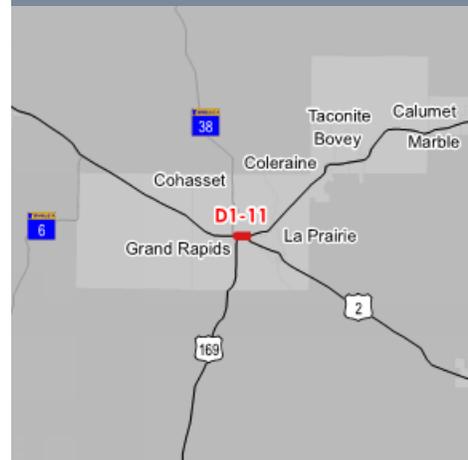


Location Description:

Four lane urban roadway with center turn lane. Train crossing within one block south of west TH 169 signalized intersection. East TH 169 intersection also signalized.

District Input: None

Potential Follow-Up:
Additional study needed





Location Map – Project D1-12 McGregor, Aitkin County



Overall Weighted Score: **6.8**

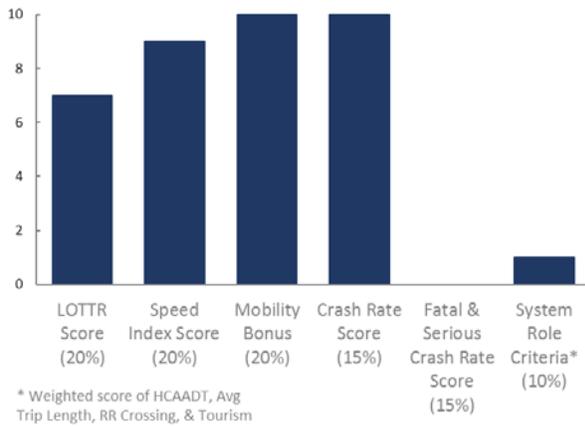
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

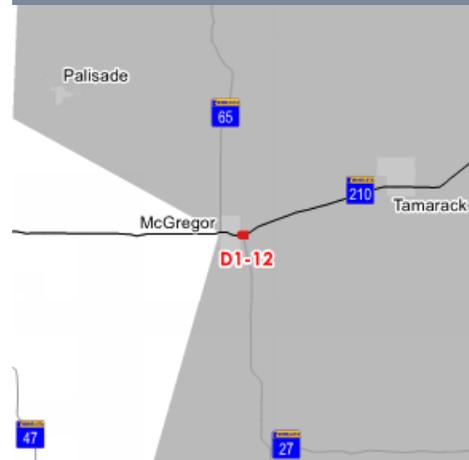


Location Description:

Signalized intersection on a two-lane highway with right turn lanes instead of shoulders.

District Input: Problem is located at all-way stop.

Potential Follow-Up: None





Location Map – Project D1-13 Virginia, St Louis County



Overall Weighted Score: **6.71**

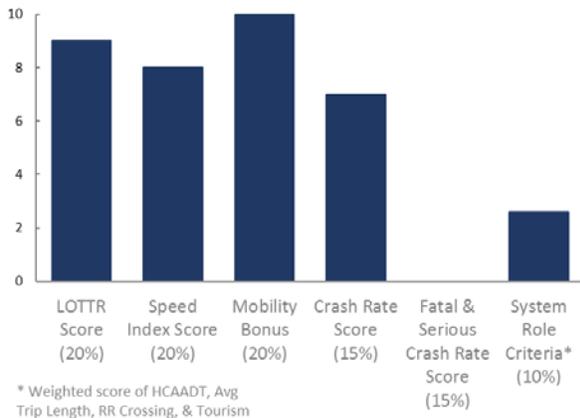
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

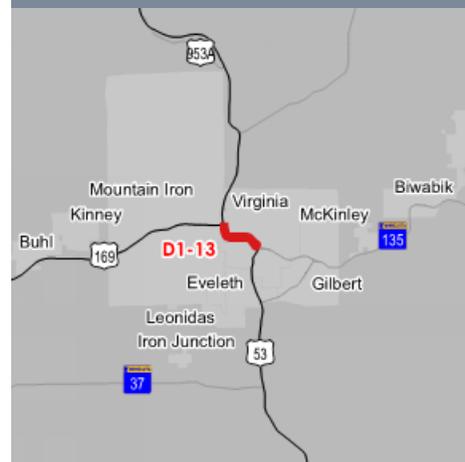


Location Description:

Divided four lane highway. Two signalized accesses on the west curve. Wide shoulders.

District Input: Review data next year to see if recent improvements addressed issues.

Potential Follow-Up: None





Location Map – Project D1-14 Duluth, St Louis County



Overall Weighted Score: **6.61**

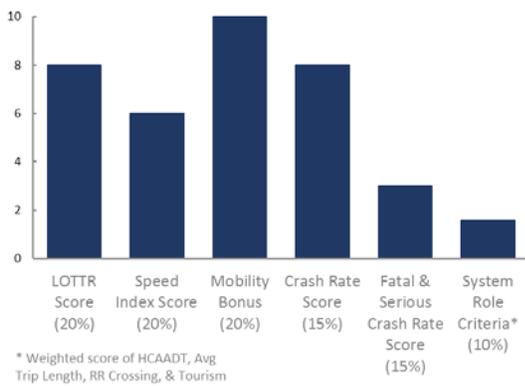
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	OK
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



Location Description:

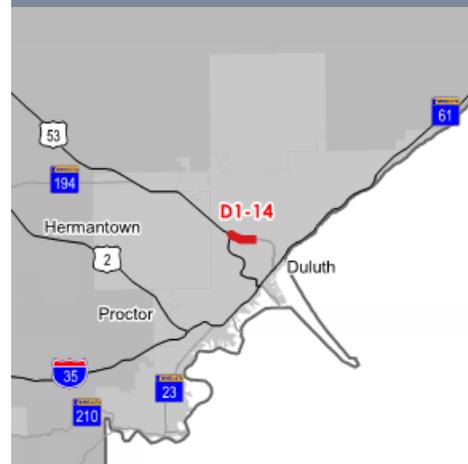
Divided four lane highway with wide shoulders. Several accesses on turns and signalized accesses.

District Input: 2024

reconstruction planned.

Potential Follow-Up: Input

for planned project





Location Map – Project D1-15 Duluth, St Louis County



Overall Weighted Score: **6.11**

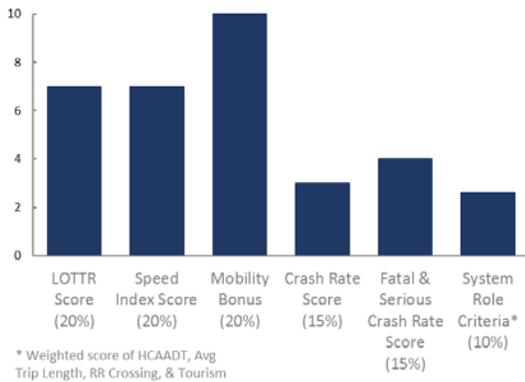
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



Location Description:

Four lane divided highway with many accesses and wide shoulders.

District Input: Review data next year to see if recent improvements addressed issues.

Potential Follow-Up: None





Location Map – Project D1-18 Virginia, St Louis County



Overall Weighted Score: **5.37**

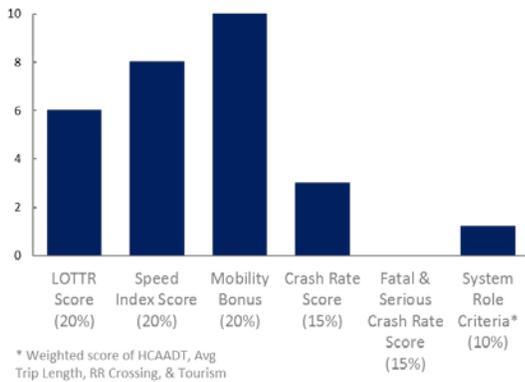
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

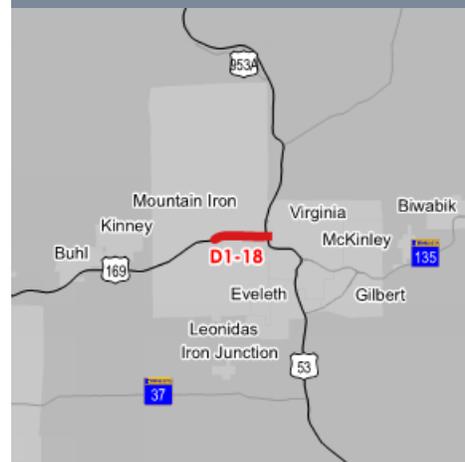


Location Description:

Divided four-lane highway with two signalized intersections and one unsignalized intersection. The entry ramps to US 53 are signalized, but the entry ramps to CSAH 102 are not. There are large shoulders.

District Input: None.

Potential Follow-Up: None





Location Map – Project D1-20 Duluth, St Louis County



Overall Weighted Score: **5.18**

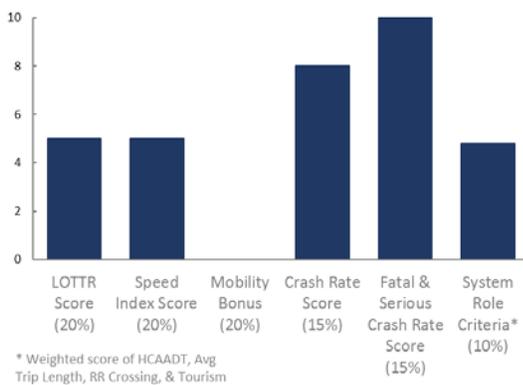
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	OK
Weekday	10a-4p	Reliable	OK
Weekday	4p-8p	Reliable	OK
Weekend	6a-8p	Reliable	OK

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

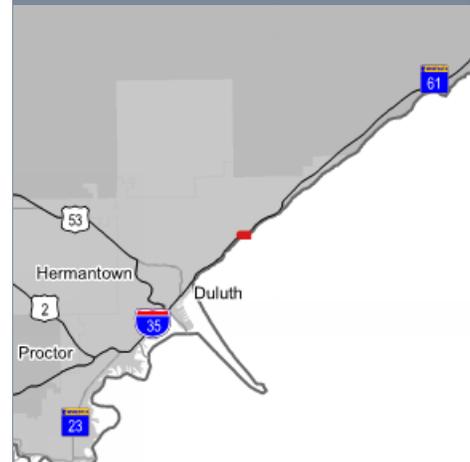


Location Description:

Two lane highway with many residential accesses and a wide shoulder.

District Input: None

Potential Follow-Up: None





Location Map – Project D1-21 Grand Rapids, Itasca County



Overall Weighted Score: **5.11**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	OK
Weekday	10a-4p	Reliable	OK
Weekday	4p-8p	Reliable	OK
Weekend	6a-8p	Reliable	OK

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

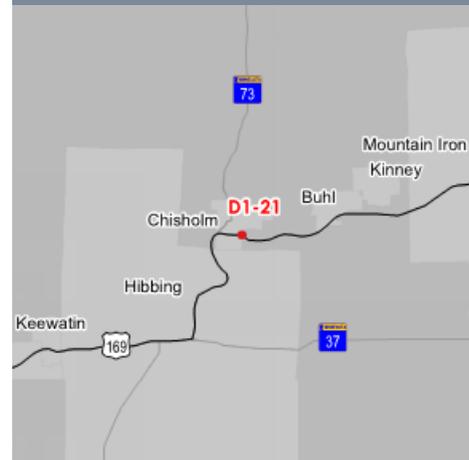
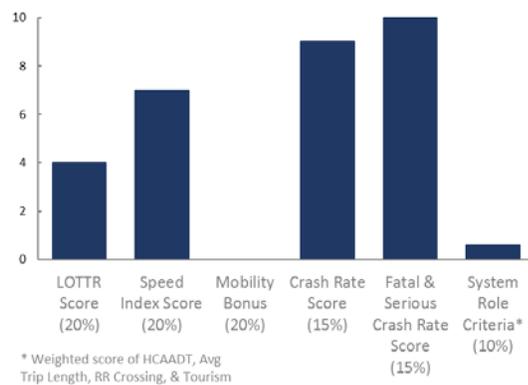
Location Description:

Intersection of two two-lane highways. US 169 has designated left and right turn lanes. CSAH 67 has a stop sign control.

District Input: None

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D1-22 Duluth, St Louis County



Overall Weighted Score: **5.08**

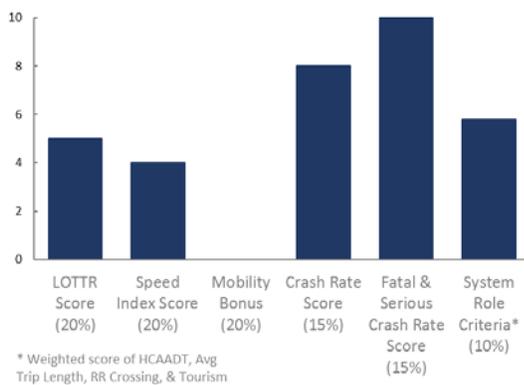
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	OK
Weekday	10a-4p	Reliable	OK
Weekday	4p-8p	Reliable	OK
Weekend	6a-8p	Reliable	OK

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

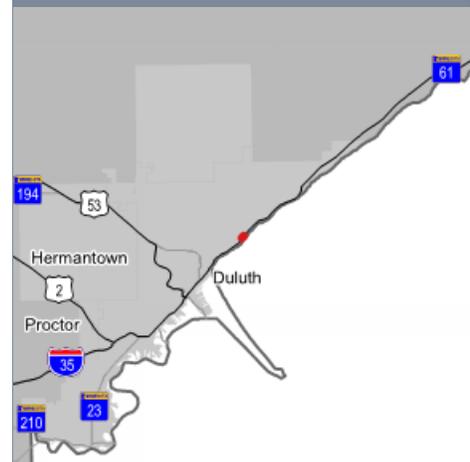


Location Description:

Signalized intersection of two four lane divided highways. Three legs use one lane as a left turn lane. Accesses begin within one block of three legs of the intersection.

District Input: None

Potential Follow-Up: None



3.2.2 District 2 Study Results



District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	LOTR Score (20%)	Speed Index Score (20%)	Mobility Bonus (20%)	Crash Rate Score (15%)	Fatal & Serious Crash Rate Score (15%)	HCAADT Score (6%)	Average Trip Length Score (2%)	Railroad Crossing Score (1%)	Tourism Score (1%)	Overall Weighted Score (100%)	Standalone Project	Input for Planned Project	Additional Study Needed	Potential Solution
D2-2	MN 371	MN 34	MN 200	086+00.811	091+00.508	4.697	6	8	10	9	3	2	1	0	10	6.84			x	Additional study needed
D2-3	US 2	MN 89	MN 89	108+00.148	108+00.322	0.174	10	7	10	6	0	2	1	0	0	6.44		x		2021 Project
D2-5	US 2 B	ND Border	2nd St NW	000+00.000	000+00.126	0.126	10	8	10	0	0	2	0	0	0	5.72				
D2-6	MSAS 120	MSAS 102 (10 St NW)	US 2	999+00.909	999+00.999	0.09	8	8	10	0	0	4	0	0	0	5.44				
D2-7	US 71	US 2	CSAH 15	312+00.399	315+00.781	3.382	5	8	10	3	0	2	1	0	10	5.29			x	Additional study needed

Mobility Only Problem Areas

District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)
D2-M1	MSAS 120	2nd St NW	Sherlock Pkwy	999+00.000	999+00.463	0.463
D2-M2	MN 32	CSAH 2	MN 1	104+00.593	110+00.690	6.097
D2-M3	US 2	McIntosh	Fosston	063+00.127	070+00.864	7.737

Removed Projects

District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	Reason Removed
-	US 2	MN 220	US 2B	000+00.813	040+00.405	3.959	Updated Scoring
-	US 2	MN 32	MN 32	042+00.935	043+00.038	0.103	Updated Scoring
D2-1	US 2	Downtown Crookston	US 75	024+00.363	026+00.677	2.314	District Feedback
D2-4	MN 32	MSAS 109	MN 1	104+00.457	104+00.593	0.136	District Feedback
D2-M4	US 2	CSAH 7	MN 92	081+00.958	088+00.351	6.393	District Feedback

$$\text{LOTR} = \frac{\text{80th Percentile TT}}{\text{50th Percentile TT}}$$

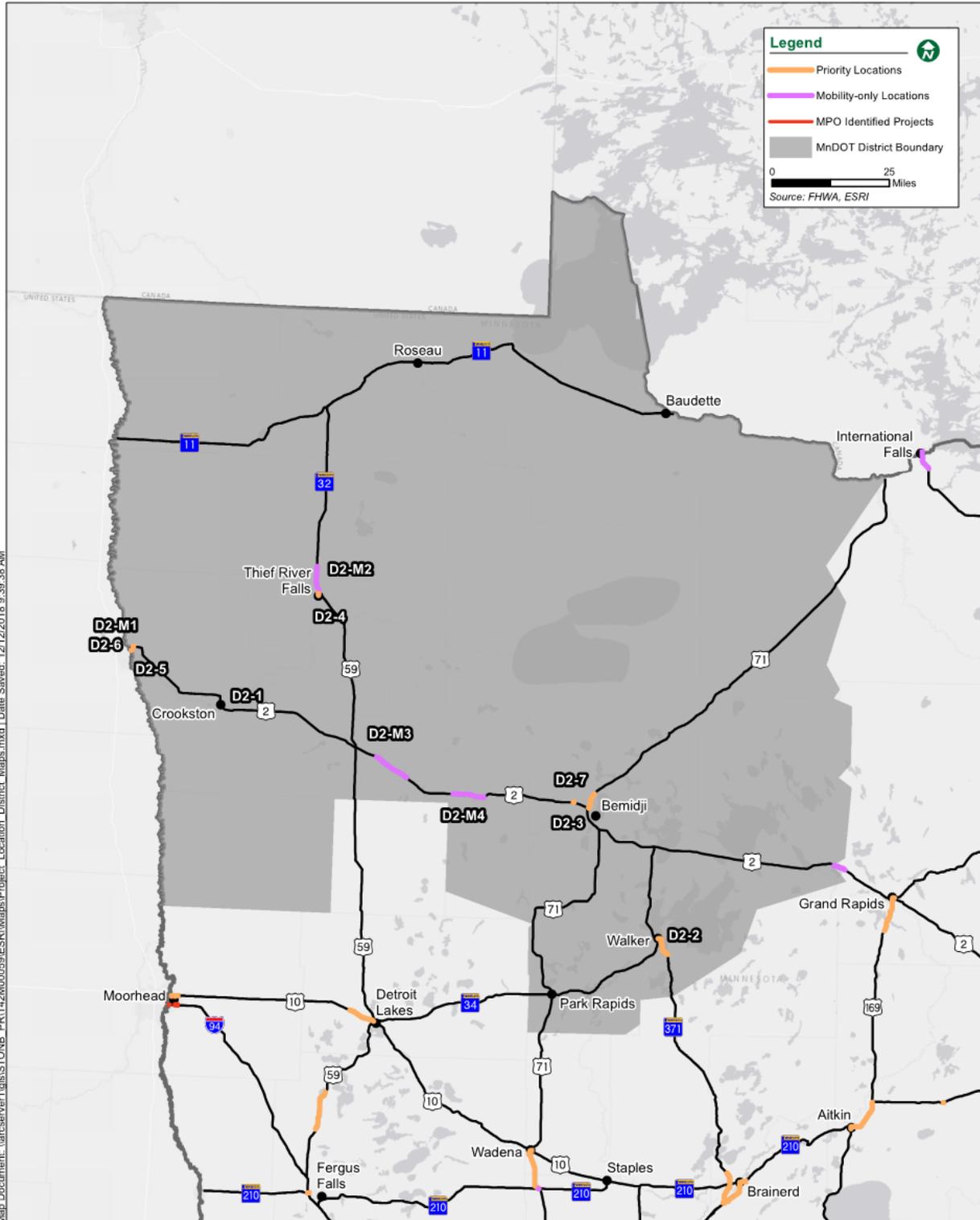
$$\text{Speed Index} = \frac{\text{Historic Average Speed}}{\text{Posted Speed}}$$

Figure 8. District 2 Scoring Results Map



Greater Minnesota Mobility Study
Minnesota Department of Transportation

D2: Project Locations
December 2018



Map Document: \narcserver\GIS\STONB_PRT\42M00059\ESRI\Maps\Project_Location_District_2\Map.mxd | Date Saved: 12/12/2018 9:39:39 AM

District 2 Location Fact Sheets



Location Map – Project D2-2 Walker, Cass County, Leech Lake Tribal Boundary



Overall Weighted Score: **6.84**

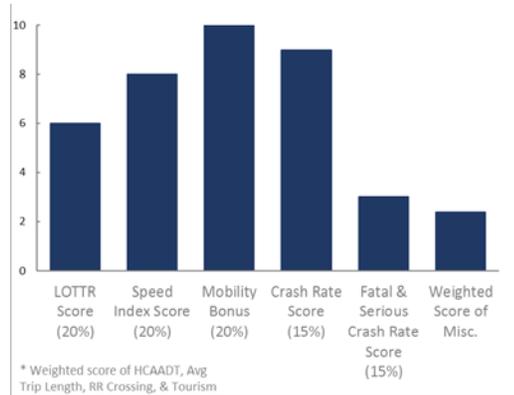
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

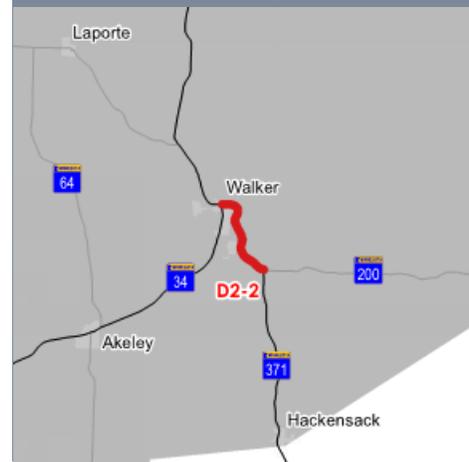


Location Description:

Three lane roadway with a center turn lane in downtown environment at either end with multiple accesses. Two lane roadway with wide shoulders in between both end of corridor.

District Input: This was previously identified as issue through IRC studies. Downtown environment with many considerations. Some discussions of intersection control changes and a bypass.

Potential Follow-Up: Additional study needed





Location Map – Project D2-3 Bemidji, Beltrami County



Overall Weighted Score: **6.44**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	OK

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Location Description:

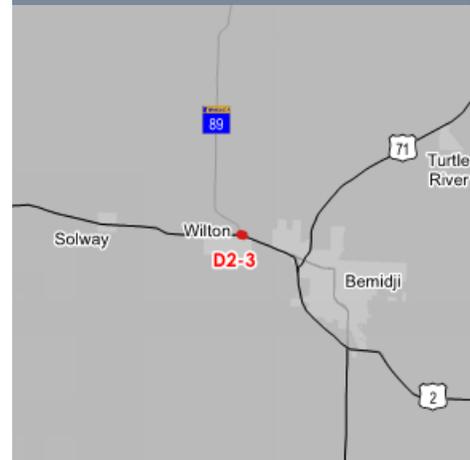
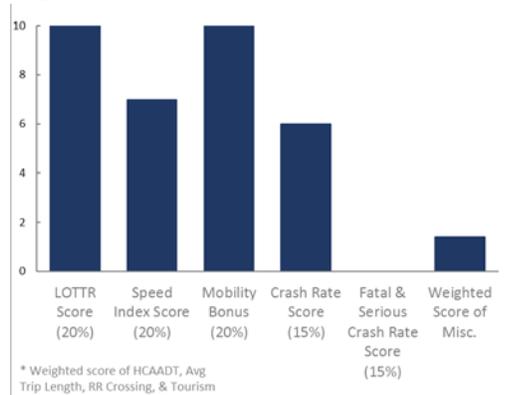
A divided four-lane highway with many accesses and wide shoulders. One signalized access entering Bemidji.

District Input:

This location is District’s highest priority. A fly-over was added in 2015 which has improved safety. A reduced conflict intersection is programmed in 2021.

Potential Follow-Up: Input for planned project

Figure 2: Evaluation Criteria Scores





Location Map – Project D2-5 East Grand Forks, Polk County



Overall Weighted Score: **5.72**

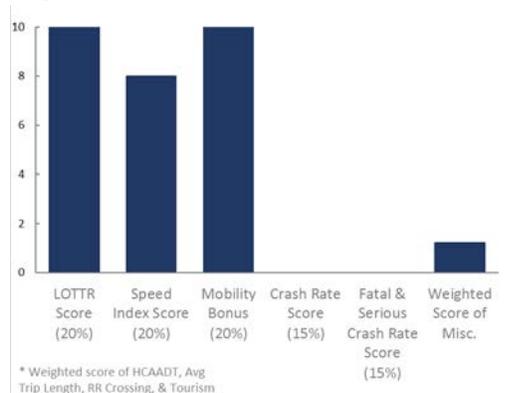
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



Location Description:

Three lane urban roadway with center left turn lane. Signalized intersection one block north of bridge.

District Input: None

Potential Follow-Up: None





Location Map – Project D2-6 Bemidji, Beltrami County



Overall Weighted Score: **5.44**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4a-8p	Reliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

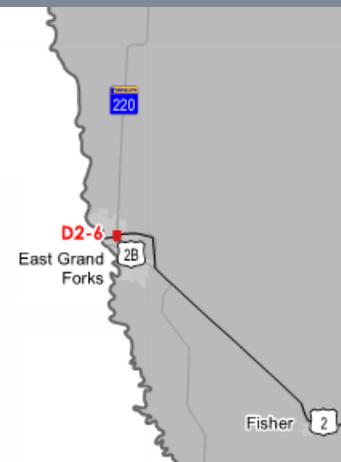
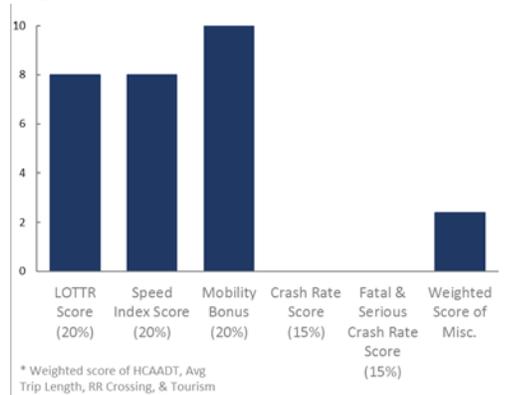
Location Description:

Divided four-lane roadway with designated left turn lane. Signalized intersection to the east.

District Input: None.

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D2-7 Bemidji, Beltrami County



Overall Weighted Score: **5.29**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Location Description:

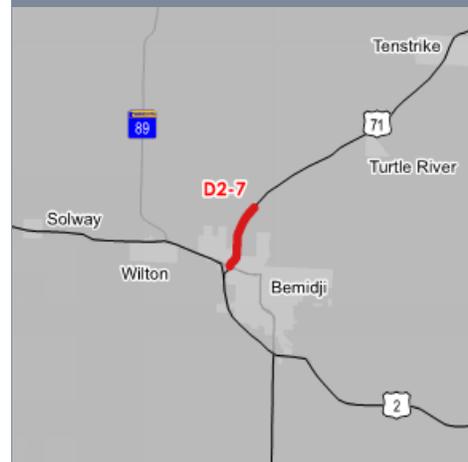
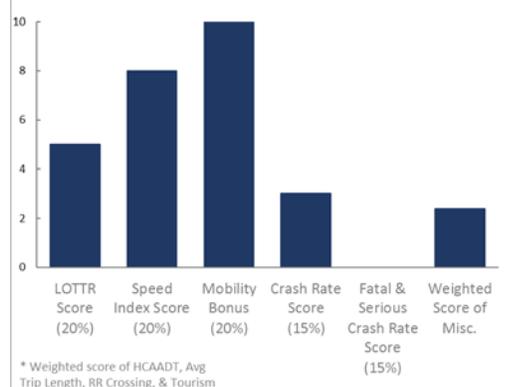
Four lane divided highway with eight access points; two are signalized. There are large shoulders.

District Input:

The district is planning to study this location. There is potential to remove the signal on Ann St. and do RCUT; however, further study is needed because Ann St. volumes are growing.

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores



3.2.3 District 3 Study Results



District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	LOTTR Score (20%)	Speed Index Score (20%)	Mobility Bonus (20%)	Crash Rate Score (15%)	Fatal & Serious Crash Rate Score (15%)	HCAADT Score (6%)	Average Trip Length Score (2%)	Railroad Crossing Score (1%)	Tourism Score (1%)	Overall Weighted Score (100%)	Standalone Project	Input for Planned Project	Additional Study Needed	Potential Solution	Notes
D3-2	MN 210	MN 371B	MN 25	122+00.663	123+00.709	1.046	10	8	10	8	10	2	1	0	10	8.54		x	x	Additional study 2025 Project	Future study on this corridor. Data shows issue is eastbound which could be influenced by the school. District unsure why issue is only one direction. They have known minor issue at westbound right at signal. 2025 project. County doing work at 4th Street.
D3-3	MN 25	I 94	I 94	067+00.946	068+00.710	0.764	10	6	10	10	10	4	1	0	0	8.46			x	Study currently underway	At capacity. Surprised scores aren't higher. Study currently underway showing existing AADT is closer to 35,000. I-94 data is 45,000 - 72,000. Study to recommend improvements.
D3-4	MN 15	MN 23	CSAH 33	150+00.405	153+00.944	3.539	10	7	10	10	5	9	1	0	0	8.21			x	Additional study needed. Signal timing; acceleration lanes; continuous RT lane on MN 15 2020 Study	This is a known issue that likely requires a bigger fix. In top 5 for safety issues. Number 1 crash cost in state. District has a planning study programmed for 2020.
D3-5	MN 371 B	MN 371	MN 210	000+00.185	006+00.521	6.336	10	8	10	10	4	4	1	1	10	8.07					
D3-6	US 71	Wadena	Hewitt	216+00.244	225+00.068	8.824	5	9	10	10	10	2	1	10	0	8.04		x		2023-24 Project	Many trains through Wadena. No issues once out of town. Previous crash issue but did some realignment work and has been better. Project in CHIP 2023-2024. US 10 improvements next year. Will improve US 10/71 signal.
D3-7	US 10	MSAS 109 (Benton Ave)	CSAH 7	177+00.244	179+00.222	1.978	10	6	10	8	7	6	1	0	0	7.83		x		Additional study Access management Potential grade separation 2022 Project	St. Germain Street signal with frontage road is closely spaced to US 10/St. Germain St intersection. Heavy left turns off US 10. Project at 23/10 in 2022 will include looking at this.
D3-8	MN 23	MN 15	MSAS 106 (Wilson Ave)	204+00.390	207+00.216	2.826	10	8	10	10	2	6	1	0	0	7.78		x		Signal timing Access management 2022 Project	Many signals on this corridor. US 10/TH 23 project programmed in 2022 to replace bridges & pavement and will look at interchange operations.
D3-9	MN 25	US 10	US 10	071+00.555	071+00.737	0.182	10	10	10	10	0	1	0	9	0	7.65			x	Additional study	District does not recall a crash issue at this location. Travel time variability is likely due to railroad influence. Many trains per day which create long delays. Leave it on the list but not highest priority for District.
D3-10	US 10	CSAH 42	US 169	213+00.356	214+00.101	0.745	10	7	10	10	3	4	0	0	0	7.59	x			Signal coordination with railroad	Issues related to traffic signals and proximity to railroad. Very little access. First signal westbound backs up. Signal at Main Street is pre-empted by railroad.
D3-11	MN 371	CSAH 77	MN 371B	025+00.483	035+00.039	9.556	10	7	10	10	1	4	1	1	10	7.42			x	Signal coordination with railroad Reduced conflict signalized intersections Displaced left turns	District surprised the rail score is not higher but issues may be related to train sidings which reset the traffic signal. Signal spacing close and railroad compounds issue.
D3-12	MN 23	MSAS 103	MN 15	203+00.041	204+00.158	1.117	10	7	10	10	0	6	0	0	0	7.26	x			Signal timing Side street geometry.	Heavy signalized corridor with many access points. Technical issues with four of the signals. Most side streets have shared thru/right.
D3-13	MN 55	MN 25	MSAS 34	155+00.193	156+00.430	1.237	9	8	10	6	5	2	0	0	0	7.17	x			Signal coordination	Lots of construction on north side of MN 25 last few years which could have some influence but District is not surprised that segment is on here. District gets complaints about signal timing often. District feels there is adequate capacity. Changed to protected lefts to address safety issue. District will not go back to permitted or flashing yellows due to safety concerns. Sacrifice in mobility necessary to ensure safety in this case.
D3-14	US 10	CSAH 6	CSAH 6	188+00.659	188+00.737	0.078	10	7	10	10	0	4	1	0	0	7.16	x			Signal coordination with railroad	Short segment. Signal next to railroad tracks. Heavy right turns as people using this as a cut through from eastbound US 10 to southbound I-94. Very busy on weekends and heavy trucks. Weekends are showing less issues which could be due to fewer trains.
D3-15	US 169	MN 210	Aitkin	252+00.105	260+00.454	8.349	4	8	10	7	10	1	1	1	10	7.14					Location was not reviewed at the workshop.
D3-16	MN 24	I 94	US 10	044+00.075	047+00.831	3.756	7	8	10	3	2	4	0	9	0	6.08					
D3-18	US 71	MN 28	I 94	166+00.993	167+00.370	0.377	8	8	10	4	0	2	1	0	0	5.94		x		Project planned soon	Reconstruction project in STIP. Ramp terminals offset. Didn't plan to look at interchange. Historic road (Sinclair-Lewis). Surprised HCAADT score not higher.
D3-19	US 12	CR 139	CR 139	140+00.451	140+00.55	0.099	6	6	0	10	10	4	1	0	0	5.66					
D3-20	US 71	MN 27	MN 287	186+00.171	186+00.637	0.466	6	8	10	4	0	2	1	0	0	5.54					Location was not reviewed at the workshop.
D3-21	US 10	CSAH 14/15	CSAH 14/15	207+00.888	208+00.319	0.431	10	6	10	1	0	2	1	0	0	5.49			x	Additional study	Not aware of issues but could be due to short merge area.
SC MPO-1	MN 23	Waite Ave	Waite Ave	-	-	-	10	7	10	10	0	6	0	0	0	7.26					MPO project.
SC MPO-2	MN 15	MN 23	CSAH 75	-	-	-	10	7	10	10	1	6	1	0	0	7.43					MPO project.
SC MPO-3	MN 15	3rd St	3rd St	-	-	-	10	6	10	9	0	6	1	0	0	6.93					MPO project.
SC MPO-4	MN 15	8th St	8th St	-	-	-	10	6	10	9	2	9	1	0	0	7.41					MPO project.
SC MPO-5	MN 15	18th St	CR 1	-	-	-	10	7	10	5	5	4	1	0	0	7.16					MPO project.

Mobility Only Problem Areas

District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)
D3-M1	MN 210	US 71	US 71	077+00.496	077+00.564	0.068

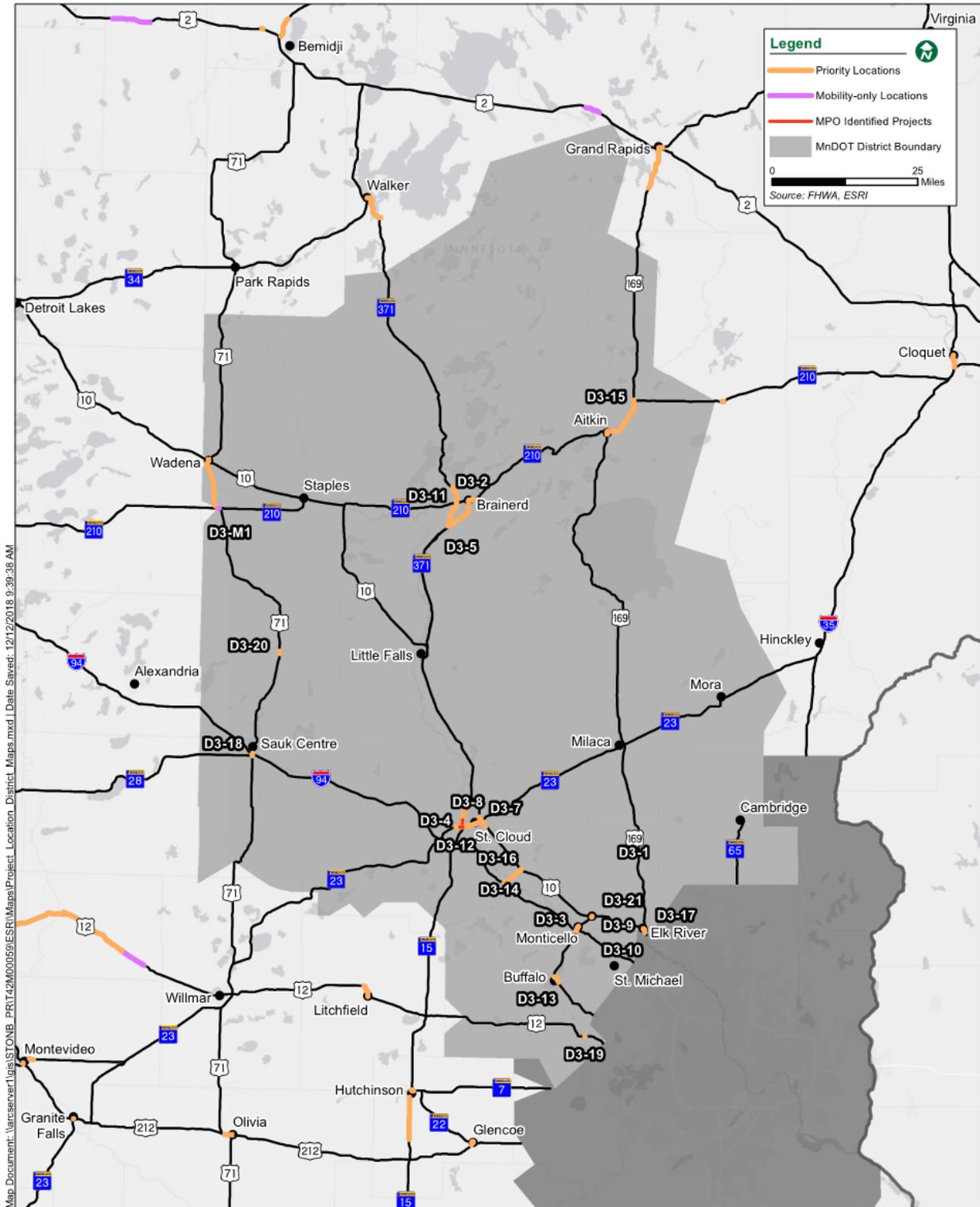
Removed Projects

District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	Reason Removed
-	I 94	W of CSAH 19	CSAH 19	200+00.936	201+00.288	0.352	Updated Scoring
-	MN 210	US 10	US 10	100+00.714	100+00.774	0.06	Updated Scoring
-	I 94	MN 25	MN 25	193+00.201	193+00.777	0.576	Updated Scoring
-	US 10	MN 210	MN 210	114+00.770	114+00.810	0.04	Updated Scoring
-	MN 23	I 94	I 94	199+00.328	199+00.558	0.23	Updated Scoring
-	I 94	MN 23	MN 23	163+00.755	164+00.440	0.685	Updated Scoring
D3-1	US 169	CSAH 4	CSAH 4	169+00.191	169+00.251	0.06	District Feedback
D3-17	US 169	CSAH 33	CSAH 33	161+00.397	162+00.210	0.813	District Feedback

$$LOTTR = \frac{80th\ Percentile\ TT}{50th\ Percentile\ TT}$$

$$Speed\ Index = \frac{Historic\ Average\ Speed}{Posted\ Speed}$$

Figure 9. District 3 Scoring Results Map



District 3 Location Fact Sheets



Location Map – Project D3-2 Brainerd, Crow Wing County



Overall Weighted Score: **8.54**

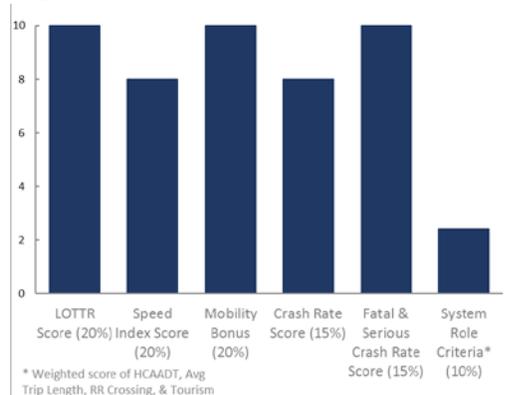
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



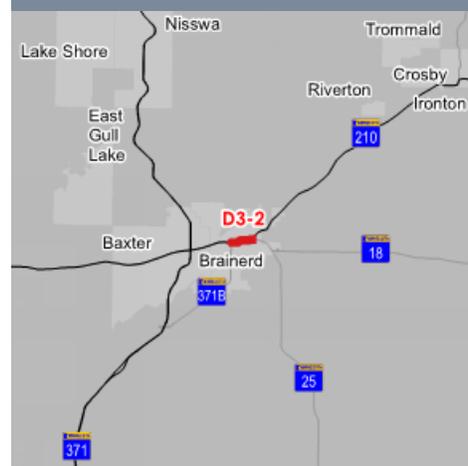
Location Description:

Divided four-lane highway with designated left turn and many accesses and signalized intersections.

District Input:

Future study on this corridor. Data shows issue is eastbound which could be influenced by the school. District unsure why issue is only one direction. They have known minor issue at westbound right at signal. 2025 project. County doing work at 4th Street.

Potential Follow-Up: None





Location Map – Project D3-3 Monticello, Wright County



Overall Weighted Score: **8.46**

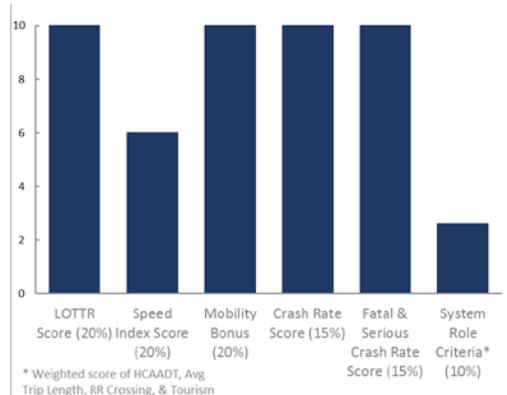
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



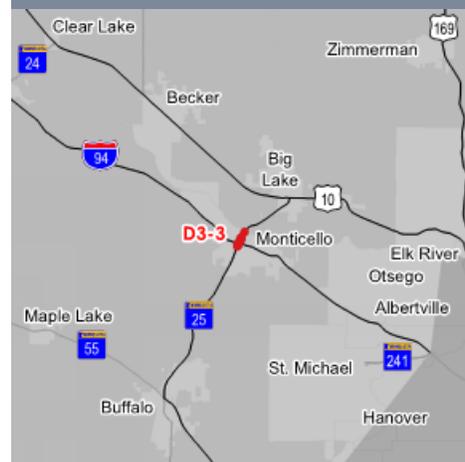
Location Description:

Divided four lane highway with no shoulder and several accesses and signalized intersections.

District Input: At capacity.

Surprised scores aren't higher. Study currently under way showing existing AADT is closer to 35,000. I-94 data is 45,000 - 72,000. Study to recommend improvements.

Potential Follow-Up: Additional study needed





Location Map – Project D3-5 Brainerd, Crow Wing County



Overall Weighted Score: **8.07**

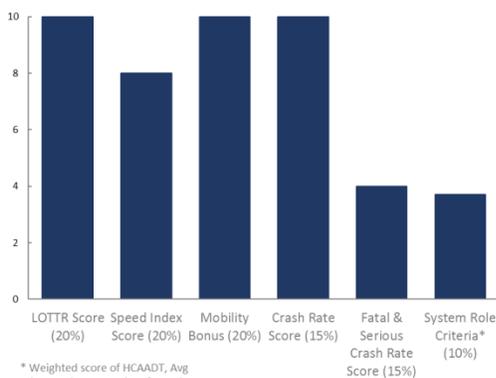
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

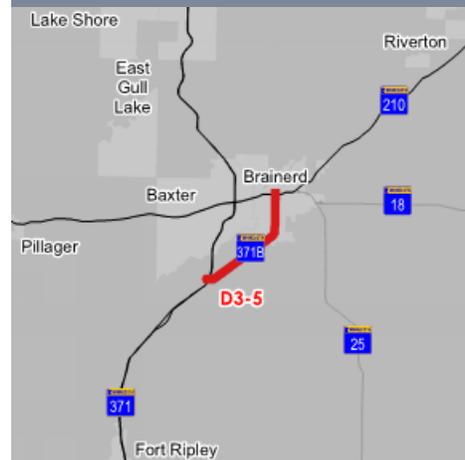


Location Description:

Four lane divided highway with designated turn lanes. Many accesses and signalized intersections. Wide shoulders.

District Input: None

Potential Follow-Up: None





Location Map – Project D3-6 Wadena, Otter Tail County; Hewitt, Todd County



Overall Weighted Score: **8.04**

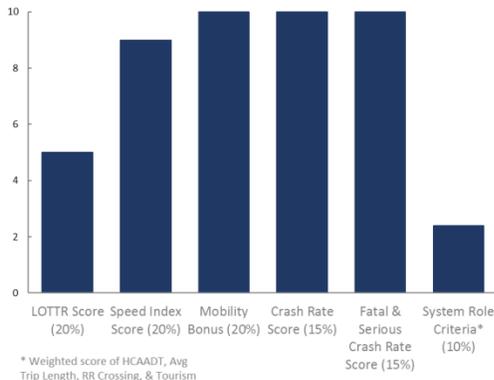
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

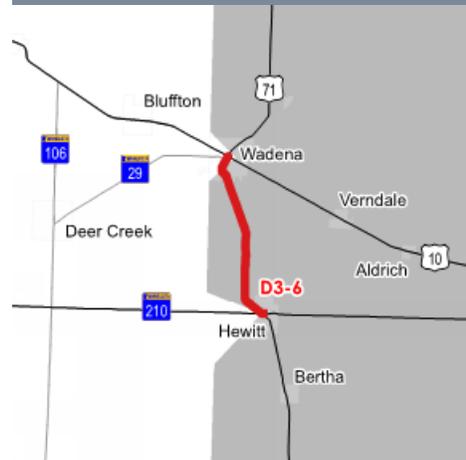


Location Description:

Two lane roadway with wide shoulder from Hewitt to Wadena. Downtown has designated left turn lanes, multiple access points and signalized intersections.

District Input: Many trains through Wadena. No issues once out of town. Previous crash issue but did some realignment work and has been better. Project in CHIP 2023-2024. US 10 improvements next year. Will improve US 10/71 signal.

Potential Follow-Up: None





Location Map – Project D3-7 St Cloud, Stearns County



Overall Weighted Score: **7.83**

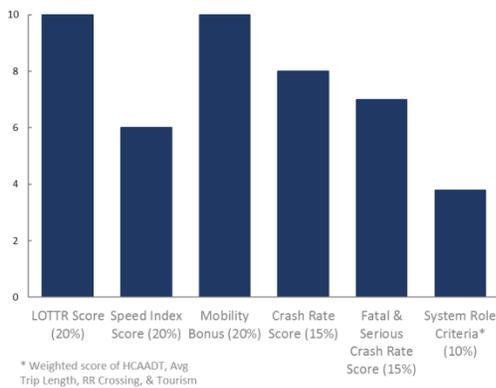
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



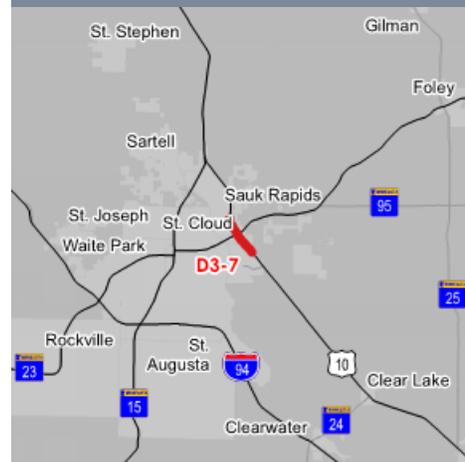
Location Description:

Four-lane divided highway with wide shoulder. Many access points, two signalized intersections, and a railroad crossing.

District Input:

St. Germain Street signal with frontage road is closely spaced to US 10/St. Germain St intersection. Heavy left turns off US 10. Project at 23/10 in 2022 will include looking at this.

Potential Follow-Up: None





Location Map – Project D3-8 St Cloud, Stearns County



Overall Weighted Score: **7.78**

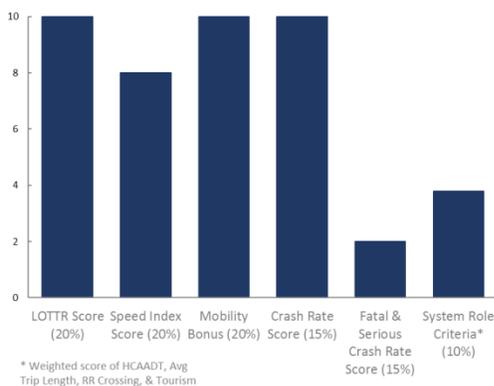
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



Location Description:

Divided four-lane highway with designated left turn and many accesses and signalized intersections.

District Input: None

Potential Follow-Up: None





Location Map – Project D3-9 Big Lake, Wright County



Overall Weighted Score: **7.65**

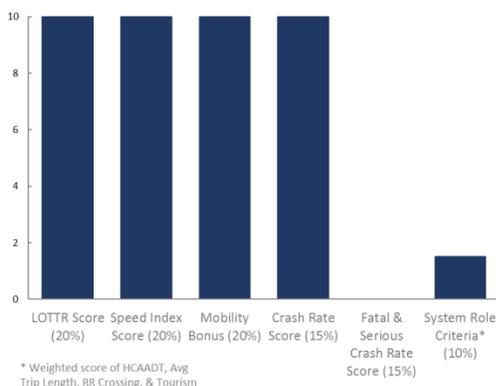
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

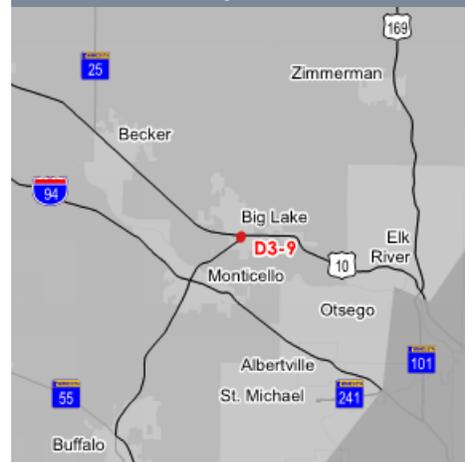


* Weighted score of HCAADT, Avg Trip Length, RR Crossing, & Tourism

Location Description: Three lane roadway with a center turn lane. Signalized intersection to the north. Railroad crossing located a block west of US 10.

District Input: District does not recall a crash issue at this location. Travel time variability is likely due to railroad influence. Many trains per day which create long delays. Leave it on the list but not highest priority for District.

Potential Follow-Up:
Additional study needed





Location Map – Project D3-10 Otsego, Wright County



Overall Weighted Score: **7.59**

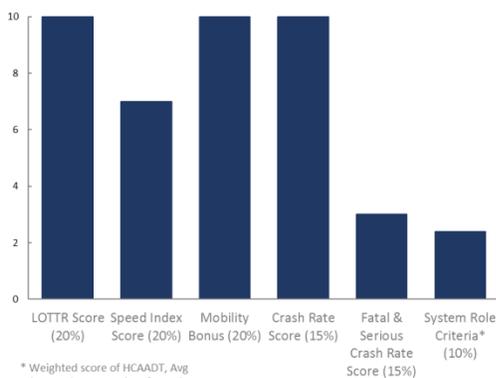
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

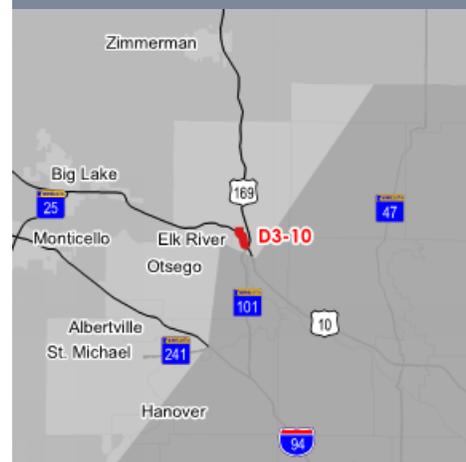


Location Description:

Four lane divided highway with intermittent access point. Signalized intersection to north.

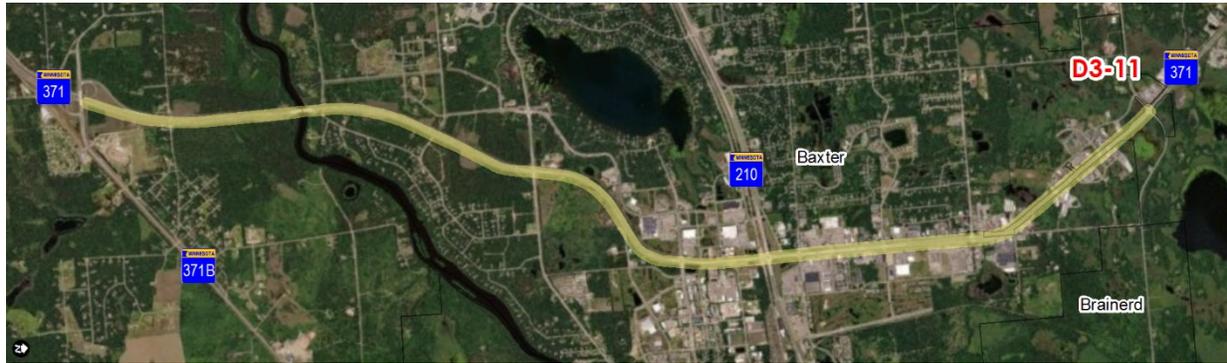
District Input: Issues related to traffic signals and proximity to rail. Very little access. First signal westbound backs up. Signal at Main Street is pre-empted by railroad.

Potential Follow-Up: None





Location Map – Project D3-11 Brainerd, Crow Wing County



Overall Weighted Score: **7.42**

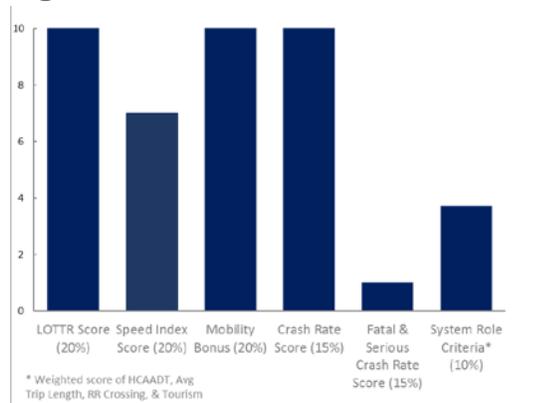
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



Location Description:

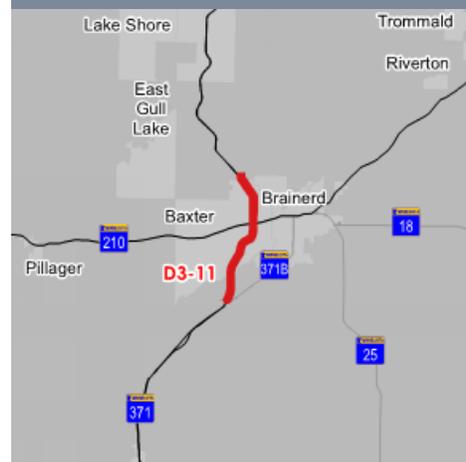
North/South 4-lane divided roadway. Railroad crossing just south of TH 210 signalized intersection.

District Input:

District surprised the rail score is not higher, but issues may be related to train sidings which reset the traffic signal. Signal spacing close and railroad compounds issue.

Potential Follow-Up:

Additional study needed





Location Map – Project D3-12 St Cloud, Stearns County



Overall Weighted Score: **7.26**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Location Description:

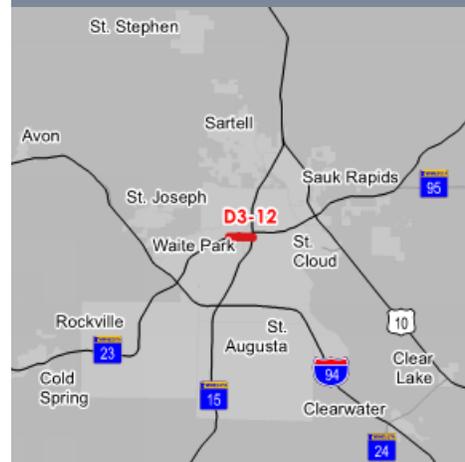
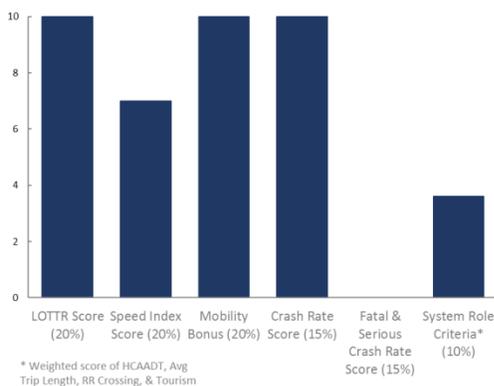
Four lane divided urban roadway with multiple signalized intersections.

District Input:

Heavy signalized corridor with many access points. Technical issues with four of the signals. Most side streets have shared thru/right.

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D3-13 Buffalo, Wright County



Overall Weighted Score: **7.17**

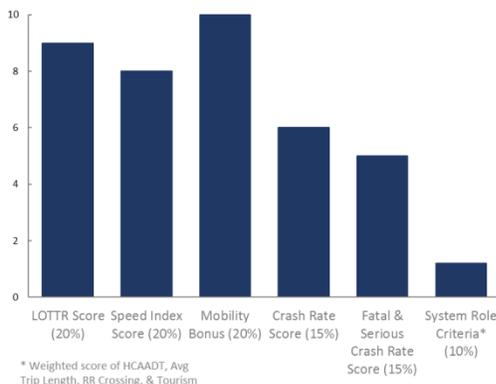
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



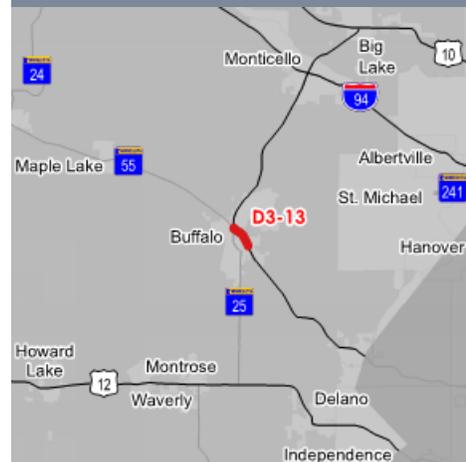
* Weighted score of HCAADT, Avg Trip Length, RR Crossing, & Tourism

Location Description:

Four lane divided highway with designated right-turn lane at all access points. Multiple signalized intersections.

District Input: Lots of construction on north side of MN 25 last few years which could have some influence but District is not surprised that segment is on here. District gets complaints about signal timing often. District feels there is adequate capacity. Changed to protected lefts to address safety issue. District will not go back to permitted or flashing yellows due to safety concerns. Sacrifice in mobility necessary to ensure safety in this case.

Potential Follow-Up: None





Location Map – Project D3-14 Clear Lake, Sherburne County



Overall Weighted Score: **7.16**

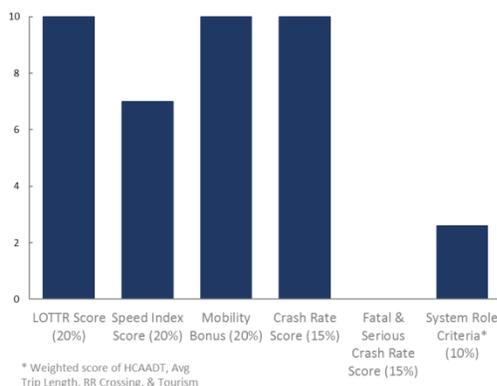
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

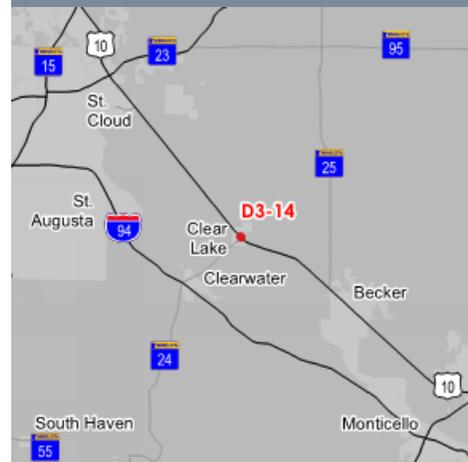


Location Description:

Signalized intersection of a four lane divided highway and a two lane roadway. Railroad track located one block south of intersection.

District Input: Short segment. Signal next to railroad tracks. Heavy right turns as people using this as a cut through from eastbound US 10 to southbound I-94. Very busy on weekends and heavy trucks. Weekends are showing less issues which could be due to fewer trains.

Potential Follow-Up: None





Location Map – Project D3-15 Aitkin, Aitkin County



Overall Weighted Score: **7.14**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

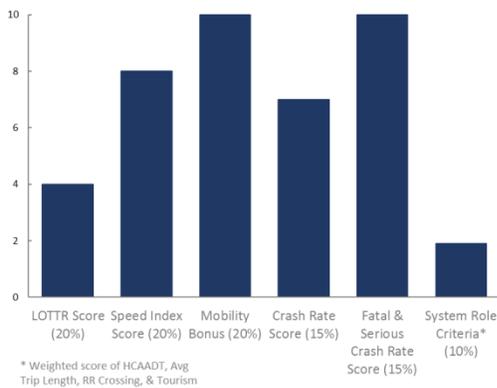
Location Description:

Two-lane highway with short shoulders and occasional access points.

District Input: None

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D3-16 Clear Lake, Sherburne County



Overall Weighted Score: **6.08**

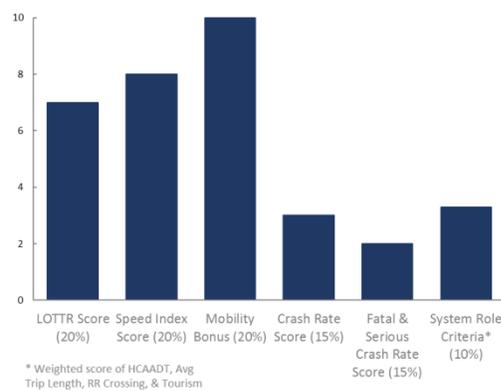
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



Location Description:

Two lane highway with wide shoulders and few access points between cities. One signalized intersection between cities.

District Input: Problem is located at all-way stop.

Potential Follow-Up: None





Location Map – Project D3-18 Sauk Centre, Stearns County



Overall Weighted Score: **5.94**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

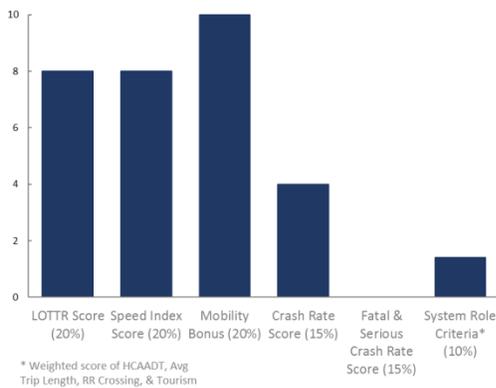
Location Description:

Two lane highway with designated left turn lanes and wide shoulders. Several access points.

District Input: None

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores



* Weighted score of HCAADT, Avg Trip Length, RR Crossing, & Tourism





Location Map – Project D3-19 Delano, Wright County



Overall Weighted Score: **5.66**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

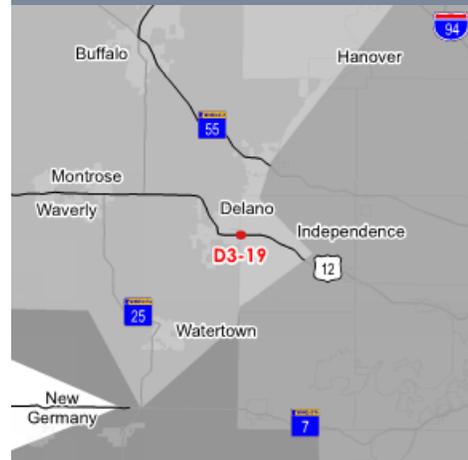
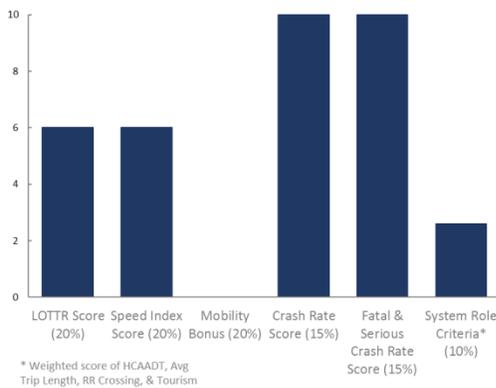
Location Description:

Signalized intersection of two two-lane divided highways with designated turn lanes.

District Input: None

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D3-20 Long Prairie, Todd County



Overall Weighted Score: **5.54**

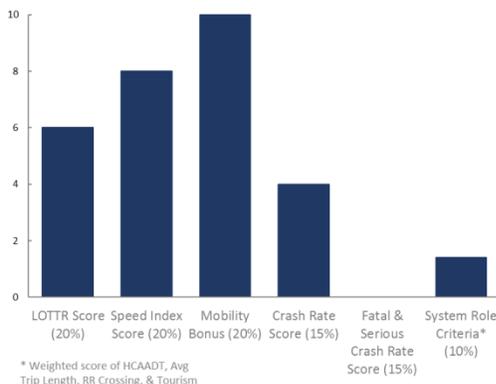
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

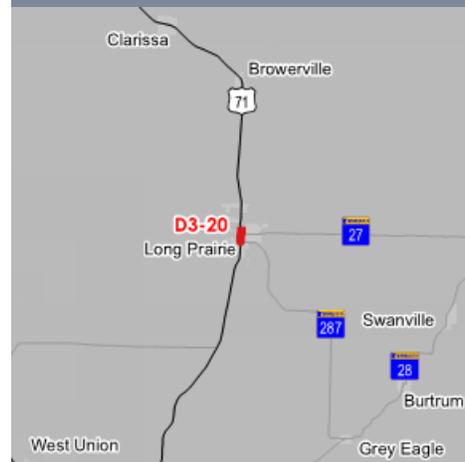


Location Description:

Two lane highway with small shoulders and center turn lane. Many accesses and a signalized intersection.

District Input: None

Potential Follow-Up: None





Location Map – Project D3-21 Bailey, Sherburne County



Overall Weighted Score: **5.49**

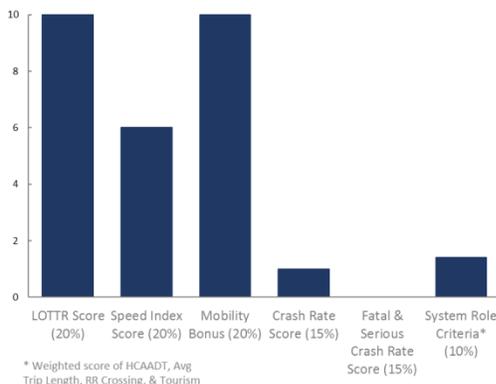
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

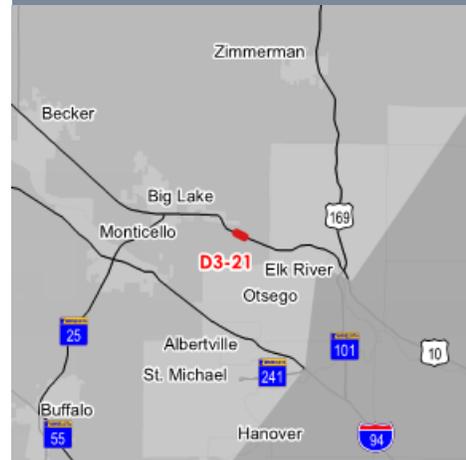


Location Description:

Four lane divided freeway with wide shoulders at a diamond interchange.

District Input: Not aware of issues but could be due to short merge area.

Potential Follow-Up: Additional study needed



3.2.4 District 4 Study Results



District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	LOTR Score (20%)	Speed Index Score (20%)	Mobility Bonus (20%)	Crash Rate Score (15%)	Fatal & Serious Crash Rate Score (15%)	HCAADT Score (6%)	Average Trip Length Score (2%)	Railroad Crossing Score (1%)	Tourism Score (1%)	Overall Weighted Score (100%)	Standalone Project	Input for Planned Project	Additional Study Needed	Potential Solution	Notes
D4-4	US 12	MN 29	CSAH 33 (Murdock)	042+00.632	054+00.956	12.324	7	9	10	6	10	1	1	2	0	7.7			x	Additional study needed Turn lanes, underpass, frontage road, Potential to close one crossing	At-grade railroad in Benson - underpass. River and rail siding constraints. HCADT-lots of trucks entering/exiting. 2 signals. NHS. 2017 ADA in Benson.
D4-5	US 10	US 75	US 75	000+00.402	001+00.483	1.081	10	8	10	9	0	2	0	10	0	7.17	x			Current study underway Signal coordination with railroad RR Underpass. 75/10 merge improvement.	Uncoordinated signals west of 21st. 11th St. underpass being proposed. Metro COG Study.
D4-7	MN 210	I 94	I 94	024+00.157	024+00.252	0.095	6	7	10	7	0	2	1	0	0	5.79			x	Additional study needed Lengthen Left turn lanes Add right turns Widen medians for trucks	Very short turn lane. Ramp separation issue with offset. Heavy truck traffic. Heavy left turns off of I-94. Short turn lanes.
D4-16	MN 7	Appleton	Appleton	048+00.347	049+00.173	0.826	4	9	10	3	0	1	1	0	0	5.13	X			Current study underway	4 way stop & railroad. Study currently underway which will identify potential improvements.
FM MPO-1	I-94	North Dakota	8th St	-	-	-	10	0	0	3	2	10	2	0	0	3.39					MPO project.
FM MPO-2	I-94	8th St	North Dakota	-	-	-	10	0	0	3	2	10	2	0	0	3.39					MPO project.
FM MPO-3	I-94	20th St	20th St	-	-	-	10	4	0	3	0	10	2	0	0	3.89					MPO project.

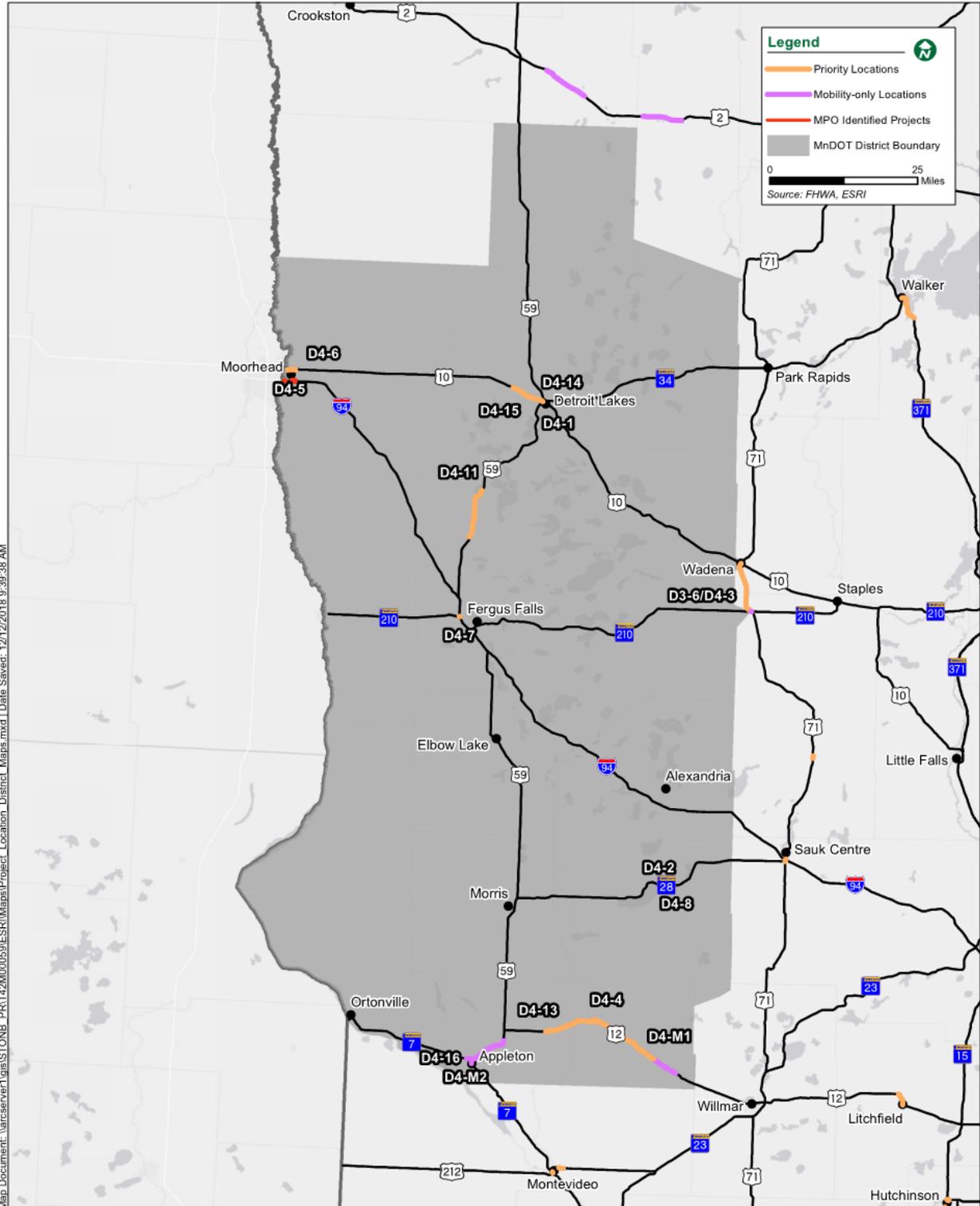
Removed Projects

District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	Reason Removed
-	I 94	MN 114	MN 114	097+00.283	097+00.713	0.43	Updated Scoring
-	I 94	MN 29	MN 29	102+00.792	103+00.280	0.488	Updated Scoring
D4-1	US 59	MN 34	CSAH 6	261+00.789	264+00.232	2.443	District Feedback
D4-2	MN 28	MN 29/MN 104	MN 29/MN 104	076+00.163	076+00.314	0.151	District Feedback
D4-3	US 71	Wadena	Hewitt	216+00.244	225+00.068	8.824	District Feedback
D4-6	US 10	MN 336	MN 336	005+00.587	006+00.260	0.673	District Feedback
D4-8	MN 28	CSAH 35	CSAH 22	079+00.411	080+00.173	0.762	District Feedback
D4-9	MN 210	US 75	US 75	000+00.773	000+00.821	0.048	District Feedback
D4-10	MN 34	US 59	US 59	035+00.515	035+00.551	0.036	District Feedback
D4-11	US 59	CSAH 24	CSAH 4	234+00.484	243+00.061	8.577	District Feedback
D4-12	US 75	I 94	I 94	248+00.257	248+00.512	0.255	District Feedback
D4-13	US 12	Danvers	MN 29	034+00.087	042+00.632	8.545	District Feedback
D4-14	US 10	US 59	MSAS 110 (Roosevelt Ave)	044+00.421	045+00.298	0.877	District Feedback
D4-15	US 10	CSAH 15	US 59	038+00.698	044+00.421	5.723	District Feedback
D4-M1	US 12	CSAH 33 (Murdock)	CSAH 6 (Kerkhoven)	054+00.956	059+00.431	4.475	District Feedback
D4-M2	MN 7	Appleton	Appleton	047+00.508	048+00.347	0.839	District Feedback
D4-M3	US 59	MN 119	CSAH 38	135+00.995	142+00.441	6.446	District Feedback

$$LOTR = \frac{80th\ Percentile\ TT}{50th\ Percentile\ TT}$$

$$Speed\ Index = \frac{Historic\ Average\ Speed}{Posted\ Speed}$$

Figure 10. District 4 Scoring Results Map



Map Document: \\narscerver1\gis\STONB_PRT\212\00059\ESRI\Maps\Project_Location_District_Maps.mxd | Date Saved: 12/12/2018 9:39:38 AM

District 4 Location Fact Sheets



Location Map – Project D4-4 Murdock and Benson, Swift County



Overall Weighted Score: **7.70**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Location Description:

Two lane roadway with medium shoulder from outskirts of Benson to Murdock. Three lane roadway in Benson with shared left-turn lanes and multiple access points with couple signalized intersections.

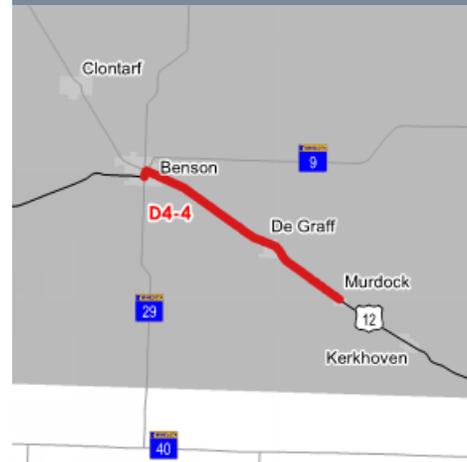
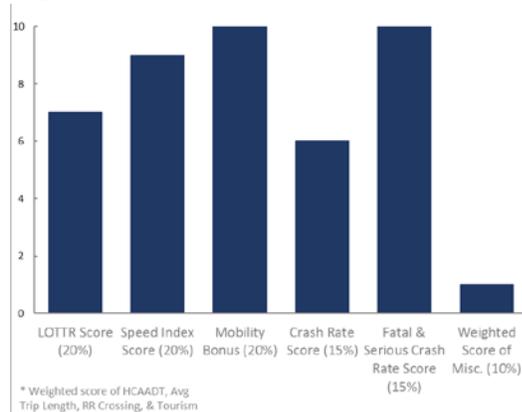
District Input:

At-grade railroad in Benson underpass. River and rail siding constraints. HCAADT has lots of trucks entering and exiting. 2 signals. NHS. 2017 ADA in Benson.

Potential Follow-Up:

Additional study needed

Figure 2: Evaluation Criteria Scores





Location Map – Project D4-5 Moorhead, Clay County



Overall Weighted Score: **7.17**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

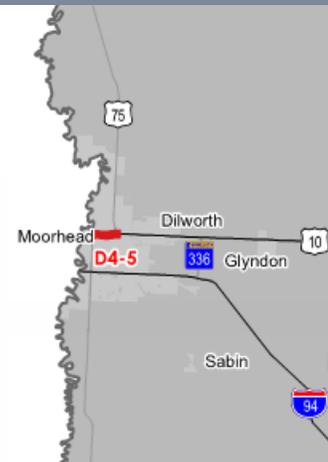
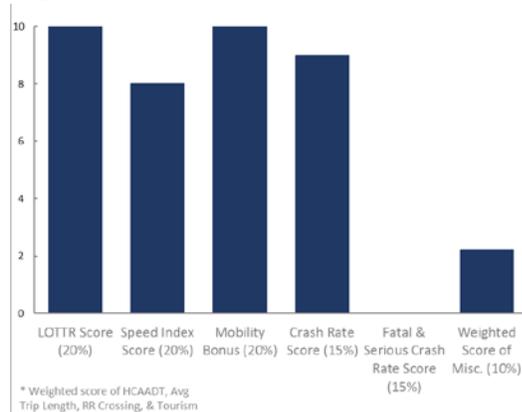
Location Description:

Five lane roadway with designated shared center left-turn lane in the downtown area. Four lane divided roadway to the east. Access points throughout with signalized intersections.

District Input: Uncoordinated signals west of 21st. 11th St. underpass being proposed. Metro COG Study.

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D4-7 Fergus Falls, Otter Tail County



Overall Weighted Score: **5.79**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Location Description:

Four lane divided roadway at an interchange above a freeway. Wide shoulders.

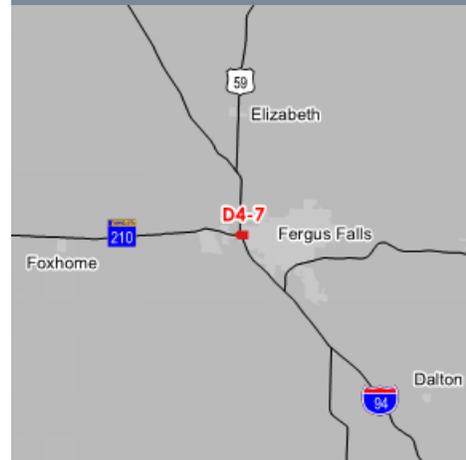
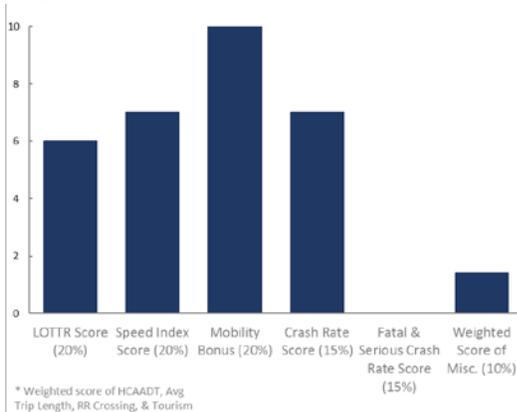
District Input:

Very short turn lane. Ramp separation issue with offset. Heavy truck traffic. Heavy left turns off of I-94. Short turn lanes.

Potential Follow-Up:

Additional study needed

Figure 2: Evaluation Criteria Scores





Location Map – Project D4-16 Appleton, Swift County



Overall Weighted Score: **5.13**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

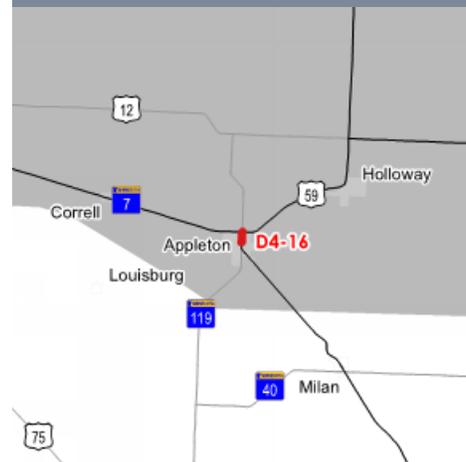
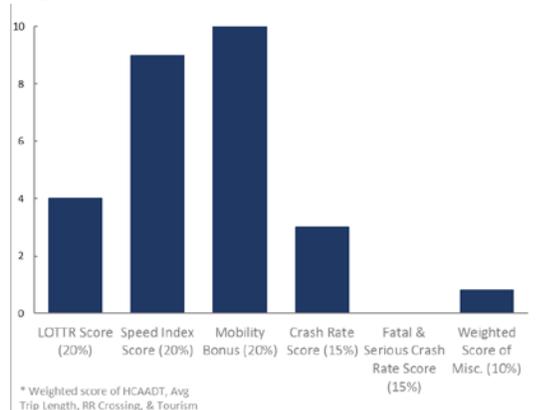
Location Description:

Two lane highway with wide shoulders, several access points and a railroad crossing.

District Input: Four-way stop and railroad. Study currently underway which will identify potential improvements.

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores



3.2.5 District 6 Study Results



\District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	LOTTR Score (20%)	Speed Index Score (20%)	Mobility Bonus (20%)	Crash Rate Score (15%)	Fatal & Serious Crash Rate Score (15%)	HCAADT Score (6%)	Average Trip Length Score (2%)	Railroad Crossing Score (1%)	Tourism Score (1%)	Overall Weighted Score (100%)	Standalone Project	Input for Planned Project	Additional Study Needed	Potential Solution	Notes
D6-2	US 61	MN 16/CSAH 6	MN 16/CSAH 6	001+00.598	001+00.658	0.06	10	8	10	10	0	2	1	0	0	7.24	x			Geometric improvements Signal timing/modifications	Intersection related. PM weekend issues; commuter traffic. Southbound left turn lane is very long which may be taking a lot of green time.
D6-3	US 61	CSAH 19	Downtown Red Wing	091+00.049	092+00.759	1.71	10	7	10	6	2	4	1	0	10	6.96	x			Signal timing/coordination	Reconstruction in 2012-14. Issues likely related to downtown environment. Look into signal timing or coordination opportunities. District and City decision to not sacrifice pedestrian mobility/safety for NHS mobility through a downtown.
D6-4	I 90	US 14	US 14	271+00.168	271+00.466	0.298	10	8	10	4	0	9	2	0	10	6.88			x	Additional study	70 mph posted speed may not be comfortable for most drivers. Left exits, curves, weaving/merging.
D6-6	MN 19	I 35	I 35	169+00.243	169+00.495	0.252	5	9	10	10	0	2	1	0	0	6.44		x	x	20XX Project Potential for auxiliary lanes	Speed issues with trucks going to/from Flying J. CSAH 46 will be realigned west of interchange.
D6-7	I 90	US 63	US 63	209+00.304	209+00.601	0.297	5	8	10	10	0	4	2	0	0	6.38		x		2020 Project	Short merge and deceleration areas. 2020 interchange improvement planned and will include redesign and access changes. Keep on list to confirm both issues are addressed (eastbound to northbound loop).
D6-8	US 61	US 14	CR 129	029+00.512	030+00.314	0.802	7	7	10	3	5	2	1	0	10	6.24			x	Additional study	2018 signal replacement at Huff Street. Known issues on segment to south that include CSAH 43.
D6-9	US 218	I 90	CSAH 27	015+00.000	015+00.280	0.28	10	10	10	0	0	2	0	0	0	6.12					
D6-11	I 90	Oakland PI SE	Oakland PI SE	180+00.021	180+00.140	0.119	10	7	10	2	0	4	2	0	0	5.98			x	Additional study Potential ramp consolidation	Issues related to short weave area.
D6-12	US 52	I 90	I 90	046+00.351	046+00.704	0.353	6	6	0	9	10	2	1	0	0	5.39					
D6-13	MN 19	MSAS 118 (Armstrong Rd)	MN 3	175+00.708	176+00.190	0.482	5	8	0	9	8	2	1	2	0	5.31					
R MPO-1	US 63	CSAH 16	CSAH 16	-	-	-	3	8	0	8	8	2	0	0	0	4.86					MPO project.
R MPO-2	US 52	55th St	55th St	-	-	-	10	1	0	10	2	10	1	0	0	4.62					MPO project.
R MPO-3	US 63	I-90	I-90	-	-	-	7	8	10	10	3	6	1	0	0	7.39					MPO project.
R MPO-4	US 14	Byron	Byron	-	-	-	7	6	0	4	3	6	1	0	0	4.03					MPO project.
R MPO-5	US 52	I-90	I-90	-	-	-	7	8	0	9	10	10	1	0	0	6.53					MPO project.

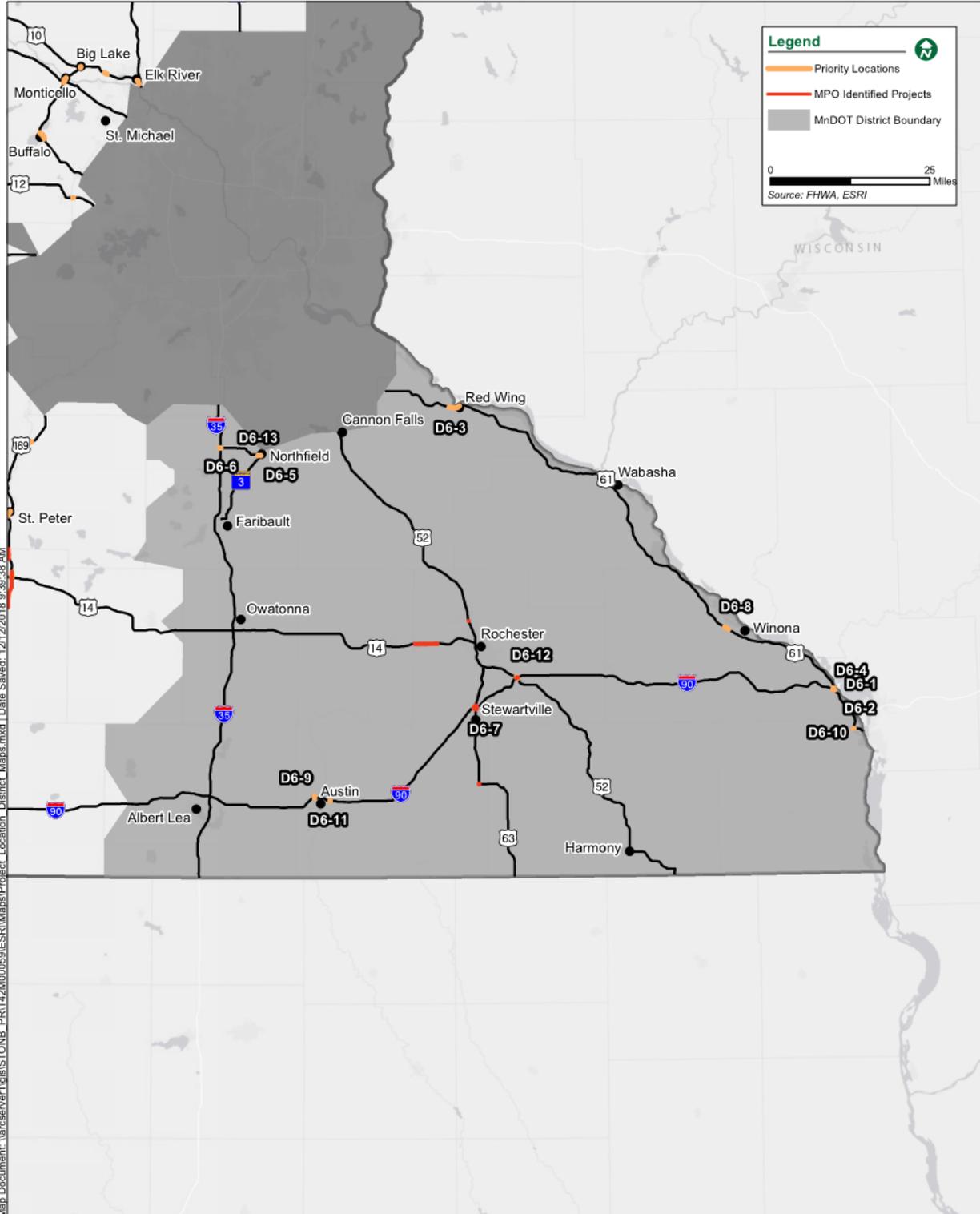
Removed Projects

District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	Reason Removed
-	US 52	US 14	CSAH 25	053+00.940	054+00.312	0.372	Updated Scoring
-	US 63	Downtown Spring Valley	Downtown Spring Valley	215+00.212	215+00.440	0.228	Updated Scoring
-	I 35	MN 21	MN 21	058+00.776	059+00.113	0.337	Updated Scoring
D6-1	I 90	Dresbach	Dresbach	273+00.843	274+00.038	0.195	District Feedback
D6-5	MN 3	MN 246	MN 246	012+00.372	012+00.533	0.161	District Feedback
D6-10	I 90	US 14	Wisconsin	003+00.914	004+00.377	0.463	District Feedback

$$LOTTR = \frac{80th\ Percentile\ TT}{50th\ Percentile\ TT}$$

$$Speed\ Index = \frac{Historic\ Average\ Speed}{Posted\ Speed}$$

Figure 11. District 6 Scoring Results Map



Map Document: \\arcserver1\gis\STONB_PRT\42M\0059\ESRI\Mapa\Project_Location_District_Maps.mxd | Date Saved: 12/12/2018 9:39:38 AM

District 6 Location Fact Sheets



Location Map – Project D6-2 La Crescent, Houston/Winona County



Overall Weighted Score: **7.24**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

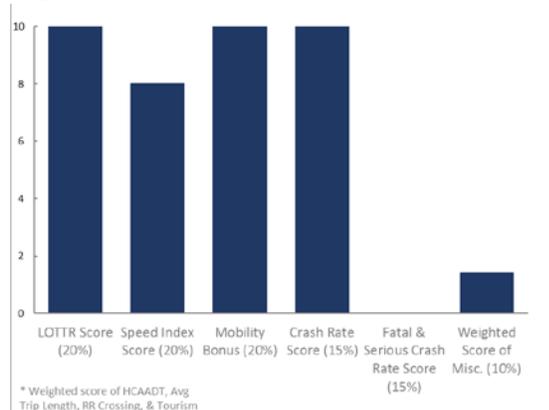
² Segment considered slow if Speed Index is less than 0.9

Location Description:
Signalized intersection of two four lane divided highways. Designated turn lanes on all legs.

District Input: None

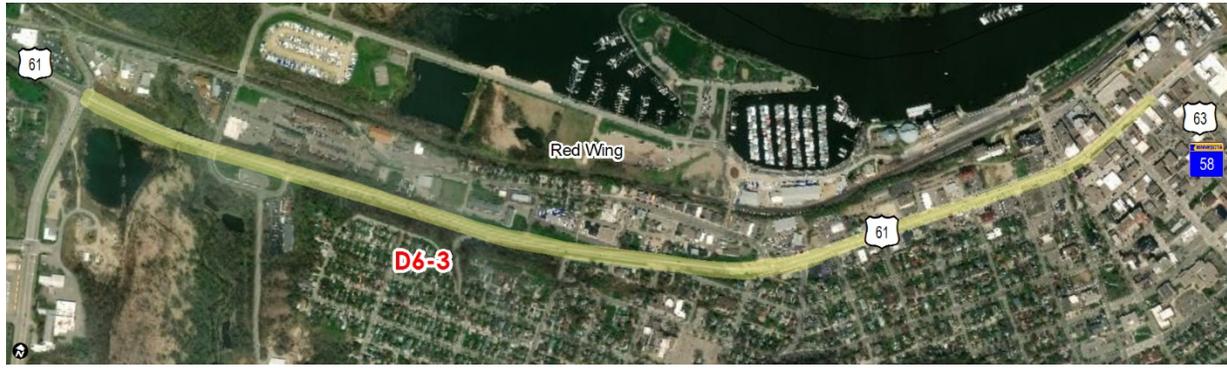
Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D6-3 Red Wing, Goodhue County



Overall Weighted Score: **6.96**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Location Description:

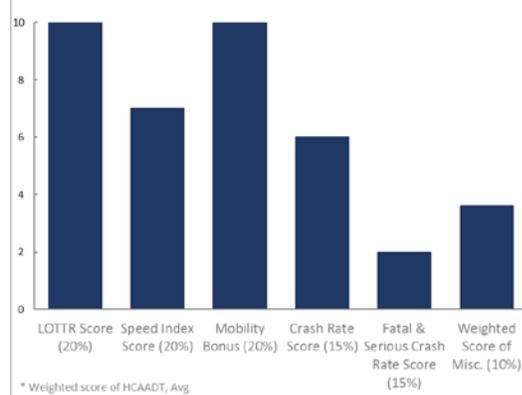
Four lane divided roadway outside of downtown. Five lane roadway with multiple access points in downtown section with shared left-turn lanes. Signalized at few intersections.

District Input:

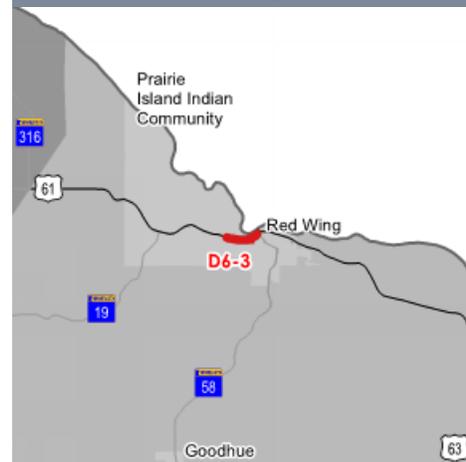
Reconstruction in 2012-14. Issues likely related to downtown environment. Look into signal timing or coordination opportunities. District and City decision to not sacrifice pedestrian mobility/safety for NHS mobility through a downtown.

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores



* Weighted score of HCAADT, Avg Trip Length, RR Crossing, & Tourism





Location Map – Project D6-4 Dresbach, Winona County



Overall Weighted Score: **6.88**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Location Description:

Four lane divided freeway with curves.

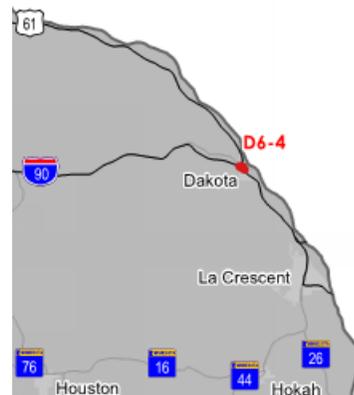
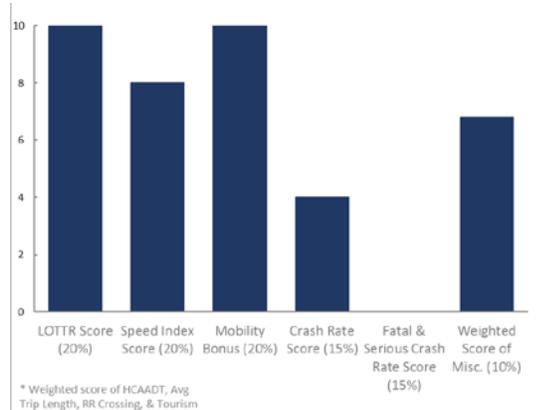
District Input:

70 mph posted speed may not be comfortable for most drivers. Left exits, curves, weaving/merging.

Potential Follow-Up:

Additional study needed

Figure 2: Evaluation Criteria Scores





Location Map – Project D6-6 Little Chicago, Rice County



Overall Weighted Score: **6.44**

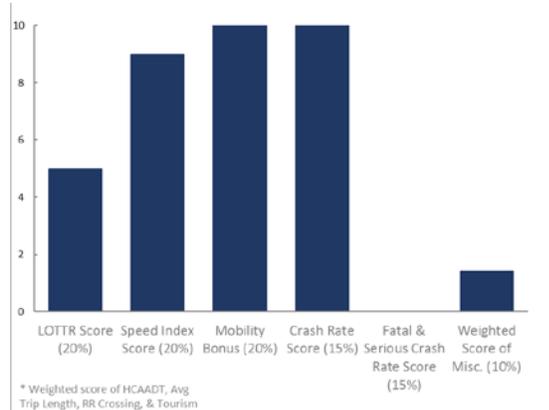
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

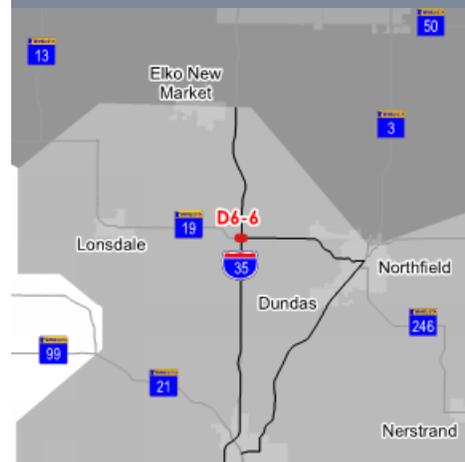


Location Description:

Two lane roadway with designated left turn and right turn lane for accessing freeway ramp.

District Input: Speed issues with trucks going to/from Flying J. CSAH 46 will be realigned west of interchange.

Potential Follow-Up: None





Location Map – Project D6-7 Stewartville, Olmsted County



Overall Weighted Score: **6.38**

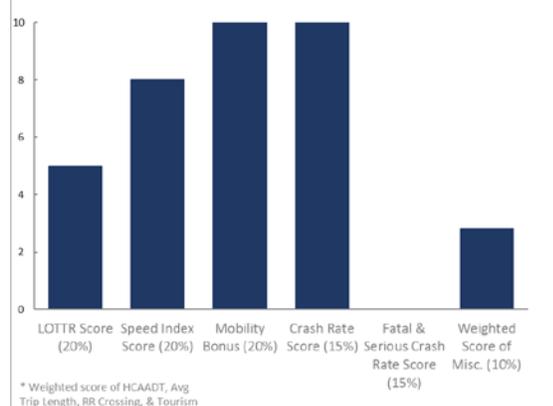
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

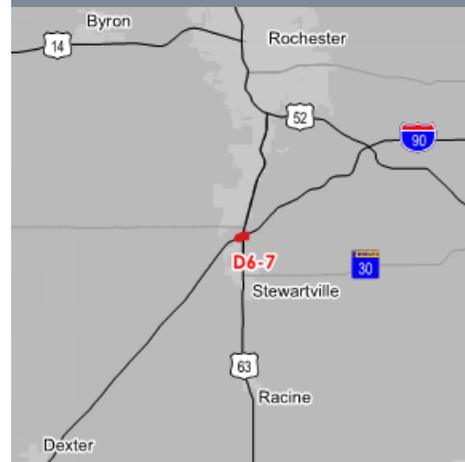


Location Description:

Four lane divided freeway with wide shoulders at a partial cloverleaf interchange.

District Input: Short merge and deceleration areas. 2020 interchange improvement planned and will include redesign and access changes. Keep on list to confirm both issues are addressed (eastbound to northbound loop).

Potential Follow-Up: None





Location Map – Project D6-8 Goodview, Winona County



Overall Weighted Score: **6.24**

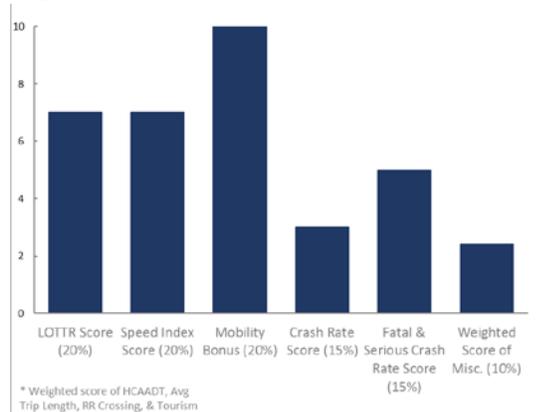
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

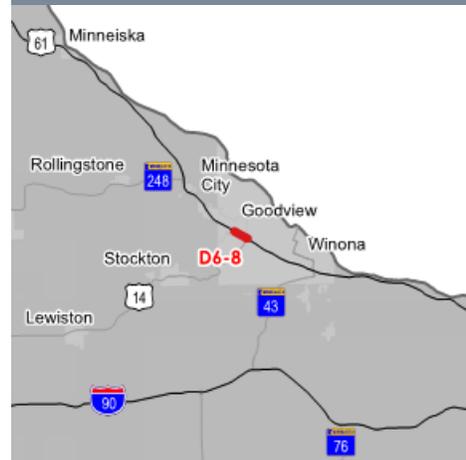
Figure 2: Evaluation Criteria Scores



Location Description:
Divided four lane highway with wide shoulders and occasional access points.

District Input: None

Potential Follow-Up: None





Location Map – Project D6-9 Austin, Mower County



Overall Weighted Score: **6.12**

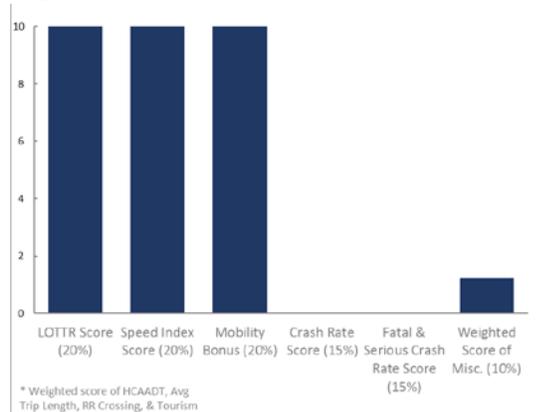
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

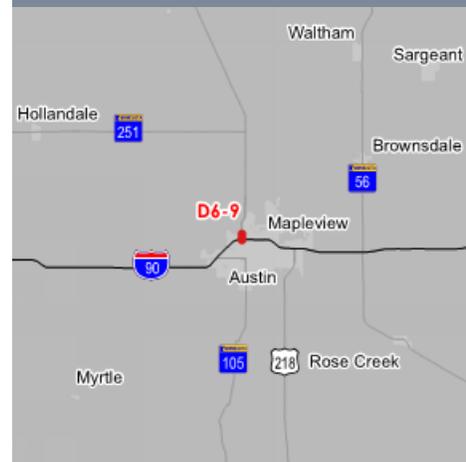


Location Description:

Freeway exits and next intersection all signalized. Four lanes divided and wide shoulder.

District Input: None

Potential Follow-Up: None





Location Map – Project D6-11 Austin, Mower County



Overall Weighted Score: **5.98**

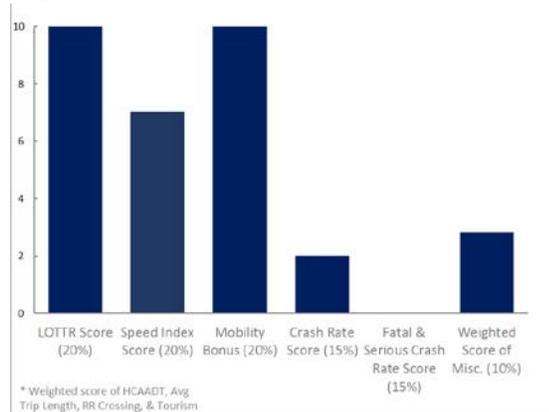
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

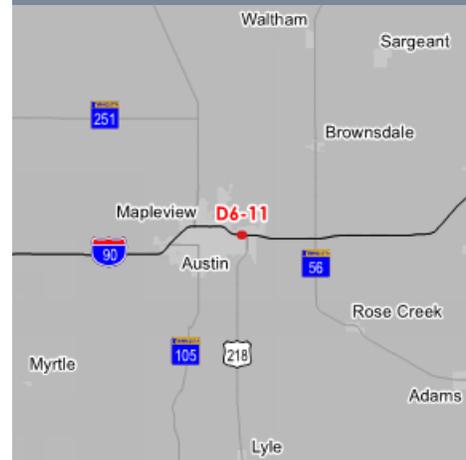


Location Description:

Four-lane road, no shoulders. Many access points.

District Input: Issues related to short weave area.

Potential Follow-Up: Additional study needed





Location Map – Project D6-12 Marion, Olmsted County



Overall Weighted Score: **5.39**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	OK
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	OK

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

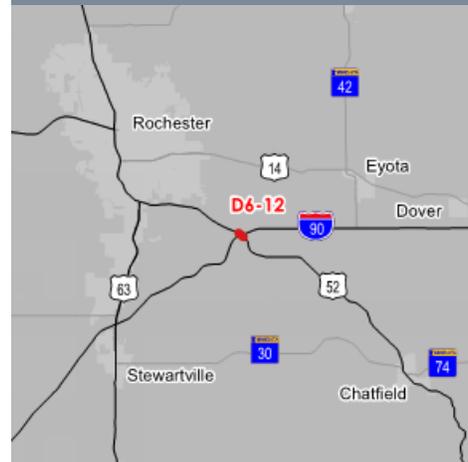
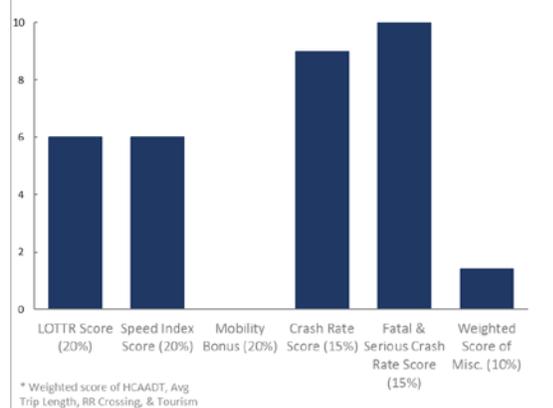
² Segment considered slow if Speed Index is less than 0.9

Location Description:
Divided six lane freeway.
Entrance/exit ramps at location.

District Input: None

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D6-13 Northfield, Dakota/Rice County



Overall Weighted Score: **5.31**

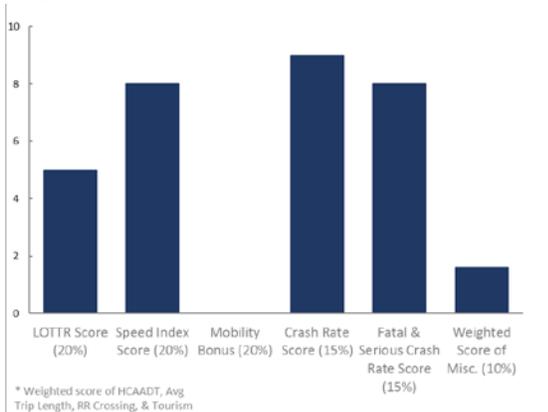
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

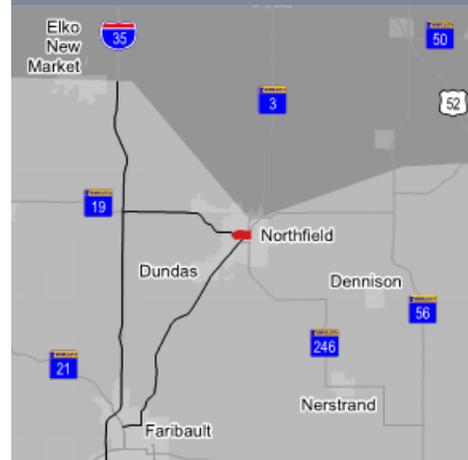


Location Description:

Mixed divided-undivided two-lane road with wide shoulders and sometimes designated turning lanes. Many access points.

District Input: None

Potential Follow-Up: None



3.2.6 District 7 Study Results



District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	LOTR Score (20%)	Speed Index Score (20%)	Mobility Bonus (20%)	Crash Rate Score (15%)	Fatal & Serious Crash Rate Score (15%)	HCAADT Score (6%)	Average Trip Length Score (2%)	Railroad Crossing Score (1%)	Tourism Score (1%)	Overall Weighted Score (100%)	Standalone Project	Input for Planned Project	Additional Study Needed	Potential Solution	Notes
D7-1	MN 22	US 14	CSAH 3	052+00.524	053+00.272	0.748	10	8	10	10	0	2	0	0	0	7.22		x		2023 Project Study currently underway	Operations and safety issues at TH 22/Augusta; LOS at TH 22/CSAH 26. No signal coordination on corridor. District has a 2023 pavement preservation project planned. MnDOT and MAPO have TH 22 Study currently underway and will provide recommendations on improvements.
D7-3	US 59	I 90	MN 60	010+00.837	012+00.220	1.383	6	9	10	10	0	4	1	0	0	6.76		x		2027 Project Study currently underway	2027 project planned. Current study underway. Roundabout operates best but not viable due to business impacts. Traffic signals are likely to stay. Frontage Road proximity to highway an issue - limited stacking distance. Focus on access management. Study will recommend improvements.
D7-4	US 169	MN 112	MN 112	078+00.998	079+00.199	0.201	10	7	10	3	0	9	1	0	0	6.41	x			Extend acceleration lanes	District aware of issue but not District's highest priority. Considering extension of acceleration lanes.
D7-7	US 169	I 90	CSAH 16	010+00.187	011+00.442	1.255	5	9	10	5	0	2	1	0	0	5.69				Location was not reviewed at workshop	
D7-8	US 169	MN 22	MN 99	065+00.454	066+00.424	0.97	9	6	0	7	5	10	1	0	10	5.52		x		2021-22 Project Signal coordination Potential roundabout	Signalized corridor. Back-ups on TH 22/169 overflowing into adjacent intersection (Jefferson Ave). Signal coordination and potential for roundabout on TH 22. High priority for District. 2021-22 Project planned.
D7-9	US 14	Essig	Sleey Eye	089+00.080	095+00.536	6.456	4	8	10	3	2	1	1	0	0	5.23				Location was not reviewed at workshop	
D7-10	US 71	I 90	I 90	009+00.924	009+00.987	0.063	2	9	0	8	10	2	1	0	0	5.04		x		Speeds are lower. Could be related to tourist traffic to Okoboji.	
M MPO-1	MN 22	TH 14	Victory Dr	-	-	-	10	8	10	10	0	2	1	0	0	7.24				MPO project.	
M MPO-2	MN 22	CSAH 57	CSAH 21	-	-	-	3	7	0	4	4	4	1	0	0	3.46				MPO project.	
M MPO-3	US 14	Riverfront Dr	Riverfront Dr	-	-	-	7	4	0	2	0	9	1	0	10	3.16				MPO project.	
M MPO-4	US 14	CSAH 5	CSAH 5	-	-	-	8	4	0	2	0	9	1	0	10	3.36				MPO project.	
M MPO-5	MN 22	Victory Dr	Victory Dr	-	-	-	9	8	10	7	0	1	1	0	0	6.53				MPO project.	
M MPO-6	MN 22	Augusta Dr	Augusta Dr	-	-	-	6	7	0	4	0	1	1	0	0	3.28				MPO project.	
M MPO-7	US 14	US 169	US 169	-	-	-	8	6	0	5	2	9	2	0	10	4.53				MPO project.	

Mobility Only Problem Areas

District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)
D7-M1	MN 15	I 90	CSAH 38	012+00.480	016+00.226	3.746
D7-M2	US 71	CSAH 14	CSAH 4	001+00.505	008+00.885	7.38

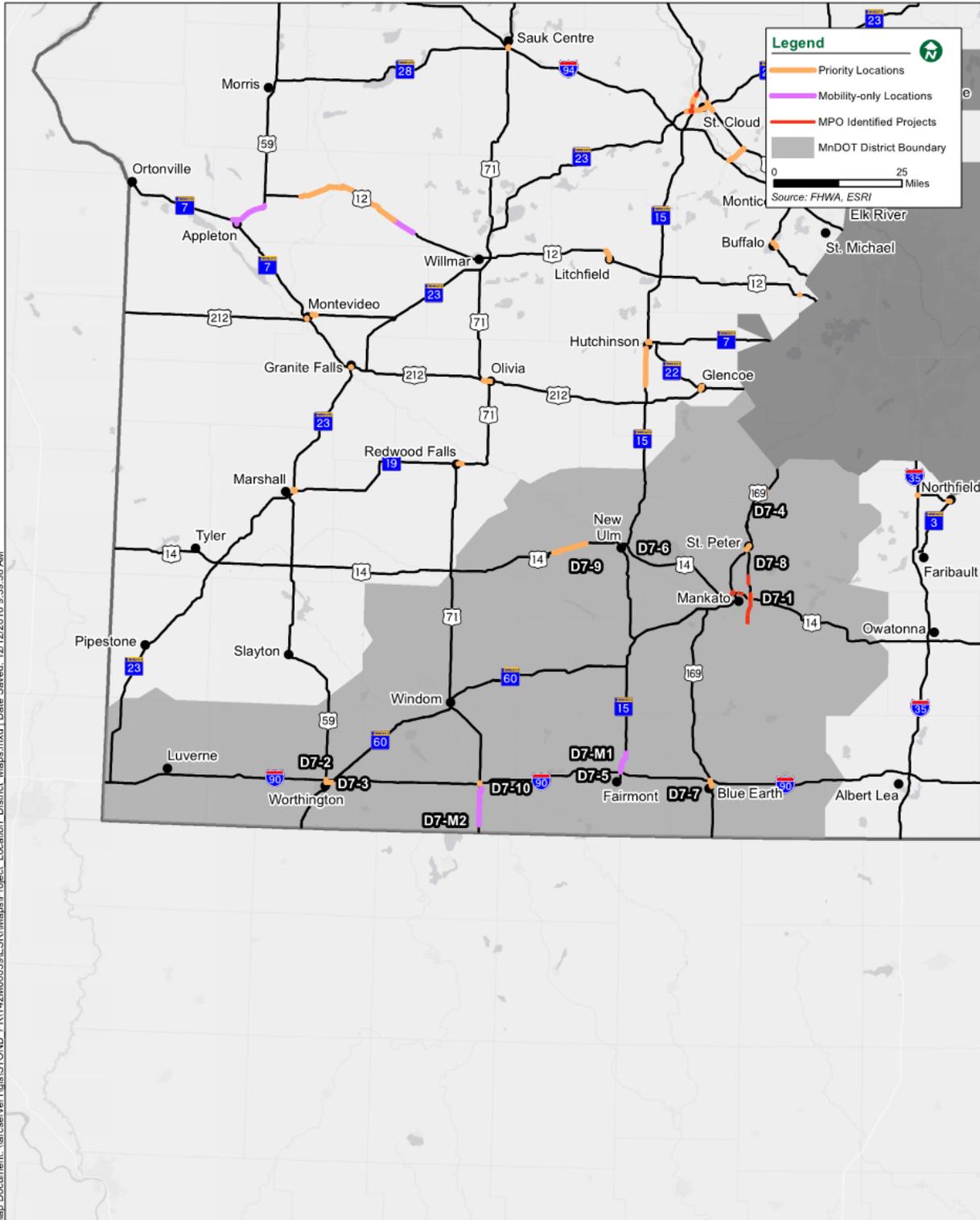
Removed Projects

District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	Reason Removed
-	US 169	US 14	US 14	055+00.486	056+00.900	1.414	Updated Scoring
-	US 169	CSAH 90	Belgrade Ave	052+00.634	054+00.273	1.639	Updated Scoring
-	US 14	US 169	US 169	129+00.582	130+00.233	0.651	Updated Scoring
D7-2	MN 60	I 90	US 59	011+00.164	012+00.380	1.216	District Feedback
D7-5	MN 15	CSAH 26	I 90	010+00.473	012+00.480	2.007	District Feedback
D7-6	US 14	MN 15	CSAH 21	104+00.308	104+00.333	0.025	District Feedback

$$\text{LOTR} = \frac{\text{80th Percentile TT}}{\text{50th Percentile TT}}$$

$$\text{Speed Index} = \frac{\text{Historic Average Speed}}{\text{Posted Speed}}$$

Figure 12. District 7 Scoring Results Map



District 7 Location Fact Sheet



Location Map – Project D7-1 Mankato, Blue Earth/Nicollet/Le Sueur County



Overall Weighted Score: **7.22**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Location Description:

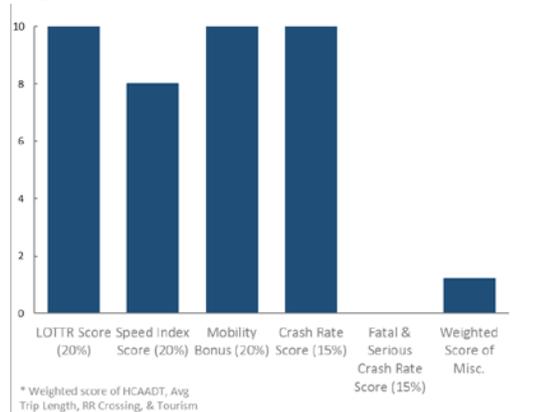
Four lane divided roadway with entrance/exit ramp on west side. Signalized intersection to east. Access point located in between.

District Input:

Operations and safety issues at TH 22/Augusta; LOS at TH 22/CSAH 26. No signal coordination on corridor. District has a 2023 pavement preservation project planned. MnDOT and MAPO have TH 22 study currently underway and will provide recommendations on improvements.

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D7-3 Worthington, Nobles County



Overall Weighted Score: **6.76**

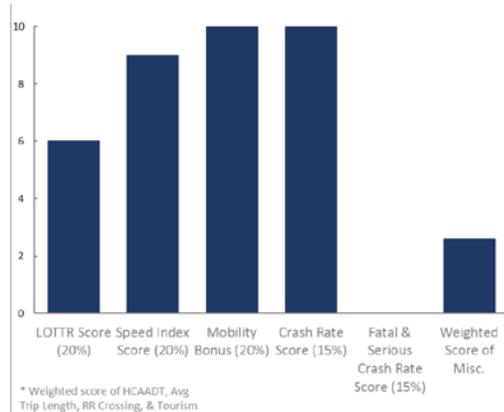
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



Location Description:

Four lane divided urban roadway with designated left turn lanes at intersections. Bike lane on the east-west segment of the roadway. Multiple access points through town. Couple signalized intersections.

District Input: 2027 project planned. Current study underway. Roundabout operates best but not viable due to business impacts. Traffic signals are likely to stay. Frontage Road proximity to highway an issue - limited stacking distance. Focus on access management. Study will recommend improvements.

Potential Follow-Up: Input for planned project





Location Map – Project D7-4 Le Sueur, Le Sueur County



Overall Weighted Score: **6.41**

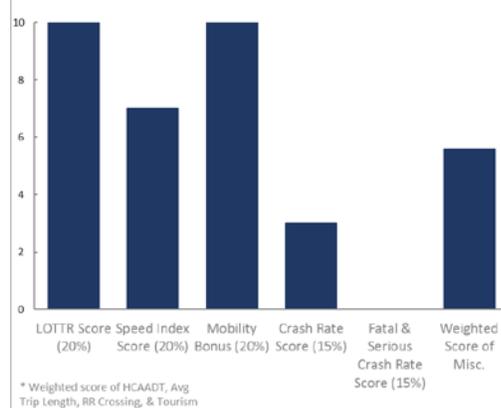
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

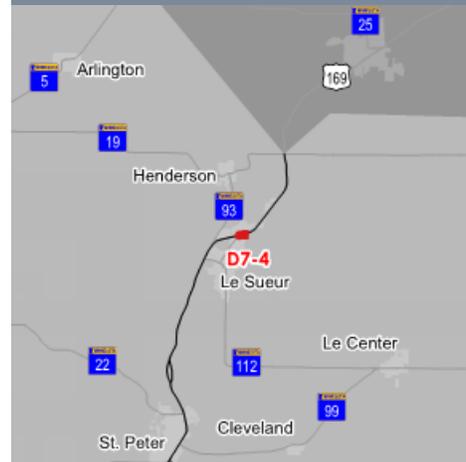


Location Description:

Four lane divided highway at merge zone.

District Input: District aware of issue but not District's highest priority. Considering extension of acceleration lanes.

Potential Follow-Up: None





Location Map – Project D7-7 Blue Earth, Blue Earth County



Overall Weighted Score: **5.69**

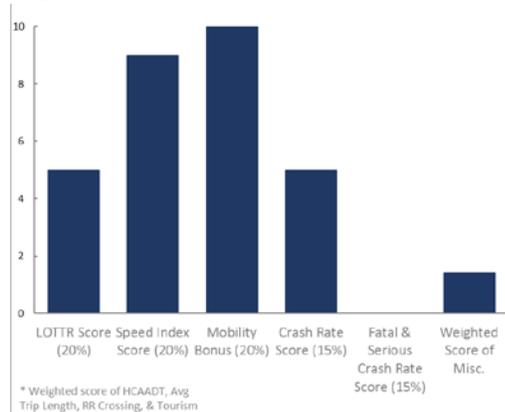
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

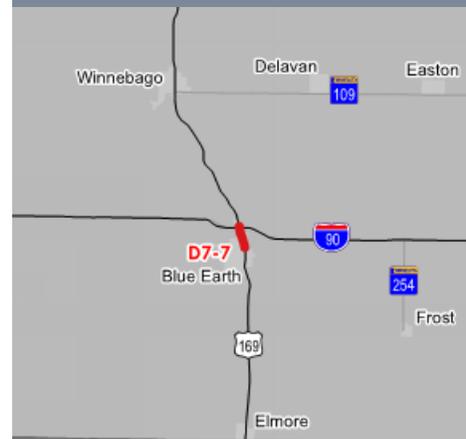


Location Description:

Divided four lane highway with several access points and two roundabouts.

District Input: None

Potential Follow-Up: None





Location Map – Project D7-8 St Peter, Nicollet County



Overall Weighted Score: **5.52**

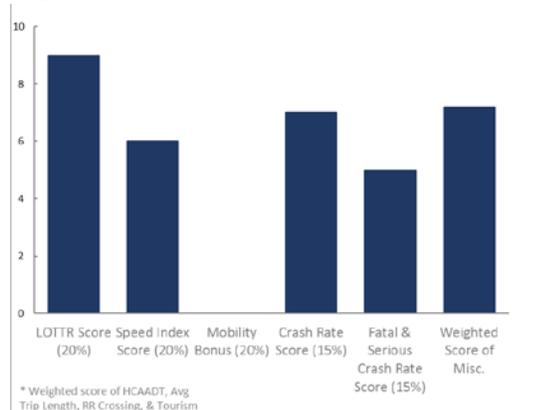
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

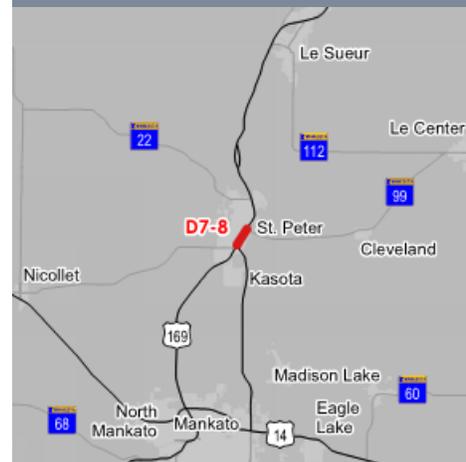


Location Description:

Divided four lane urban roadway with designated left turn lane. Street parking on both side with bumpouts at signalized/unsignalized intersections in downtown. Multiple access points.

District Input: Signalized corridor. Back-ups on TH 22/169 overflowing into adjacent intersection (Jefferson Ave). Signal coordination and potential for roundabout on TH 22. High priority for District. 2021-22 project planned.

Potential Follow-Up: Input for planned project





Location Map – Project D7-9 Essig and Sleepy Eye, Brown County



Overall Weighted Score: **5.23**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

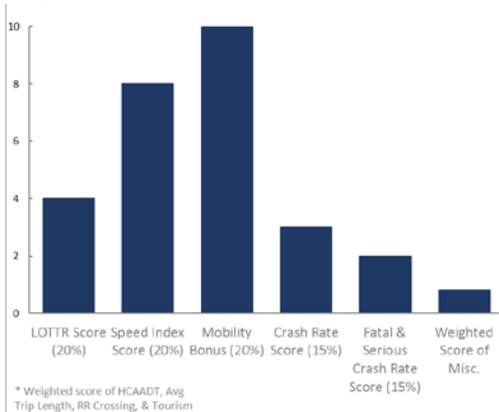
² Segment considered slow if Speed Index is less than 0.9

Location Description:
Two lane road with wide shoulders and occasional access points.

District Input: None

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D7-10 Jackson, Jackson County



Overall Weighted Score: **5.04**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

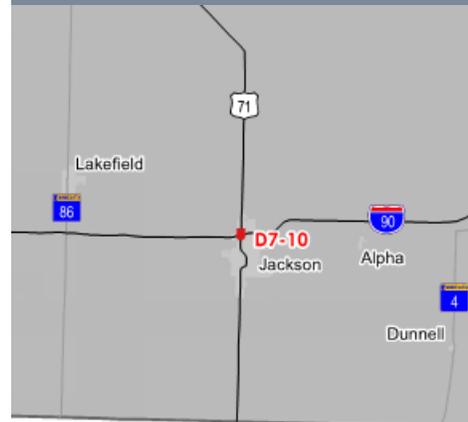
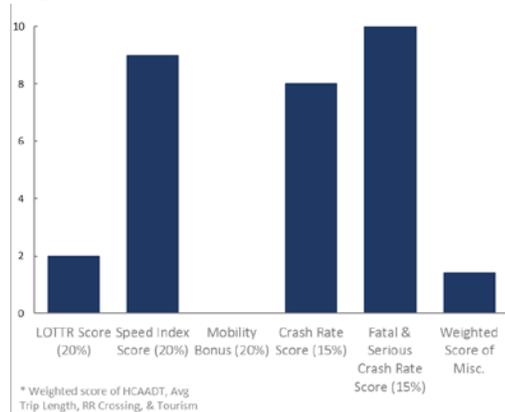
Location Description:

Divided four lane highway with wide shoulders and unsignalized exit/entrance ramps to interstate.

District Input: Speeds are lower. Could be related to tourist traffic to Okoboji.

Potential Follow-Up:
Additional study needed

Figure 2: Evaluation Criteria Scores



3.2.7 District 8 Study Results



District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	LOTTR Score (20%)	Speed Index Score (20%)	Mobility Bonus (20%)	Crash Rate Score (15%)	Fatal & Serious Crash Rate Score (15%)	HCAADT Score (6%)	Average Trip Length Score (2%)	Railroad Crossing Score (1%)	Tourism Score (1%)	Overall Weighted Score (100%)	Standalone Project	Input for Planned Project	Additional Study Needed	Potential Solution	Notes
D8-1	MN 7	MN 15	CSAH 7	141+00.970	142+00.293	0.323	10	8	10	10	10	2	1	0	0	8.74			x	Signal timing Access management	2 signals along corridor. Lots of access. Issues more associated with MN 15 intersections
D8-2	MN 19	MN 23	MN 23	036+00.422	036+00.513	0.091	6	8	10	10	10	1	1	0	0	7.88	x			Potential intersection redesign (for left turns)	At-grade signalized intersection. 20,000 ADT. Top 3 intersection in District. Speed concerns. Recent safety assessment completed.
D8-3	MN 23	MN 19	MN 19	074+00.973	075+00.075	0.102	5	8	10	10	10	2	1	0	0	7.74	x			Potential intersection redesign (for left turns)	At-grade signalized intersection. 20,000 ADT. Top 3 worst intersection in District. Speed concerns. Safety assessment concluded few potential solutions available.
D8-5	MN 19	MSAS 105	CSAH 101	072+00.491	073+00.245	0.754	6	8	10	7	8	2	1	0	10	7.29		x		2019 Project	2019 project adding TWCLTL & signal improvements.
D8-6	US 12	Downtown Litchfield	MN 22	098+00.756	100+00.776	2.02	6	9	10	5	4	2	1	0	0	6.49			x	Additional study	Slow moving. Lots of truck traffic.
D8-7	MN 22	Glencoe	Glencoe	107+00.023	107+00.693	0.67	5	9	10	10	0	2	0	0	0	6.42			x	2019 Study	2019 study is planned
D8-8	MN 29	MN 7	US 212	000+00.000	000+00.223	0.223	4	9	10	10	0	2	1	0	0	6.24			x	Additional study Intersection improvements	Previous construction near segment could be influencing data. Intersection improvements may help.
D8-9	MN 7	CSAH 15	CSAH 15	074+00.962	075+00.174	0.212	7	8	10	7	0	2	1	0	0	6.19			x	Additional study	Lots of heavy commercial traffic. Needs further study to understand issues.
D8-10	MN 15	CSAH 3	MSAS 101 (Lynn Rd SW)	093+00.019	100+00.231	7.212	5	8	10	4	5	2	1	0	0	6.09		x		2020 Project Signal modifications Geometric improvements	2020 five block reconstruction planned. Narrow lanes and signal improvements.
D8-12	MN 7	CSAH 41	CSAH 41	074+00.449	074+00.541	0.092	5	8	10	8	0	2	1	0	0	5.94	x			Signal modifications	
D8-14	MN 22	US 212	US 212	106+00.630	106+00.680	0.05	2	10	0	10	10	2	0	0	0	5.52			x	Additional study	2019 study planned through Glencoe
D8-15	US 212	MN 23	MN 23	049+00.073	049+00.120	0.047	3	8	0	10	10	2	2	0	10	5.46					
D8-16	MN 23	US 212	US 212	103+00.337	103+00.369	0.032	3	8	0	10	10	2	0	0	10	5.42					
D8-17	US 212	US 71	US 71	075+00.583	076+00.660	1.077	5	8	10	1	0	4	2	0	0	5.03			x	Additional study Green-T opportunity	Heavy truck traffic. Ag/Freight - U of M Study concluded this was one of busiest areas in region.

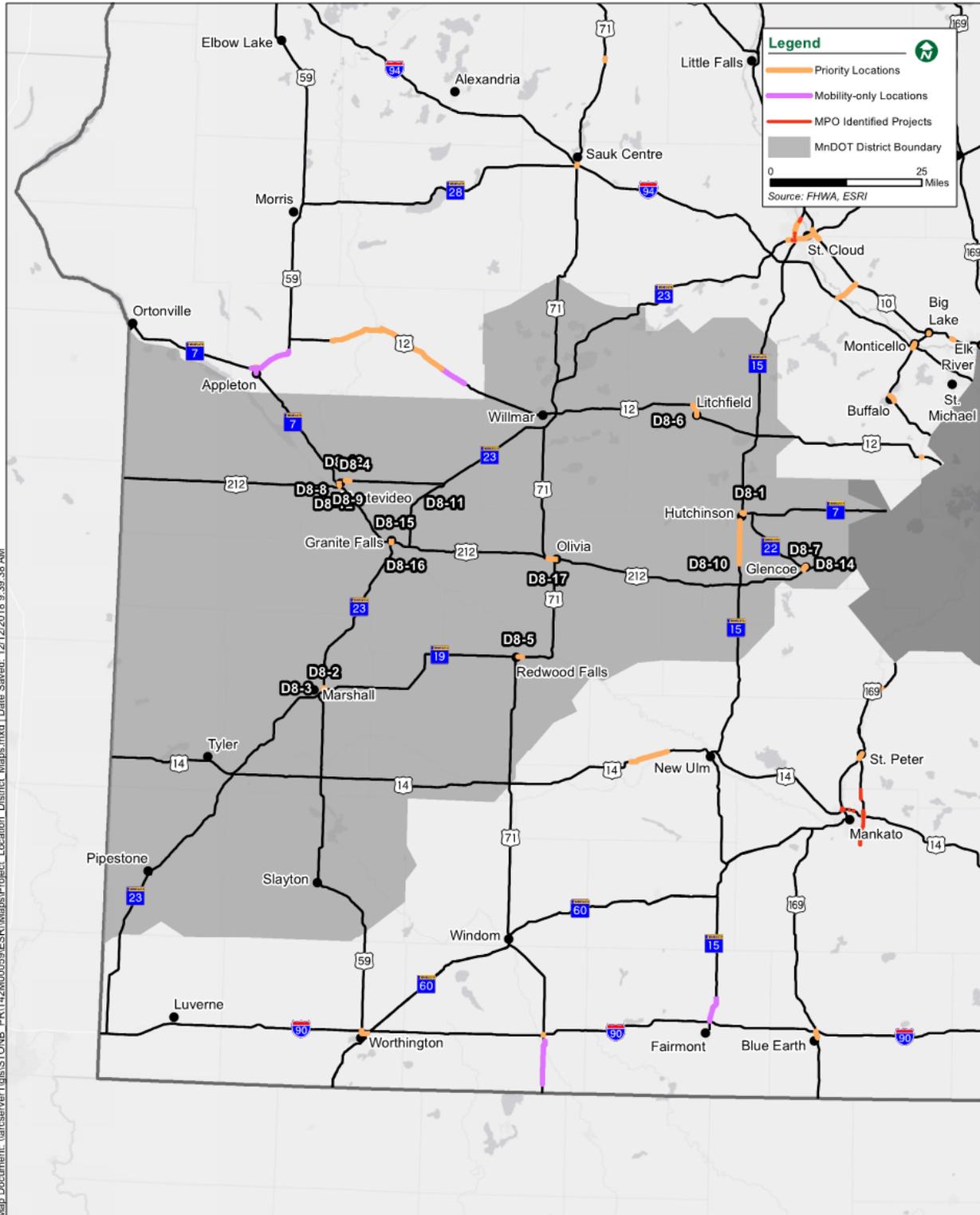
Removed Projects

District Rank	Route	From Intersection	To Intersection	From Reference Point	To Reference Point	Length (Miles)	Reason Removed
-	US 12	Downtown Willmar	Downtown Willmar	072+00.658	073+00.775	1.117	Updated Scoring
D8-4	MN 7	CSAH 15	MN 29	071+00.571	072+00.615	1.044	District Feedback
D8-11	MN 7	MN 23	MN 23	090+00.754	090+00.887	0.133	District Feedback
D8-13	MN 7	N 8th St	N 11th St	073+00.934	074+00.109	0.175	District Feedback

$$LOTTR = \frac{80th\ Percentile\ TT}{50th\ Percentile\ TT}$$

$$Speed\ Index = \frac{Historic\ Average\ Speed}{Posted\ Speed}$$

Figure 13. District 8 Scoring Results Map



Map Document: \\arcserver1\gis\STONB_PRT\42M00059\ESRI\Maps\Project_Location_District_Maps.mxd | Date Saved: 12/12/2018 9:39:38 AM

District 8 Location Fact Sheets



Location Map – Project D8-1 Montevideo, Chippewa County



Overall Weighted Score: **8.74**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

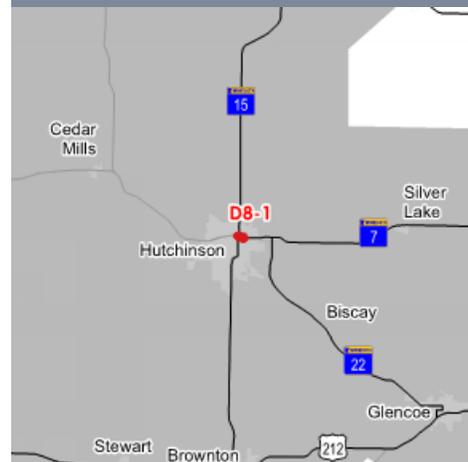
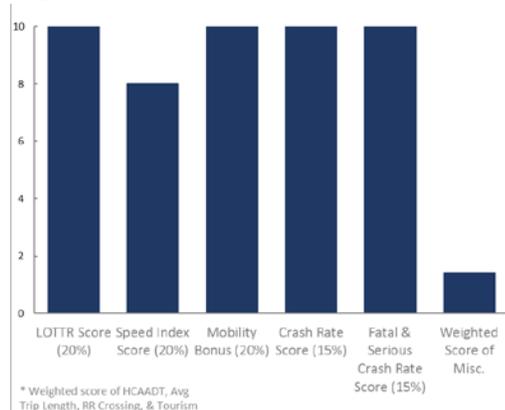
Location Description:

Two lane road with center turning lane and wide shoulders. Many access points and few designated turn lanes.

District Input: None

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores





Location Map – Project D8-2 Marshall, Lyon County



Overall Weighted Score: **7.88**

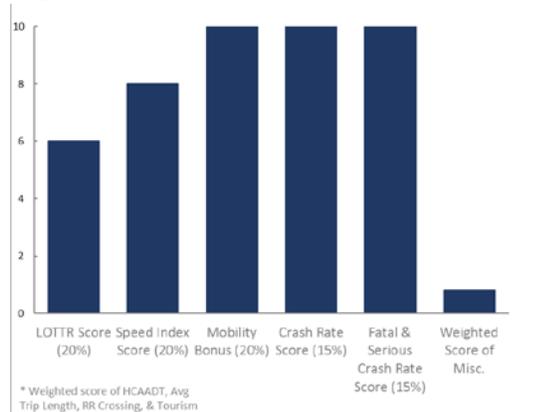
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



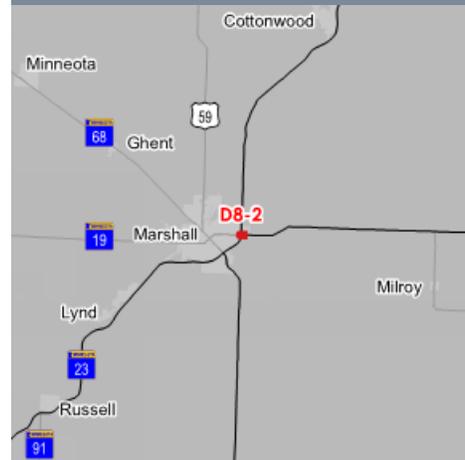
Location Description:

At-grade signalized intersection with 20,000 ADT.

District Input: Top 3

intersection in District. Speed concerns. Recent safety assessment completed.

Potential Follow-Up: Input for planned project.





Location Map – Project D8-3 Marshall, Lyon County



Overall Weighted Score: **7.74**

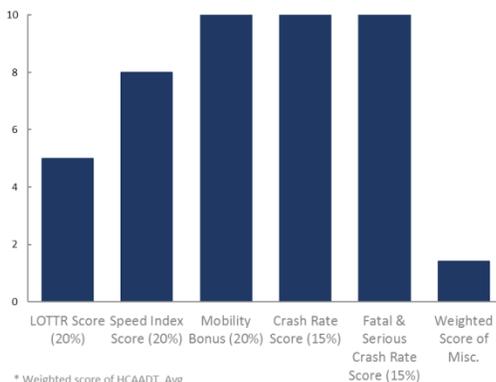
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



* Weighted score of HCAADT, Avg Trip Length, RR Crossing, & Tourism

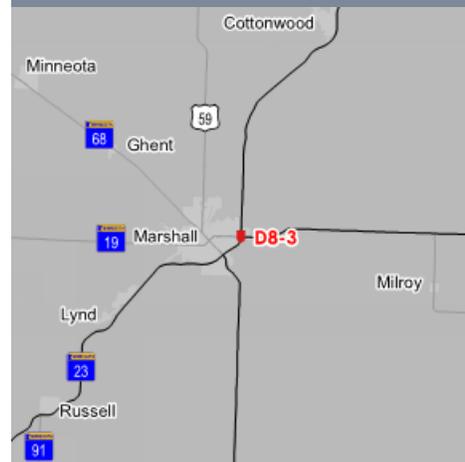
Location Description:

At-grade signalized intersection. 20,000 ADT.

District Input:

Top 3 worst intersection in District. Speed concerns. Safety assessment concluded few potential solutions available.

Potential Follow-Up: None





Location Map – Project D8-5 Redwood Falls, Redwood County



Overall Weighted Score: **7.29**

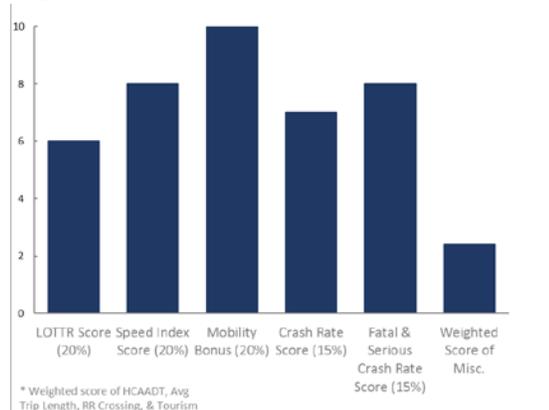
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

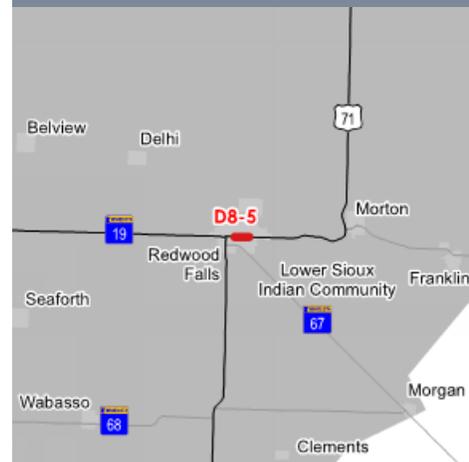


Location Description:

Two lane highway with many access points and wide shoulder.

District Input: 2019 project adding TWCLTL & signal improvements.

Potential Follow-Up: Input for planned project





Location Map – Project D8-6 Litchfield, Meeker County



Overall Weighted Score: **6.49**

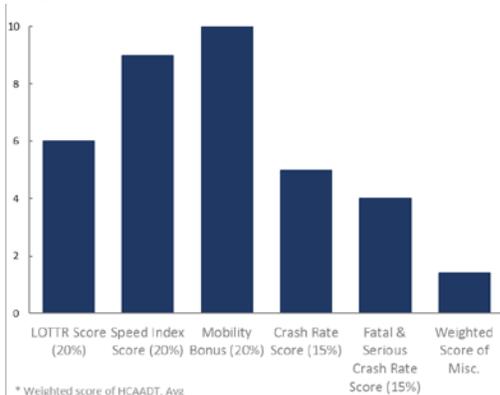
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



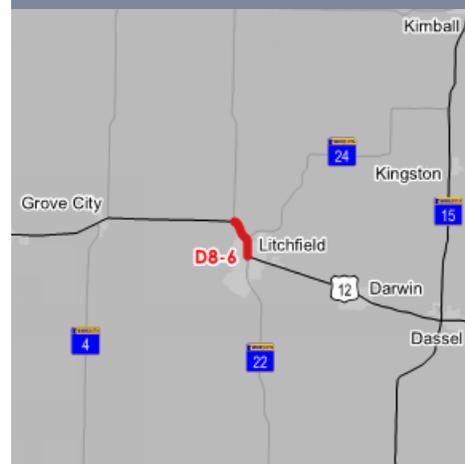
* Weighted score of HCAADT, Avg Trip Length, RR Crossing, & Tourism

Location Description:

Two lane inner city roads, signalized intersections, no shoulders.

District Input: Slow moving. Lots of truck traffic.

Potential Follow-Up: Additional study needed





Location Map – Project D8-7 Glencoe, McLeod County



Overall Weighted Score: **6.42**

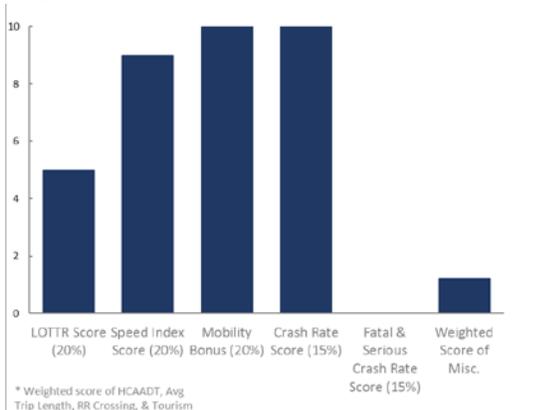
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

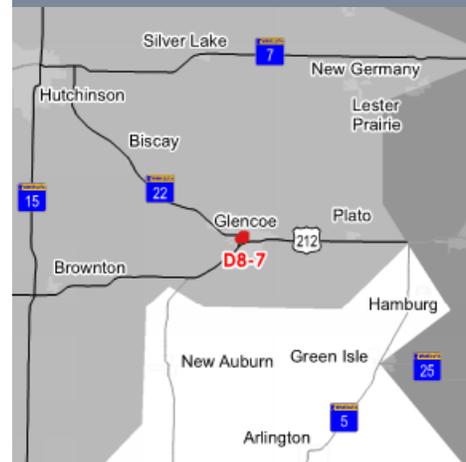


Location Description:

Road goes through town and connects to highway.

District Input: 2019 study is planned.

Potential Follow-Up: Additional study needed





Location Map – Project D8-8 Montevideo, Chippewa County



Overall Weighted Score: **6.24**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

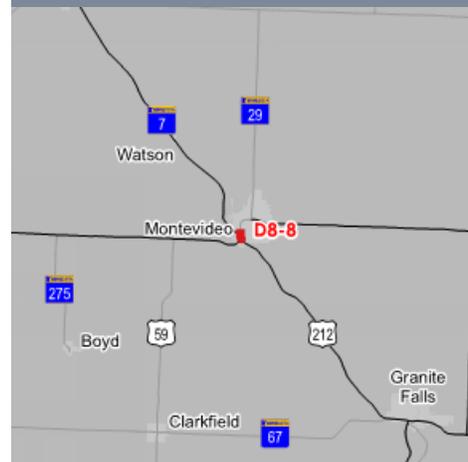
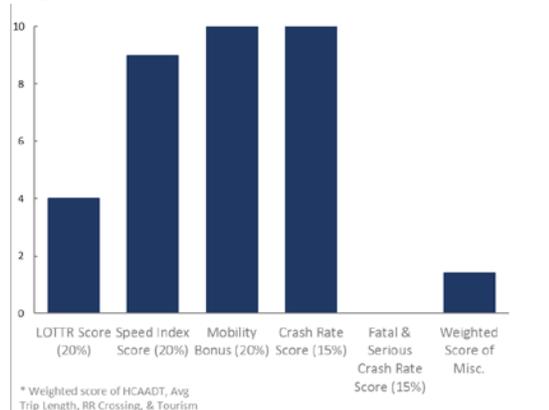
Location Description:

Two-lane roadway between a signalized and unsignalized intersection.

District Input: Previous construction near segment could be influencing data. Intersection improvements may help.

Potential Follow-Up:
Additional study needed

Figure 2: Evaluation Criteria Scores





Location Map – Project D8-9 Montevideo, Chippewa County



Overall Weighted Score: **6.19**

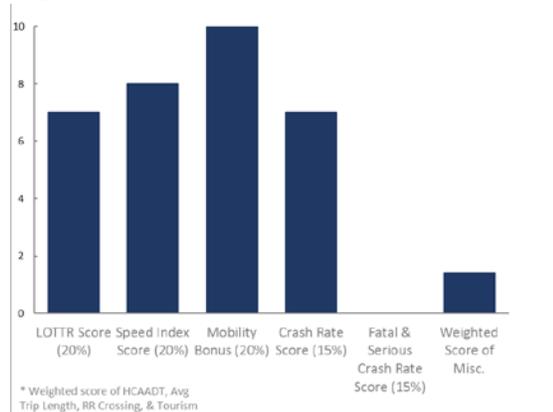
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	OK	OK
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	OK

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

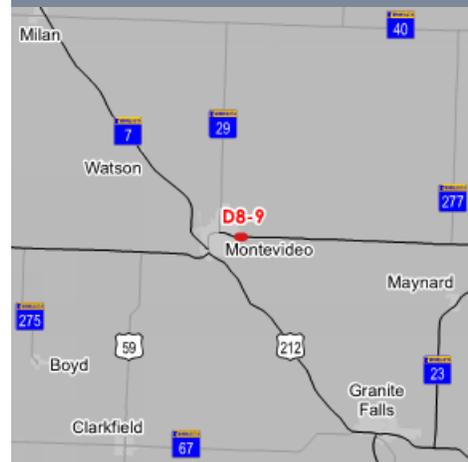


Location Description:

Four lanes of traffic, many access points. No shoulder for much of section.

District Input: Lots of heavy commercial traffic. Needs further study to understand issues.

Potential Follow-Up: Additional study needed





Location Map – Project D8-10 Hutchinson, McLeod County



Overall Weighted Score: **6.09**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

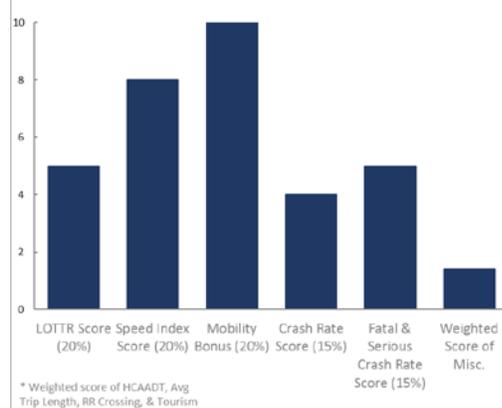
Location Description:

Two lane road, part divided, with designated turn lanes, wide shoulders, and many intersections and access points.

District Input: None.

Potential Follow-Up: Input for planned project

Figure 2: Evaluation Criteria Scores





Location Map – Project D8-12 Montevideo, Chippewa County



Overall Weighted Score: **5.94**

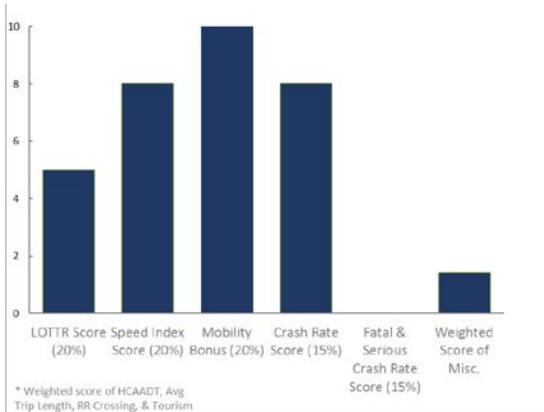
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

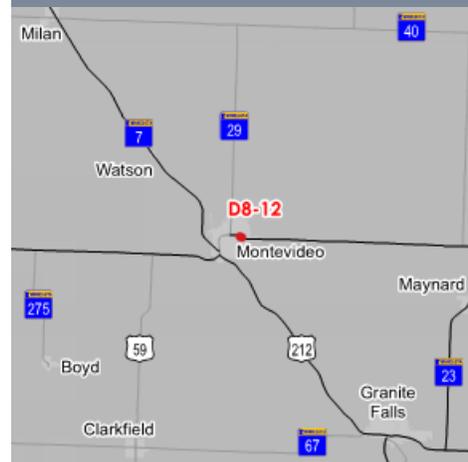
Figure 2: Evaluation Criteria Scores



Location Description:
Signalized intersection with designated turning lanes.

District Input: None

Potential Follow-Up: None





Location Map – Project D8-14 Glencoe, McLeod County



Overall Weighted Score: **5.52**

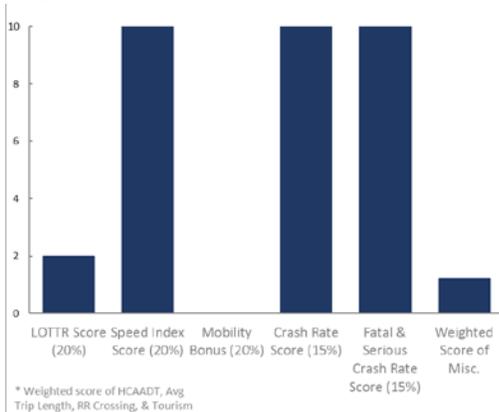
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Unreliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores

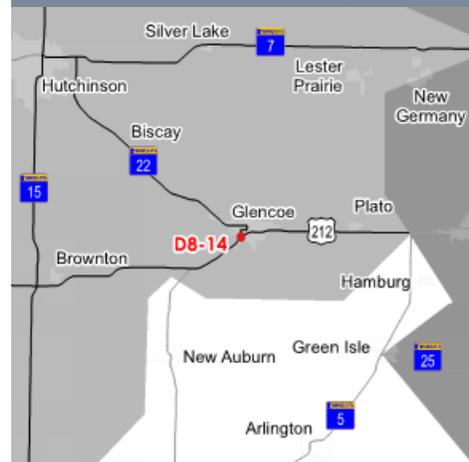


Location Description:

Two lane roadway with wide shoulders intersecting with a four-lane divided highway and a frontage road access.

District Input: 2019 study planned through Glencoe.

Potential Follow-Up: Additional study needed.





Location Map – Project D8-15 Granite Falls, Chippewa County



Overall Weighted Score: **5.46**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

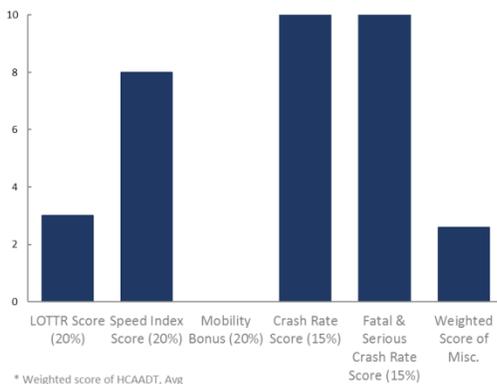
Location Description:

Two- or three-lane highway, occasional access points, wide shoulders on two lane portions.

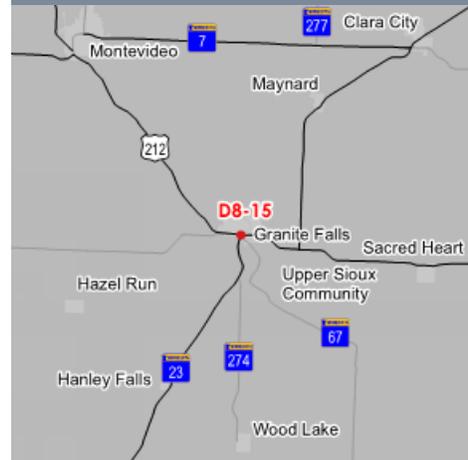
District Input: None

Potential Follow-Up: None

Figure 2: Evaluation Criteria Scores



* Weighted score of HCAADT, Avg Trip Length, RR Crossing, & Tourism





Location Map – Project D8-16 Granite Falls, Chippewa County



Overall Weighted Score: **5.42**

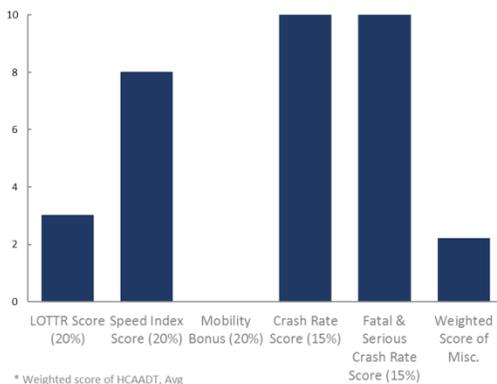
Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Speed Index ²
Weekday	6a-10a	Reliable	OK
Weekday	10a-4p	Reliable	OK
Weekday	4p-8p	Reliable	Slow
Weekend	6a-8p	Reliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Figure 2: Evaluation Criteria Scores



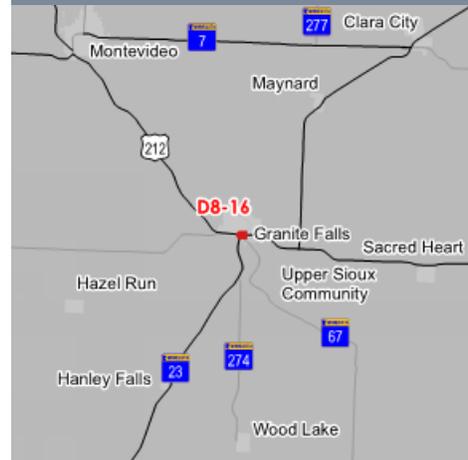
* Weighted score of HCAADT, Avg Trip Length, RR Crossing, & Tourism

Location Description:

Two- and three-lane highway, wide shoulder on two-lane portion. Few access points.

District Input: None

Potential Follow-Up: None





Location Map – Project D8-17 Olivia, Renville County



Overall Weighted Score: **5.03**

Figure 1: Mobility and Reliability Summary

		Travel Time Reliability ¹	Index ²
Weekday	6a-10a	Unreliable	Slow
Weekday	10a-4p	Reliable	Slow
Weekday	4p-8p	Unreliable	Slow
Weekend	6a-8p	Unreliable	Slow

¹ Segment considered unreliable if Level of Travel Time Reliability index is greater than 1.5

² Segment considered slow if Speed Index is less than 0.9

Location Description:

Five-lane roadway with shared center left-turn lane in the downtown environment. Two lane roadway with wide shoulders outside of downtown. Multiple access points.

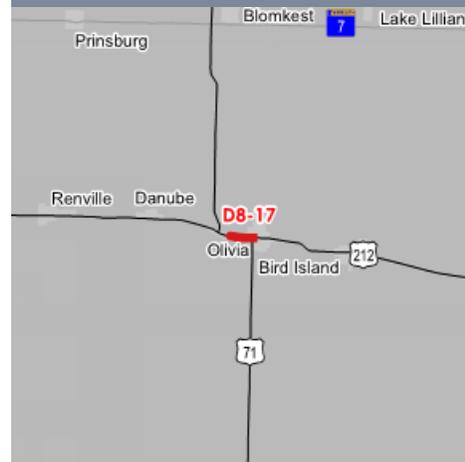
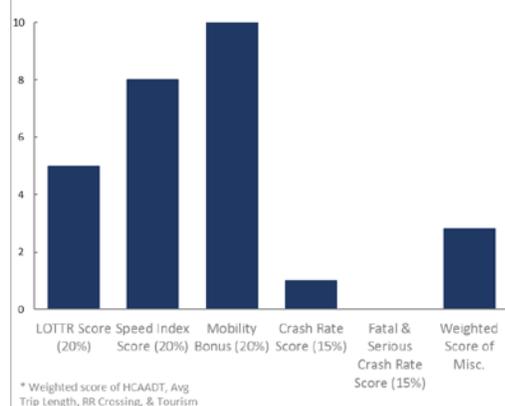
District Input:

Heavy truck traffic. Ag/Freight - U of M Study concluded this was one of busiest areas in region.

Potential Follow-Up:

Additional study needed

Figure 2: Evaluation Criteria Scores



4 Toolbox of Solutions

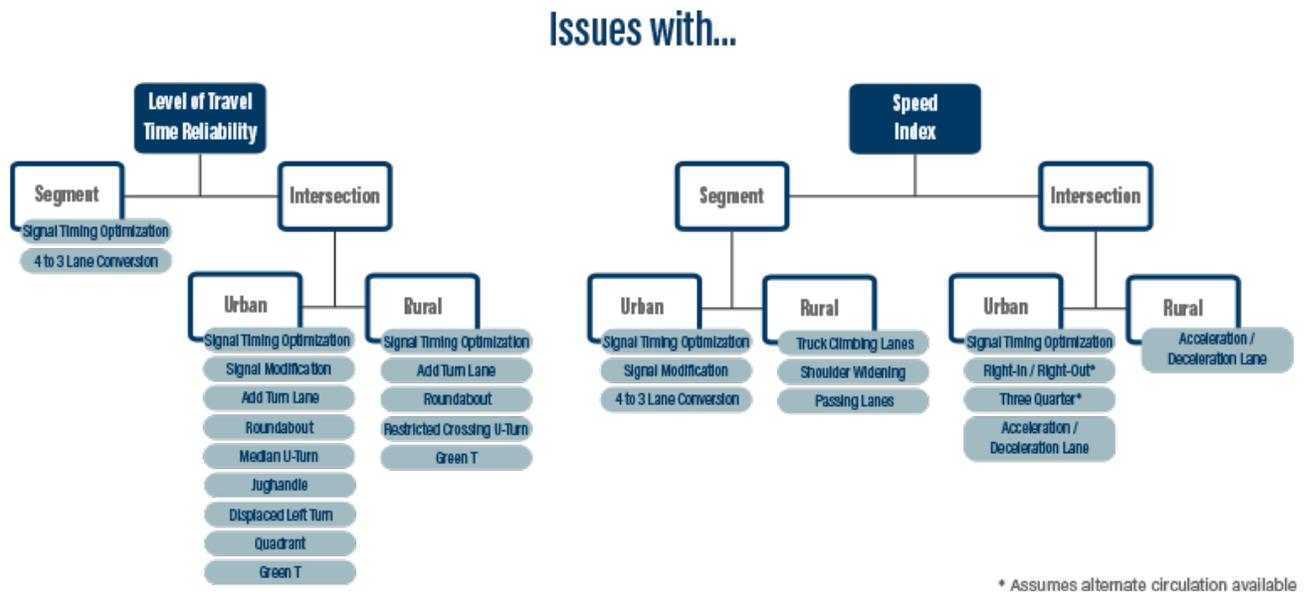
Since the intent of the study is to identify low-cost, high-benefit type solutions for Greater Minnesota vehicle and freight mobility challenges, the PMT wanted to influence future project scoping decisions accordingly. A toolbox of solutions was developed to display intersection and segment alternatives to enhance mobility, with the focus on lower-cost solutions. Expansion and grade-separation alternatives were not included as those fixes fall outside the scope of the study and funding allocation for the Greater Minnesota Mobility investment category.

The toolbox is organized by problem area type: intersection or segment. Within these categories, the following potential solutions are identified and described at a high-level with pros, cons, and situations where they may best be applied. The following solutions are included, and a complete toolbox is attached in **Appendix B**.

Intersection	Segment
Signal Timing Optimization	Truck Climbing Lanes
Signal Modifications	Shoulder Widening
Add Turn Lane	Passing Lanes
Right in/Right Out	Access Management
Three Quarter	
Acceleration/Deceleration	
Roundabout	
Restricted Crossing U-Turn (RCUT)	
Median U-Turn	
Jughandle	
Displaced Left Turn	
Offset T	
Quadrant	
Green T	

Additionally, these solutions were added to a flow chart as a guide to implement potential solutions based on particular mobility and reliability results based on the data presented in this study. See **Figure 14**. The application of a solution certainly needs additional consideration than what is provided at this level of analysis, however this can help guide the realm of possibility before detailed analysis is completed.

Figure 14. Solutions Toolbox Flow Chart



5 Study Limitations

Due to the scale of the study and data sources used there are known limitations that should be discussed.

1. **Study Scale** – Since approximately 4,750 centerline miles of roadway were part of the analysis area, more traditional and/or detailed analysis of the system was not possible given the study budget, schedule, or available data. For example, more detailed analysis of intersections typically requires specific site data such as turning movement counts. Data in this format for the study area was not already available and not feasible to collect. This limitation is present in the higher-level nature of the priority location documentation, especially relative to exact problems and potential solutions.
2. **Data Sources** – The main source of mobility data utilized was from NPMRDS. Characteristics and issues of this data that posed limitations are as follows:
 - a. The data is originally obtained from cell phone companies, truck fleets, GPS equipment, etc. Actual quality and sources of the data for each TMC segment is not disclosed – therefore the reliability of the data is unknown.
 - b. The TMC segmentation the data is provided and cannot be edited. This became an issue along rural stretches of roadway which were comprised of TMCs many miles in length. The Advisory Committee and representatives at the District Workshops felt that, at times, this washed out smaller/more discrete problem areas. Some of this could have been supplemented with StreetLight data, however at the time when this became known, the StreetLight data contract expired and the project team could no longer access the tool.

- c. In some cases, NPMRDS did not have data along certain stretches of the NHS. The team utilized Streetlight data to fill these gaps. It is unclear how data between each platform differs from the other, but had to be used simultaneously as a result of data gaps.

6 Role of the Study in Future Planning

The Study's key inputs for future planning will be to support local planning, the State Highway Investment Plan (MnSHIP), and related MnDOT funding programs. The work will also help guide the right-sizing of proposed projects and provide background for other plans and for transportation policy initiatives.

6.1 Incorporate Study Findings into Transportation Policy and Investment Plans

The results of the Greater Minnesota Mobility study will be used to select projects on the state highway system and will inform the next update of MnSHIP. As part of the MnSHIP planning process completed in 2017, MnDOT created the Greater Minnesota Mobility investment category. This category replaced the IRC Mobility category. The plan designated the NHS as the priority network for mobility investment in Greater Minnesota and retired the IRC system. MnSHIP identified \$26 million for Greater Minnesota mobility investments. Locations identified as part of this study, and locations identified in MPO long-range plans, are eligible for these investments. Once districts select a location for funding, that project will be listed in the STIP or CHIP.

This study's methodology will be the basis for the greater Minnesota mobility needs assessment in MnSHIP when the plan is updated in 2022 or 2023. MnDOT will use the most recent data at that time.

6.2 Support Project Funding Decisions

As part of MnSHIP, MnDOT created, and provided funding for, the Greater Minnesota mobility investment category. However, the plan did not define eligible locations or uses of that investment category. The Greater Minnesota Mobility Study was used to answer these questions. MnDOT, in coordination with the study's advisory committee, identified the eligible uses of funding, how the funds would be distributed, and the project selection and scoring process.

6.2.1 Use of Funding

Greater Minnesota mobility funds are limited to locations identified as part of this study (**Section 3**), and locations identified on the NHS in MPO long-range plans. Projects will focus on low-cost, high benefit improvements as highlighted in the Toolbox of Solutions. Area or corridor studies are also eligible uses of these funds.

6.2.2 Distribution of Funds

The Greater Minnesota mobility funds will be distributed to the districts based on their share of vehicle miles traveled (VMT) on the NHS as outlined in **Table 12**. The advisory committee viewed this as the fairest way to distribute mobility funds throughout the state. The Metro district has its own mobility investment category and was not included in this distribution.

Table 12. Greater Minnesota Mobility Funds Distribution

District	NHS VMT	Share of Greater MN VMIT	Mobility Funds Per Year
D1	1.96 B*	14%	\$1,799,000
D2	0.77 B	6%	\$771,000
D3	3.98 B	29%	\$3,726,500
D4	1.57 B	11%	\$1,413,500
D6	2.89 B	21%	\$2,698,500
D7	1.53 B	11%	\$1,413,500
D8	1.09 B	8%	\$1,028,000
Total	13.79 B	100%	\$12,850,000

*B = billion miles

6.2.3 Project Selection

Projects for the Greater Minnesota mobility investment category will be identified and selected by MnDOT district staff. The process to select these projects will adhere to MnDOT’s recently adopted [project selection policy](#). The new process, mandated by the legislature, requires MnDOT to score all highway projects in the STIP. For greater Minnesota mobility projects, MnDOT will use the quantitative score developed for this study as described in Chapter 2. In some cases, MnDOT may add a mobility improvement onto a pavement or bridge project. In that case, the project’s pavement or bridge score will be used to score the project. Area or corridor studies using greater Minnesota mobility funds will not be scored.

6.3 Provide a Reference for Local and Regional Planning

The Study may provide guidance for local transportation and corridor planning. For example, it could be referenced to support transportation planning and project strategies used by MPO, counties and cities in local transportation or comprehensive plans.

6.4 Future Updates to the Study’s Analysis and Priority Locations

For the Greater Minnesota Mobility study, MnDOT and the consultant team implemented a repeatable process that can be periodically updated in whole or in part. The advisory committee preferred to treat the two years of funding (2022-2023) as pilots for implementing this study. After these projects have been selected and programmed, MnDOT will look at updating the study with new data. At a minimum, MnDOT will update the study data prior to the MnSHIP update.

MnDOT district staff also expressed a desire to use the same data sets to measure the effectiveness of projects after they have been completed. The Office of Transportation System Management will track these projects periodically to analyze changes to mobility, reliability, and safety at the project locations. OTSM will develop a methodology for how to track these project benefits.

Appendix A: Advisory Committee Minutes



ADVISORY COMMITTEE MEETING

Friday, December 8, 2017

1:00 – 3:00 PM

MEETING SUMMARY

ATTENDEES

John Welle, Aitkin County	Brad Estochen, MnDOT
Duane Hill, MnDOT D1 (Phone)	Michael Corbett, MnDOT
James Curran, MnDOT D2	Thomas Styrbicki, MnDOT
James Hallgren, MnDOT D3	Shaker Rabban, MnDOT
Steve Voss, MnDOT D3	Brad Utecht, MnDOT
Mary Safgren, MnDOT D4	Sheila Kauppi, MnDOT
Ronda Allis, MnDOT D6	Tim Ardvison, Stonebrooke Engineering
Susann Karnowski, MnDOT D8	Chris Chromy, Bolton & Menk
Edward Idzorek, MnDOT	Angie Bersaw, Bolton & Menk
Nicole George, MnDOT	Ross Tillman, Bolton & Menk
Paul Czech, MnDOT Metro (Phone)	

1. Introductions

Angie asked each person on the Advisory Committee to introduce themselves.

Angie provided background on the need for the study and reviewed the study goal. All meeting handouts and the presentation are attached for reference.

Paul Czech stated the study’s focus on the National Highway System (NHS) may miss some of the bigger transportation issues in Greater Minnesota which are likely not on the NHS system. Brad said that may be true but current MnSHIP investment direction and federal performance measures support the emphasis on NHS in Greater Minnesota for this study at this time.

2. Scope, Schedule and Methodology

Angie reviewed the overall study approach as outlined in the study overview, the study schedule and the role of the Advisory Committee. Ross explained each screening level in detail including the goal, criteria and data to be used.

3. Level 1 Test Case (TH 23)

Chris reviewed a few test segments showing Level 1 screening results on TH 23 between St. Cloud and I-35 and TH 10/371 from St. Cloud to Walker. Committee members that know these corridors felt the results seemed reasonable – the Level 1 Screening did identify mobility and reliability issues as expected on these corridors.

The committee requested Bolton & Menk illustrate the segments analyzed for each corridor and identify issues by direction.

4. Round Robin – Early Study Observations and Specific Concerns

Angie requested input from committee members on the study approach and/or any other specific concerns. The following summarizes Advisory Committee comments provided:

- Need to confirm speed data is accurate. Consider using middle of the day speeds rather than posted speed. Most states are going away from using posted speeds.
- Concern that some areas showing mobility issues are actually related to construction. Bolton & Menk will filter results by removing construction projects included in the STIP.
- Seasonal fluctuations need to be considered. Need to capture the summer tourism season but should exclude winter influences on speed.
- Ensure issues on NHS within communities are not excluded or washed out in segment analysis.
- Why are mobility/reliability issues showing up on interstates? Bolton & Menk to consider the influence heavy commercial trucks may have on interstate speeds.
- Provide screening results to MnDOT Districts for verification. There is a possibility that some districts may not have any high-priority issues and that is ok.
- Safety is a mobility issue and should be considered. A safety measure will be included in the Level 2 analysis.
- Consider transit routes and need for mobility on these routes in the Level 2 analysis.

Angie reported the next Advisory Committee Meeting is anticipated to be held in February.

District Outreach Update: The Project Management Team will send refined Level 1 Screening results to individual districts for verification prior to the next Advisory Committee Meeting.

February 9, 2018 Update

Based on Advisory Committee input and MnDOT staff review, the following changes were incorporated to the Level 1 Screening:

- We have removed data that could have been affected by a roadway or bridge project identified in the STIP data
- We are only using non-winter months (May-Oct) to attempt to avoid data affected by inclement weather
- New data incorporates verified speed limit data – we did not check all miles of the state, but we did look at the areas that were the most suspect in terms of what we were receiving for speed data from NPMRDS compared to the posted speed we were showing.
- We feel keeping the LOTTR threshold at the federal level of **1.5** is still reasonable – we are flagging 223 miles
- In terms of speed index, we modified our method slightly which along with the edits mentioned above has reduced the amount of interstate mileage shown at the 0.95 level. That being said, the **0.90** level removes most of the interstate mileage and retains a good number of areas to look at further in level 2. At 0.90, we are flagging 1,044 miles. We may be picking up data from when the interstates were signed at 65MPH versus 70MPH – using the 0.90 threshold alleviates the problem of us flagging speeds closer to 65MPH.



ADVISORY COMMITTEE MEETING

March 9, 2018

10:00 am – 12:00 pm

MEETING SUMMARY

ATTENDEES

John Welle, Aitkin County	Mark Nelson, MnDOT
Duane Hill, MnDOT D1 (Phone)	Michael Corbett, MnDOT
James Curran, MnDOT D2	Thomas Styrbicki, MnDOT
James Hallgren, MnDOT D3	Shaker Rabban, MnDOT
Steve Voss, MnDOT D3	Brad Utecht, MnDOT
Shiloh Wahl, MnDOT D4 (Phone)	Ross Tillman, Bolton & Menk
Susann Karnowski, MnDOT D8	Kate Miner, Stonebrooke Engineering
Nicole George, MnDOT	Chris Chromy, Bolton & Menk
Edward Idzorek, MnDOT	Angie Bersaw, Bolton & Menk
Brad Estochen, MnDOT	

1. Introductions and Study Recap

Angie provided a brief recap on study progress since the last Advisory Committee Meeting in December 2017.

2. Level 1 Results

Angie stated the goal of the Level 1 screening was to screen out NHS segments with no mobility or reliability issues. She noted Districts were asked to review the Level 1 screening to verify and/or suggest changes to what is carried forward into the Level 2 evaluation based on their local knowledge.

Ross reviewed the Level 1 screening and District input as follows:

- 9,300 total NHS centerline miles studied
- Level 1 screening removed approximately 76% of segments and 87% of the total miles

- District review removed an additional 112 segments and added 24 segments that did not pass the Level 1 screening
- In summary, 940 segments of 1,265 miles are proposed to move on to Level 2 screening

Some Advisory Committee members commented their review of the initial screening results felt subjective since they naturally default to what they know. The Advisory Committee agreed to move all NHS segments into the detailed Level 2 screening to remove this subjectivity.

3. Level 2 Approach

Angie presented draft evaluation criteria for the Advisory Committee's consideration. With the revised approach agreed to earlier, all NHS segments will now be evaluated at one time using the proposed evaluation criteria:

- **Mobility and Reliability** – *Prioritize locations with high variability in travel times and consistent mobility issues.*
 - Level of Travel Time Reliability (LOTTR) – Exhibits a reliability issue based on the 80th percentile travel time/50th percentile travel time
 - Speed Index – Exhibits a mobility issue based on historic average speed/posted speed
 - Exhibits both a LOTTR and Speed Index issue
- **Safety** – *Prioritize locations that have a higher number of crashes and traffic volume as compared to other locations throughout the State*
 - Critical Crash Index – Provides a relative score based on the number of crashes and traffic volume for a segment as compared to similar locations
 - Fatal and Serious Crash Index – Provides a relative score based on the number of fatal and serious injury crashes for a segment
- **System Role and Route Characteristics** – *Prioritize locations that serve the greatest amount of regional trips, freight traffic, and tourism.*
 - Traffic Volume – Total AADT
 - HCAADT – Number of heavy commercial vehicles
 - Trip Length – Average trip length (sum of passenger car and truck data from Streetlight)
 - Rail – Number of trains per day
 - Tourism – Provides access to a state park or is a scenic byway.

The Advisory Committee suggested the following changes:

- Tourism – consider other destinations/events such as casinos and consider a buffer boundary (i.e., within five miles of a casino) for the tourism destination
- Trip length – be clear its an average length measure

Ross reviewed weighting options using the proposed evaluation criteria. The following comments were suggested:

- How often does a location meet LOTTR and Speed Index? Are we double counting with a criteria of “Both LOTTR and Speed Index”? Ross said it is not double counting but does put additional emphasis on locations that meet both.
- Suggestion to weight the safety criteria of critical crash index and fatal and serious crashes equally.
- Should safety be greater?
- This is a mobility/reliability study so that category should receive the highest percentage of points. Should safety be measured at all?
- Suggestion to factor the LOTTR by traffic volumes.
- Give HCADT more weight than the other system role and route characteristic criteria.

The Advisory Committee recommended moving forward with Weighting Option #1 with the following changes:

- Weight safety criteria equally
- Factor LOTTR by traffic volume and remove AADT as a criteria from the system role and route characteristics category
- Increase HCADT weight and decrease trip length weight

4. Solutions Toolbox – Review Framework

Ross introduced the idea of a solutions toolbox and showed examples of what this could contain. This included a list of potential low-cost, high-benefit intersection and segment solutions. Each solution in the toolbox would include a page outlining the pros/cons of the solution, where best applied, and magnitude of potential costs. The Advisory Committee suggested adding road diets (4 to 3-lane conversions) and access management to the list of potential solutions. Brad reiterated the focus of the solutions toolbox is on at-grade, low-cost improvements that could be funded with the Greater MN Mobility Investment Category (approximately \$24M available over two years).

5. Next Steps – District/Area Workshops

Angie reviewed the next step of the study is to schedule workshops with each MnDOT District and area representatives to discuss and confirm the evaluation results. She said in some cases it may be clear what solution is needed and in others there may be too many variables. The Advisory Committee agreed it may be difficult to get to solutions at all locations with the data available. They agreed the workshop objectives may be to confirm

the list of problem locations and put locations into one of the following buckets if possible:

- Stand-alone, low cost improvement (i.e., range of solutions are known)
- Scoping for larger planned or programmed project
- Unprogrammed, complex issue with additional study needed

The Advisory Committee recommended Bolton & Menk contact each MnDOT District representative to schedule workshops in April and May. Districts were encouraged to invite other local stakeholders (MPOs, RDCs, etc.) to the workshops as desired.



ADVISORY COMMITTEE MEETING

June 26, 2018

10:00 am – 12:00 pm

MEETING SUMMARY

ATTENDEES

Patrick Weidemann, MnDOT	Tad Erickson, Region 5
Duane Hill, MnDOT D1 (Phone)	Michael Corbett, MnDOT
James Curran, MnDOT D2 (Phone)	Phillip Schafner, MnDOT
Greg Ous, MnDOT D7	Shaker Rabban, MnDOT
Steve Voss, MnDOT D3	Brad Utecht, MnDOT
Shiloh Wahl, MnDOT D4 (Phone)	Ross Tillman, Bolton & Menk
Susann Karnowski, MnDOT D8	Kate Miner, Stonebrooke Engineering
Nicole George, MnDOT (Phone)	Chris Chromy, Bolton & Menk
Edward Idzorek, MnDOT (Phone)	Angie Bersaw, Bolton & Menk
Mao Yang, MnDOT	

1. Introductions and Study Recap

Angie provided a brief recap on study progress since the last Advisory Committee Meeting in March 2018.

2. District Workshop Summaries

Angie reviewed a summary of comments/questions that came up at District Workshops that were held in April and May of 2018:

- Study goal – Several asked about the study’s focus on NHS routes only. Some commented that NHS routes are typically Greater MN Districts best functioning routes. What other funding sources are available to address mobility in Greater MN on non-NHS routes?
- Evaluation Criteria – District 7 staff expressed concerns with the evaluation criteria. They felt safety was rated too high for a study focused on

mobility/reliability and were concerned the mobility bonus was double counting the mobility issue.

- Availability of data for future use – Several asked about having access to the data for before/after comparisons to understand the effectiveness of low-cost improvements. Many were also interested in having access to the data for other potential uses.
- Crash data – at the time of the original scoring analysis the 2015-2017 crash data was not available and therefore the reliability data was looking at different years than the crash data. Every district recommended updating the analysis with the most recent crash data for consistency now that it's available.
- Funding – Each workshop had several questions on the Greater MN Mobility funding and how it would be distributed. Brad noted this is on the agenda for today's meeting.
- Data segmentation – Each District had a few locations that were questioned due to how the NPRMDS data was segmented. Ross said due to how the data is provided, this is not something that can be changed easily. He said it would require manually creating segments and supplementing the new segments with other data sources such as Streetlight.

Angie reviewed District Workshop Summaries that were prepared for each of the seven Districts. She noted comments and requests for clarification were being accepted on the District Workshop Summaries for another few weeks.

3. Options for Study Conclusion

Angie reported that based on input from the District Workshops, the project team has requested Bolton & Menk/Stonebrooke move forward with rerunning the scoring results with updated crash data and following upon questions identified by Districts. Once these tasks are completed, the project team will send revised scoring lists and responses to comments to each District for review.

Angie then presented the following study conclusion options for the Advisory Committees consideration:

- Additional data segmentation – Although this was something each district identified as a need, the project team does not recommend it due to the effort required for potentially low return (i.e., results may not change) and data credibility concerns since it would require mixing datasets. MnDOT staff also noted the pilot project with Streetlight has ended and MnDOT is working on an RFP to select a new vendor. This could take several months and would require a delay in the study in order to have access to the Streetlight-type data. The Advisory Committee concurred with the project team's recommendation to dismiss this option for the reasons discussed.
- Further evaluate potential solutions – Ross reviewed this option. Patrick felt this option treads into project development which is the responsibility of the districts,

not a central office planning study. Other district representatives felt this would be ok if the project team was working closely with district staff. Several Advisory Committee members stated this would be helpful but recognized the risk in still lacking enough data to get closer to a range of solutions at a particular location.

- Develop a mobility checklist – Ross presented the idea to develop a checklist to determine potential mobility benefits based on a locations characteristics. There was support from Advisory Committee members for this option if somehow linked as a user guide to the solutions toolbox.

4. Greater MN Mobility Investment Category

Brad presented information about the funding available in 2022 and 2023 from the Greater MN Mobility Investment Category. Below is Advisory Committee feedback on the following discussion topics:

- Use of Funding – Advisory Committee suggested flexibility to use funding for projects and/or additional study.
- Distribution Options – Advisory Committee seemed to support the option to distribute funds to districts rather than a centralized program. Brad presented a few options for distribution. The Advisory Committee requested the percent of VMT option be changed to percent of NHS VMT. Brad will revise and bring back further details for discussion at the next Advisory Committee meeting. The Committee asked about the MPO role and whether or not a location would get more points or be included on the list if in an MPO plan. Brad reported this will also be revisited and discussed at the next Advisory Committee meeting.
- Selection Process & Evaluation Criteria – Brad presented a few considerations for selection process and evaluation criteria. The Advisory Committee recommended keeping it simple since this program is only available for two years at this point. Brad reported he would take the feedback into consideration and bring this topic back for further discussion at the next meeting.

5. Next Steps and Schedule

The project team will rerun the scoring results with updated crash data and share these results along with any additional follow-ups with the Districts. A final Advisory Committee meeting is anticipated in September.



ADVISORY COMMITTEE MEETING

September 12, 2018

10:00 am – 12:00 pm

MEETING SUMMARY

ATTENDEES

Patrick Weidemann, MnDOT (Phone)	Tad Erickson, Region 5 (Phone)
Duane Hill, MnDOT D1 (Phone)	Mary Safgren, MnDOT D3
Darren Laesch, MnDOT D2	Phillip Schafner, MnDOT (Phone)
Ronda Allis, MnDOT D7	Shaker Rabban, MnDOT (Phone)
Steve Voss, MnDOT D3	Brad Utecht, MnDOT
Shiloh Wahl, MnDOT D4 (Phone)	Mark Nelson, MnDOT
Susann Karnowski, MnDOT D8	Kate Miner, Stonebrooke Engineering
Nicole George, MnDOT (Phone)	Ross Tillman, Bolton & Menk
Edward Idzorek, MnDOT	Angie Bersaw, Bolton & Menk

1. Introductions and Study Recap

Angie provided a brief recap on study progress since the last Advisory Committee Meeting in June 2018. She presented an updated graphic that represents the revised study approach agreed to at the last meeting showing one evaluation phase to identify mobility/reliability problem locations with scores of 5 or greater. The revised approach also includes the study’s conclusion with a toolbox of potential solutions for future consideration at problem locations.

2. Review Updated Scoring Results

Angie reviewed the updated scoring tables developed as a result of the Advisory Committee’s direction to rerun the analysis with updated crash data from the years 2015-2017. Angie noted the updated scoring tables were shared with Districts prior to the Advisory Committee meeting. She said only Districts 2 and 7 provided comments/questions on the revised scoring results. She encouraged other Districts to review and contact the project team with any further questions.

3. Greater MN Mobility Investment Updates

Brad provided an update on the Greater MN Mobility Investment Category. He said approximately \$13 million is available in 2022 and 2023. Brad presented the following uses of the funding for discussion:

- Eligible locations – identified location (score >5) as part of this study or identified project in an MPO long-range plan
- Projects – standalone project (would need to be scored) or add on to a programmed or planned project (would not need to be scored)
- Additional study/evaluation – corridor studies or intersection evaluation

The Advisory Committee recommended NHS locations identified in an MPO plan should be scored and added to the District tables even if the score is <5. These locations would then be eligible for Greater MN Mobility Investment funding.

Brad presented the following funding distribution options for the committee's consideration:

- Option 1 – funds distributed by NHS VMT
- Option 2a – funds distributed by number of identified locations with a score >5
- Option 2b – funds distributed by the total score of identified locations

The Advisory Committee recommended Option 1 since it provides a stable funding amount for both years.

Brad presented two options for project selection evaluation criteria. The Advisory Committee recommended keeping the process simple and using the study's evaluation criteria since the locations are already scored.

4. Study Wrap-Up

Ross reviewed the solutions toolbox user guide that was developed to complement the toolbox. It is intended to help users get to a range of potential solutions for a problem location based on the type of issue, either LOTTR or Speed Index, that is occurring at that location.

5. Next Steps and Schedule

Angie reported the final step of the study is to develop a study report to document the methodology used to identify and evaluate (or score) locations. She said a primary component of the report will be fact sheets for each location with scores >5. Kate reviewed an example of a fact sheet. The intent is for this to be an easy reference back to the context of each particular location, the scoring results, and potential follow-ups noted along with any District and/or local input on the location.

Angie said a draft report will be provided to the Advisory Committee for review in October.

Appendix B: Solutions Toolbox



TOOLBOX OF SOLUTIONS

Toolbox of Solutions

Intersections

- Signal Timing Optimization
- Signal Modifications
- Add Turn Lane
- Right In/Right Out
- Three Quarter
- Acceleration/Deceleration
- Roundabout
- Restricted Crossing U-Turn (RCUT)
- Median U-Turn
- Jughandle
- Displaced Left Turn
- Offset T
- Quadrant
- Green T

Segments

- Truck Climbing Lanes
- Shoulder Widening
- Passing Lanes
- Access Management
- 4 to 3-Lane Conversion



Construction Cost Ranges

Unconstrained

\$ = 0 to 0.5 million

\$\$ = 0.5 to 2 million

\$\$\$ = 2 to 4+ million

Constrained

\$ = 0 to 0.5 million

\$\$ = 0.5 to 3 million

\$\$\$ = 3 to 7+ million

Unconstrained: Adjacent land largely undeveloped, substantial existing R/W available

Constrained: Adjacent land largely developed, limited existing R/W



Signal Timing Optimization

Pros

- Reduce overall delay
- Improve coordination
- Low cost improvement
- No construction/modification

Cons

- Limited improvement
- Short term solution

Best Applied

- If timing has not changed in > 5 years
- Poorly operating intersections
- Time of day issues

Cost \$



City of San Jose Evergreen
Transportation Analysis



Signal Modifications

Pros

- Increase Safety
- Increase capacity
- Provide exclusive phases (protected/permitted/FYLA/overlap)

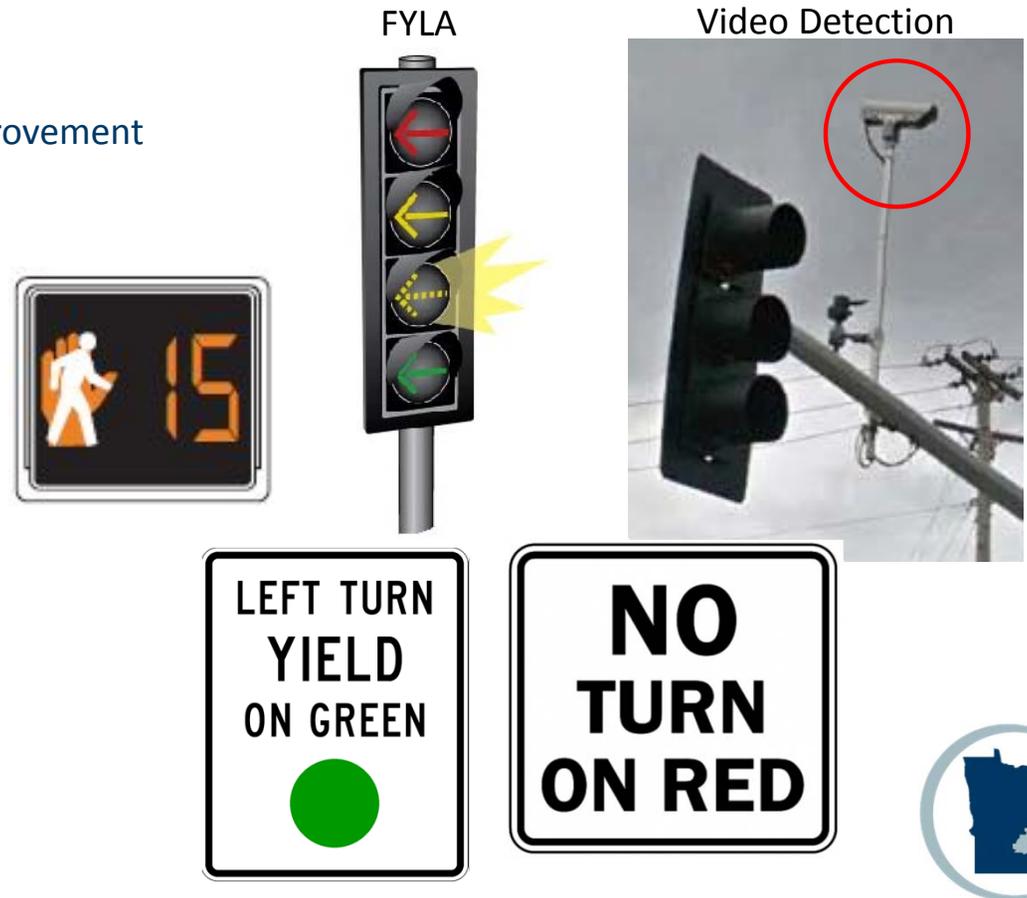
Best Applied

- Lacking protected phasing
- Lacking detection

Cost \$

Cons

- Limited improvement



Add Turn Lane

Pros

- Improves safety
- Improves sight lines
- Reduces “weaving” near intersections

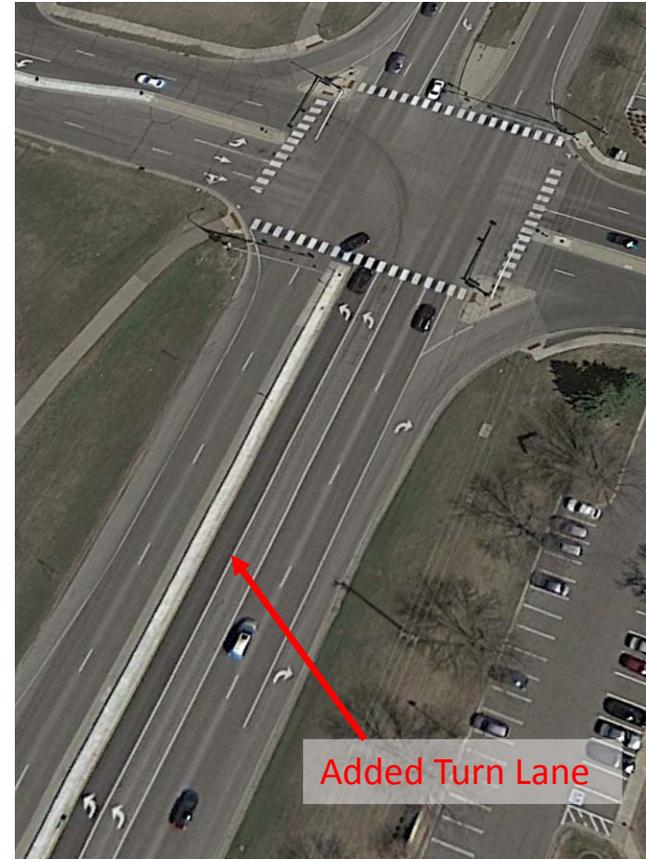
Cons

- Need adequate space
- Can requires signal modifications

Best Applied

- Intersections without turn lanes
- Where additional capacity is needed

Cost \$\$



TH 13 at Portland Ave in Burnsville, MN



Right In/ Right Out

Pros

- Eliminates crossing maneuvers
- Continuous flow on mainline
- Access to and from one direction

Cons

- Need alternative routes
- Reduce access

Best Applied

- High mainline traffic volumes
- When alternate routes are available

Cost \$



TH 65 south of 105th Avenue in Blaine, MN



Three Quarter

Pros

- Eliminates crossing maneuvers from side street
- Continuous flow on mainline
- Enables access from mainline

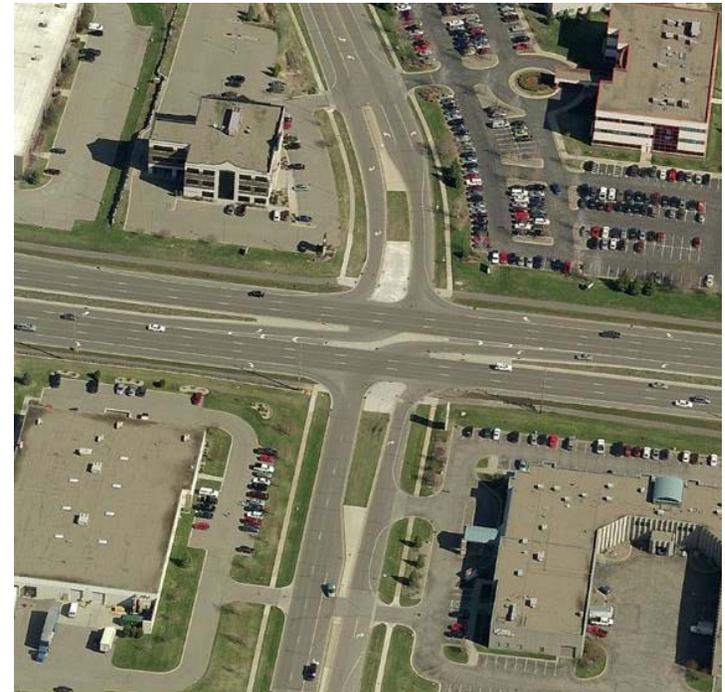
Cons

- Need alternative routes
- Reduce access from side street

Best Applied

- High mainline traffic volumes
- When alternate routes are available

Cost \$



CSAH 42 at Southcross Drive in Burnsville, MN



Acceleration/Deceleration Lanes

Pros

- Eliminates turns into mainline high speed traffic
- Allows vehicles to reach proper merging speed in separate lane
- Continuous flow on mainline

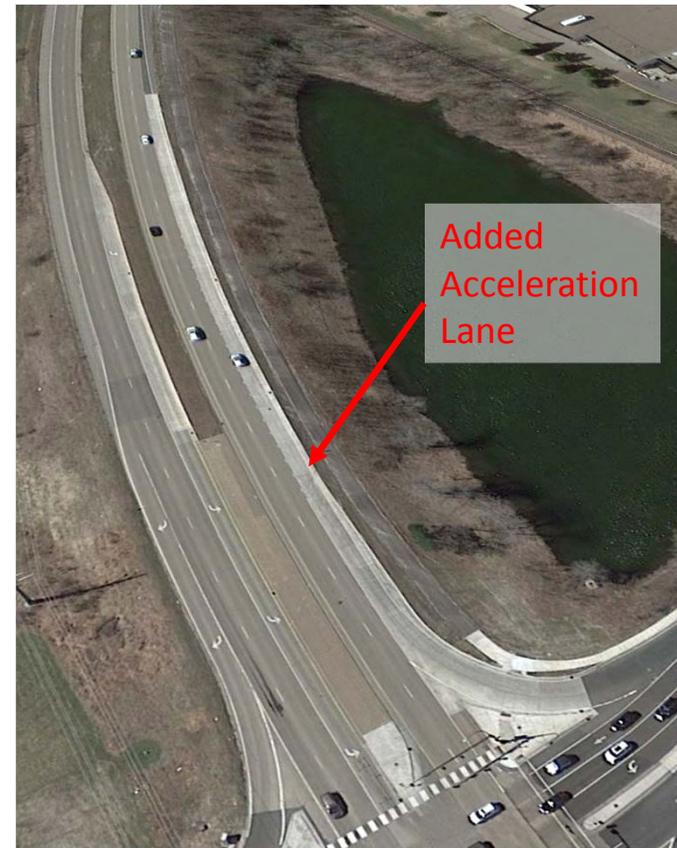
Best Applied

- High mainline traffic volumes
- Proper distance between intersections
- Divided roads (for left turn acceleration lane)

Cost \$

Cons

- Additional Pavement/Construction needs



Hwy 5 and 101 in Chanhassen, MN



Roundabout

Pros

- Increase safety/reduces conflict points
- Minimizes serious/fatal injury crashes
- Improves delay/capacity
- Reduces lifecycle cost

Cons

- Initial Confusion
- Space requirements
- Not applicable to all intersections

Best Applied

- Proper traffic volumes for roundabout
- Presence of high severity crashes

Cost \$\$



TH 284 and CSAH 10 in Waconia, MN



TH 22 at Madison Ave in Mankato, MN



Restricted Crossing U-Turn (RCUT)

Pros

- Eliminates left turns into high speed mainline traffic
- Continuous flow on mainline
- Eliminates need for traffic signal
- Beneficial for heavy vehicles on side street

Cons

- Initial Confusion
- Out of direction travel
- Reduce access from side street
- Requires wide median

Best Applied

- Rural 4-lane divided
- Low side street volume

Cost \$\$



TH 212 at TH 284 in Cologne, MN



Median U-Turn

Pros

- Increase green time for mainline
- Eliminate Left Turn Crashes
- Reduce conflict points at intersection

Cons

- Initial Confusion
- Typically require wider medians

Best Applied

- High capacity intersections

Cost \$\$



Big Beaver Road at Rochester Road, Troy, MI



Jug Handle

Pros

- Increase green time for mainline
- Eliminate Left Turn Crashes on mainline
- Reduce conflict points at intersection

Best Applied

- High mainline through movements

Cost \$\$

Cons

- Initial Confusion
- Typically require additional ROW
- Longer travel time and more stops for left turning vehicles



US-1 at Franklin Corner Road, Lawrenceville, NJ



Displaced Left Turn

Pros

- Increase green time for mainline
- Increase throughput by 25-30%
- Reduce conflict points at intersection

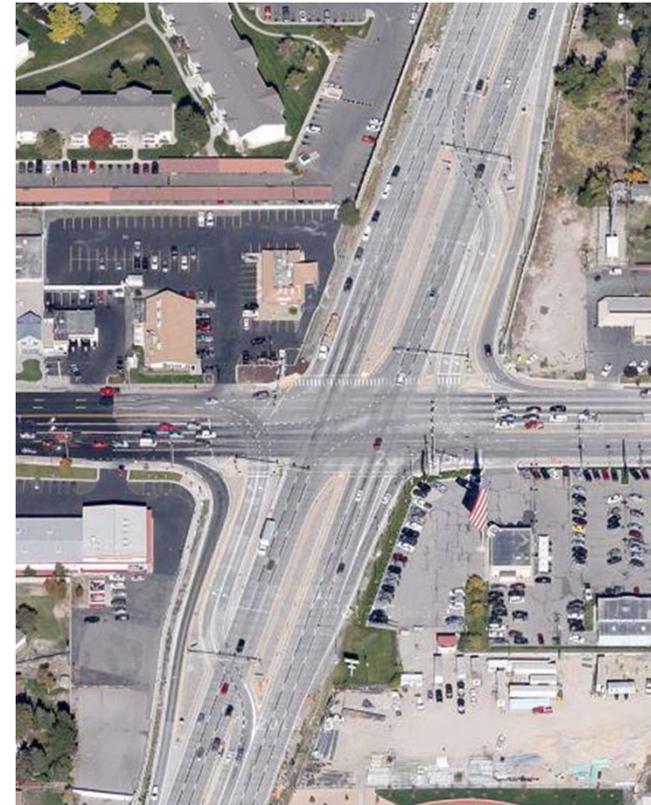
Cons

- Initial Confusion
- Typically require additional ROW
- Pedestrian accommodations
- Construction Cost

Best Applied

- High volume intersection

Cost \$\$\$



West Valley City, UT



Offset T

Pros

- Eliminate intersection skew
- Spread out turning movements across multiple intersections

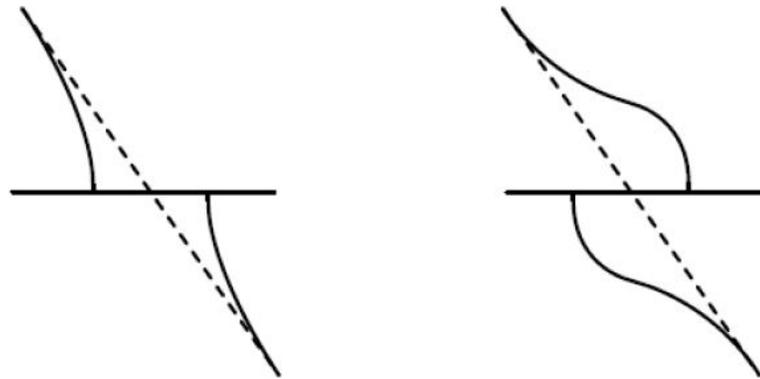
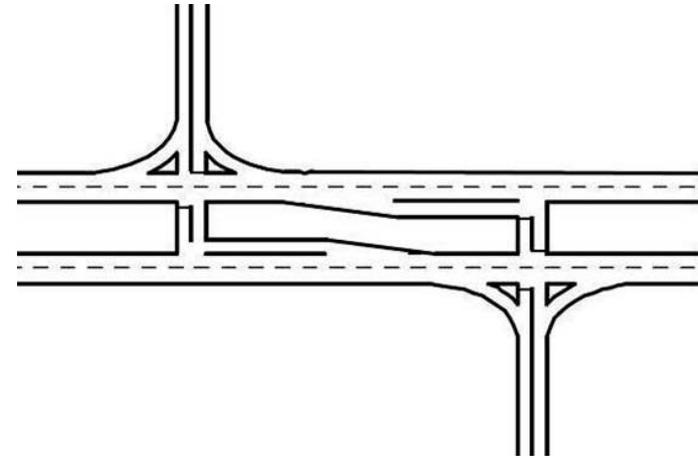
Cons

- Closely spaced intersections
- Potential weaving movement

Best Applied

- Skewed intersection
- Limited other options

Cost \$\$



Quadrant

Pros

- Increase capacity
- Increase safety
- Removing turning traffic from primary intersection

Cons

- Initial Confusion
- Add traffic to “quadrant roadway”
- Out of direction travel
- Increase number of intersections

Best Applied

- Where quadrant street is already present
- Where there is adequate space for quadrant street

Cost \$\$



Green T

Pros

- Eliminates left turns into high speed mainline traffic
- Continuous flow on mainline for *one* direction
- Can be fully or partially signalized if needed

Cons

- Initial Confusion
- Requires channelization

Cost \$\$

Best Applied

- 3-leg intersections
- High mainline and/or side street left turning volume



Shoulder Widening

Pros

- Reduces Run-of-Road crashes
- Can include rumble/mumble strips for increased safety
- Provide additional space for emergency stops

Cons

- Additional pavement to maintain

Best Applied

- Rural roadways without shoulders
- Rural roadways with gravel shoulders

Cost \$\$ (based on length)



AASHTO Strategic Highway Safety Plan



Truck Climbing Lane

Pros

- Trucks do not impede on passenger cars traveling on inclines
- Avoids back-ups on highways

Cons

- Additional pavement to maintain

Best Applied

- Roadways with high truck volumes
- Areas with steep grade

Cost \$\$ (based on length)



Hwy 27 in Sparta, WI



Passing Lanes

Pros

- Slower traffic can be passed
- Avoids back-ups on highways

Cons

- Additional pavement to maintain

Best Applied

- Rural Roadways with high truck volumes

Cost \$\$ (based on length)



Hwy 23 between Green Valley and Cottonwood, MN



Access Management

Pros

- Reduces conflict points
- Can allow for smoother operations by minimizing acceleration/deceleration needs

Cons

- Can be controversial
- May need alternative routes

Best Applied

- Roadways with high access density

Cost \$\$ (depends on extent)



Hwy 5 in Waconia, MN



4 to 3-Lane Conversion

Pros

- Increase safety by providing dedicated area for left turns
- Can create easier/safer pedestrian crossings

Cons

- May need to widen for right turn lanes
- Potential for overlapping left turn movements

Best Applied

- 4-lane undivided roadways with locations of high turning traffic volumes

Cost \$\$ (based on length)



Nicollet Ave in Richfield, MN

