Carver County
Public Works
11360 Highway 212, Suite 1
Cologne, MN 55322

August 31, 2020

TO: Ms. Elaine Koutsoukos
Transportation Advisory Board
390 ROBERT STREET NORTH, ST. PAUL, MN 55101

FROM: Mr. Lyndon Robjent
County Engineer
CARVER COUNTY PUBLIC WORKS DIVISION
11360 HIGHWAY 212 SUITE 1, COLOGNE, MN 55322

CC: Ms. Angie Stenson
Sr. Transportation Planner
CARVER COUNTY PUBLIC WORKS DIVISION

SUBJECT: Carver County 2020 Regional Solicitation Re-Evaluation Request for US 212 Freight Mobility and Safety Project (#14049) – Strategic Capacity Category; Safety Measure 6A

Dear Ms. Koutsoukos:

Carver County is seeking further information on the details and methodology for how the project benefit cost was calculated for Measure 6A – Safety for the US 212 Freight Mobility and Safety Project (#14049). Per the details in the scoring breakdown worksheet, the project benefit cost noted is substantially different than what was calculated per application requirements and guidance and submitted with the application (approximately $20 million benefit down from an approximately $136 million benefit). Further review and re-evaluation of the information and data submitted with the original application is requested.

The following information, consistent with application guidance and requirements, was included with the submitted application:

- The project area includes two correctable fatal crashes (see Attachment A). Per MnDOT guidance if there are two or more correctable fatal crashes within a three-year period, then a cost benefit per crash of $12.3 million can be used (see Attachment B).
- The CMFs utilized in the submitted application provide direct countermeasures to the two fatal crashes, one was a right angle crash and the second was vehicle slowing to make a left turn that lost control of the vehicle and then ran off the road into the north side ditch clear zone area and hit a non-breakaway sign.
- There were three (3) minor injury and five (5) possible injury crashes within the project area in the last three years. The proposed project will provide direct countermeasures for these crashes as well.

- Links were provided in the application to the following technical reports. Each of these reports provides information that speaks to the correctability of the run-off-road crashes. Pertinent pages from each of these references is attached for your reference (See Attachment C).
    - Factors Related to Fatal Single-Vehicle Run-Off-Road Crashes
    - A Pilot Study on Mitigating Run-Off-Road Crashes
    - Fatal Run Off the Road Crashes on Rural Two-Lane Two-Way Highways in Minnesota
- The proposed project includes the following improvements that will have a direct improvement on the safety of the corridor. Attached are relevant pages from the submitted application with highlighting to document these improvements (see Attachment D). The project layout included with the application provides additional detail.
    - Adding a Reduced Conflict Intersection (RCI) at the intersection of US 212 and CSAH 51 which provides a center median and exclusive left- and right-turn lanes
    - Increase the number of lanes from two to four
    - Increasing shoulder width to 8 feet
    - Providing skid-resistant pavement to increase traction
    - Widening side slopes and eliminating shoulder drop-offs along the corridor
    - Removing/relocating any objects within the clear zone or adding breakaway or crashworthy devices within the clear zone
    - Adding 8" wide white wet-reflective pavement markings to edgelines

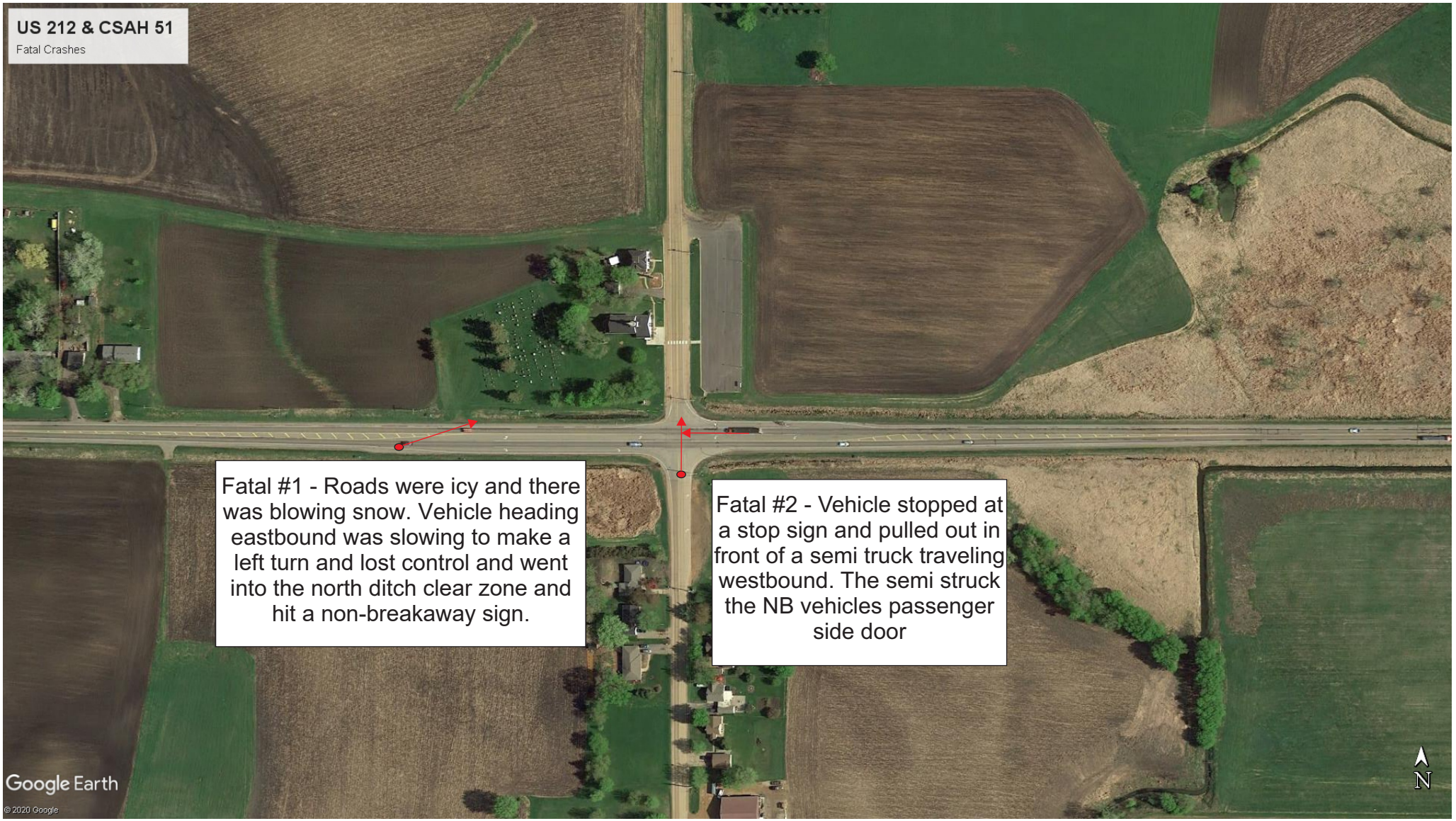
It is also important to note that a sustained crash problem has been documented in this location, which increases the validity of the 3-year crash data and subsequently calculated project benefit requested and required per application. This sustained crash issue is highlighted by the following:

- There was a fatal rear end crash at the intersection of US 212 and CSAH 51 in 2009 that resulted in two deaths (see Attachment E).
- There was a serious injury (A) right-angle crash at the intersection of US 212 and CSAH 51 in 2010.
- The intersection of US 212 and CSAH 51 was included as a study intersection during the workshops held as part of the County Road Safety Plan update (see Attachment F).

Given this information, we respectfully request revision and adjustment to the project benefit cost used for scoring this project based on the data submitted in the original application and a recalculation of the Measure 6A – Safety across projects.

Enclosures
Attachment A – Crash data
Attachment B – MnDOT HSIP guidance
Attachment C - Technical references
Attachment D – Pages from submitted application
Attachment E – Additional details on fatal crashes at US 212/CSAH 51 intersection
Attachment F – Pages from County Road Safety Workshop

Attachment A – Crash data


US 212 & CSAH 51
Fatal Crashes
Fatal #1 - Roads were icy and there was blowing snow. Vehicle heading eastbound was slowing to make a left turn and lost control and went into the north ditch clear zone and hit a non-breakaway sign.
Fatal #2 - Vehicle stopped at a stop sign and pulled out in front of a semi truck traveling westbound. The semi struck the NB vehicles passenger side door
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US 212 Roadway Expansion Benefit-Cost

Total Benefit-Cost Calculation

$136,232,835	**Benefit (present value)**	**B/C Ratio = 5.24**
$25,977,000	**Cost**	

Benefit (Present Value) Summary

$44,688,984	**Hwy 212 Segment**
$88,660,476	**Hwy 212 & Hwy 51**
$1,224,204	**Hwy 212 & Hwy 153**
$609,154	**Hwy 212 & Carver County Access**
$1,050,017	**Hwy 212 Lane Merge**

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	US 212	**District**		**County**	Carver County
Begin RP		**End RP**		**Miles**	
Location	US 212 (Non-intersections)				

B. Project Description

Proposed Work	2-lane undivded to 4-lane divided		
Project Cost*	Included in Summary	**Installation Year**	2024
Project Service Life	20 years	**Traffic Growth Factor**	2.0%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.52	**Fatal (K) Crashes**	**Reference**	
0.52	**Serious Injury (A) Crashes**		
0.55	**Moderate Injury (B) Crashes**	**Crash Type**	
0.55	**Possible Injury (C) Crashes**		
0.69	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2016	**End Date**	12/31/2018	3 years
Data Source	MnDOT			

Crash Severity	< enter target crashes >	< optional 2nd CMF >
K crashes	1	0
A crashes	0	0
B crashes	2	0
C crashes	2	0
PDO crashes	14	0

F. Benefit-Cost Calculation

$44,688,984	**Benefit (present value)**	**B/C Ratio = N/A**
Included in Summary	**Cost**	

Proposed project expected to reduce 3 crashes annually, 1 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$12,300,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.2%
Traffic Growth Rate	2.0%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.48	0.16	$1,957,750
A crashes	0.00	0.00	$0
B crashes	0.90	0.30	$63,140
C crashes	0.90	0.30	$33,073
PDO crashes	4.33	1.44	$17,304
			$2,071,267

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$2,071,267	$2,071,267
2026	$2,112,693	$2,087,641
2027	$2,154,947	$2,104,144
2028	$2,198,045	$2,120,778
2029	$2,242,006	$2,137,543
2030	$2,286,847	$2,154,440
2031	$2,332,583	$2,171,471
2032	$2,379,235	$2,188,637
2033	$2,426,820	$2,205,939
2034	$2,475,356	$2,223,377
2035	$2,524,863	$2,240,953
2036	$2,575,361	$2,258,668
2037	$2,626,868	$2,276,523
2038	$2,679,405	$2,294,519
2039	$2,732,993	$2,312,658
2040	$2,787,653	$2,330,940
2041	$2,843,406	$2,349,366
2042	$2,900,274	$2,367,938
2043	$2,958,280	$2,386,657
2044	$3,017,445	$2,405,524
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $44,688,984

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	US 212	**District**		**County**	Carver County
Begin RP		**End RP**		**Miles**	
Location	US 212 and CSAH 51				

B. Project Description

Proposed Work	Reduced Conflict Intersection (RCI)		
Project Cost*	Included in Summary	**Installation Year**	2024
Project Service Life	20 years	**Traffic Growth Factor**	2.0%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.15	**Fatal (K) Crashes**	**Reference**	Multiple CMF Calculation
0.23	**Serious Injury (A) Crashes**		
0.23	**Moderate Injury (B) Crashes**	**Crash Type**	All Types - Intersection Crashes
0.23	**Possible Injury (C) Crashes**		
0.34	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

0.00	**Fatal (K) Crashes**	**Reference**	Engineering Judgement
0.00	**Serious Injury (A) Crashes**		
0.00	**Moderate Injury (B) Crashes**	**Crash Type**	Left-turn from side-street approach
0.00	**Possible Injury (C) Crashes**		
0.00	**Property Damage Only Crashes**		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2016	**End Date**	12/31/2018	3 years
Data Source	MnDOT			

Crash Severity	All Types - Intersection Crashes	Left-turn from side-street approa
K crashes	0	1
A crashes	0	0
B crashes	0	0
C crashes	0	0
PDO crashes	2	1

F. Benefit-Cost Calculation

$88,660,476	**Benefit (present value)**	**B/C Ratio = N/A**
Included in Summary	**Cost**	

Proposed project expected to reduce 2 crashes annually, 1 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$12,300,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.2%
Traffic Growth Rate	2.0%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	1.00	0.33	$4,100,000
A crashes	0.00	0.00	$0
B crashes	0.00	0.00	$0
C crashes	0.00	0.00	$0
PDO crashes	2.32	0.77	$9,280
			$4,109,280

H. Amortized Benefit

Year	Crash Benefits	Present Value
2024	$4,109,280	$4,109,280
2025	$4,191,466	$4,141,764
2026	$4,275,295	$4,174,506
2027	$4,360,801	$4,207,506
2028	$4,448,017	$4,240,767
2029	$4,536,977	$4,274,290
2030	$4,627,717	$4,308,079
2031	$4,720,271	$4,342,135
2032	$4,814,676	$4,376,460
2033	$4,910,970	$4,411,057
2034	$5,009,189	$4,445,927
2035	$5,109,373	$4,481,073
2036	$5,211,561	$4,516,496
2037	$5,315,792	$4,552,200
2038	$5,422,108	$4,588,185
2039	$5,530,550	$4,624,456
2040	$5,641,161	$4,661,013
2041	$5,753,984	$4,697,859
2042	$5,869,064	$4,734,996
2043	$5,986,445	$4,772,427
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $88,660,476

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	US 212	**District**		**County**	Carver County
Begin RP		**End RP**		**Miles**	
Location	US 212 & CSAH 153				

B. Project Description

Proposed Work	Reduced Conflict Intersection (RCI)		
Project Cost*	Included in Summary	**Installation Year**	2024
Project Service Life	20 years	**Traffic Growth Factor**	2.0%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.15	**Fatal (K) Crashes**	**Reference**	Multiple CMF Calculation
0.23	**Serious Injury (A) Crashes**		
0.23	**Moderate Injury (B) Crashes**	**Crash Type**	All Types - Intersection Crashes
0.23	**Possible Injury (C) Crashes**		
0.34	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

0.00	**Fatal (K) Crashes**	**Reference**	Engineering Judgement
0.00	**Serious Injury (A) Crashes**		
0.00	**Moderate Injury (B) Crashes**	**Crash Type**	Left-turn or thru from side-street approach
0.00	**Possible Injury (C) Crashes**		
0.00	**Property Damage Only Crashes**		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2016	**End Date**	12/31/2018	3 years
Data Source	MnDOT			

Crash Severity	All Types - Intersection Crashes	Left-turn or thru from side-street
K crashes	0	0
A crashes	0	0
B crashes	1	0
C crashes	0	0
PDO crashes	1	0

F. Benefit-Cost Calculation

$1,224,204	**Benefit (present value)**	**B/C Ratio = N/A**
Included in Summary	**Cost**	

Proposed project expected to reduce 1 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate 1.2%

Traffic Growth Rate 2.0%

Project Service Life 20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	0.77	0.26	$53,900
C crashes	0.00	0.00	$0
PDO crashes	0.71	0.24	$2,840
			$56,740

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$56,740	$56,740
2026	$57,875	$57,189
2027	$59,032	$57,641
2028	$60,213	$58,096
2029	$61,417	$58,556
2030	$62,646	$59,018
2031	$63,898	$59,485
2032	$65,176	$59,955
2033	$66,480	$60,429
2034	$67,810	$60,907
2035	$69,166	$61,388
2036	$70,549	$61,874
2037	$71,960	$62,363
2038	$73,399	$62,856
2039	$74,867	$63,353
2040	$76,365	$63,853
2041	$77,892	$64,358
2042	$79,450	$64,867
2043	$81,039	$65,380
2044	$82,659	$65,897
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $1,224,204

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	US 212	**District**		**County**	Carver County
Begin RP		**End RP**		**Miles**	
Location	US 212 & Carver County Public Works Access				

B. Project Description

Proposed Work	Reduced Conflict Intersection (RCI)		
Project Cost*	Included in Summary	**Installation Year**	2024
Project Service Life	20 years	**Traffic Growth Factor**	2.0%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.15	**Fatal (K) Crashes**	**Reference**	Multiple CMF Calculation
0.23	**Serious Injury (A) Crashes**		
0.23	**Moderate Injury (B) Crashes**	**Crash Type**	All Types - Intersection Crashes
0.23	**Possible Injury (C) Crashes**		
0.34	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

0.00	**Fatal (K) Crashes**	**Reference**	Engineering Judgement
0.00	**Serious Injury (A) Crashes**		
0.00	**Moderate Injury (B) Crashes**	**Crash Type**	Left-turn or thru from side-street approach
0.00	**Possible Injury (C) Crashes**		
0.00	**Property Damage Only Crashes**		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2016	**End Date**	12/31/2018	3 years
Data Source	MnDOT			

Crash Severity	All Types - Intersection Crashes	Left-turn or thru from side-street
K crashes	0	0
A crashes	0	0
B crashes	0	0
C crashes	1	0
PDO crashes	0	0

F. Benefit-Cost Calculation

$609,154	**Benefit (present value)**	**B/C Ratio = N/A**
Included in Summary	**Cost**	

Proposed project expected to reduce 1 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate 1.2%

Traffic Growth Rate 2.0%

Project Service Life 20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	0.00	0.00	$0
C crashes	0.77	0.26	$28,233
PDO crashes	0.00	0.00	$0
			$28,233

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$28,233	$28,233
2026	$28,798	$28,457
2027	$29,374	$28,681
2028	$29,961	$28,908
2029	$30,561	$29,137
2030	$31,172	$29,367
2031	$31,795	$29,599
2032	$32,431	$29,833
2033	$33,080	$30,069
2034	$33,741	$30,307
2035	$34,416	$30,546
2036	$35,105	$30,788
2037	$35,807	$31,031
2038	$36,523	$31,276
2039	$37,253	$31,524
2040	$37,998	$31,773
2041	$38,758	$32,024
2042	$39,533	$32,277
2043	$40,324	$32,532
2044	$41,131	$32,790
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $609,154

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	US 212	**District**		**County**	Carver County
Begin RP		**End RP**		**Miles**	
Location	US 212 (4-lane to 2-lane merge)				

B. Project Description

Proposed Work	Extended 4-lane		
Project Cost*	Included in Summary	**Installation Year**	2024
Project Service Life	20 years	**Traffic Growth Factor**	2.0%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.00	**Fatal (K) Crashes**	**Reference**	Engineering Judgement
0.00	**Serious Injury (A) Crashes**		
0.00	**Moderate Injury (B) Crashes**	**Crash Type**	Merging Crashes eliminated
0.00	**Possible Injury (C) Crashes**		
0.00	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2016	**End Date**	12/31/2018	3 years
Data Source	MnDOT			

Crash Severity	Merging Crashes eliminated	< optional 2nd CMF >
K crashes	0	0
A crashes	0	0
B crashes	0	0
C crashes	1	0
PDO crashes	3	0

F. Benefit-Cost Calculation

$1,050,017	**Benefit (present value)**	**B/C Ratio = N/A**
Included in Summary	**Cost**	

Proposed project expected to reduce 2 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate 1.2%

Traffic Growth Rate 2.0%

Project Service Life 20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	0.00	0.00	$0
C crashes	1.00	0.33	$36,667
PDO crashes	3.00	1.00	$12,000
			$48,667

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$48,667	$48,667
2026	$49,640	$49,051
2027	$50,633	$49,439
2028	$51,645	$49,830
2029	$52,678	$50,224
2030	$53,732	$50,621
2031	$54,807	$51,021
2032	$55,903	$51,424
2033	$57,021	$51,831
2034	$58,161	$52,241
2035	$59,324	$52,654
2036	$60,511	$53,070
2037	$61,721	$53,489
2038	$62,956	$53,912
2039	$64,215	$54,338
2040	$65,499	$54,768
2041	$66,809	$55,201
2042	$68,145	$55,637
2043	$69,508	$56,077
2044	$70,898	$56,520
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $1,050,017

Multiple CMF Calculation - RCI Intersection Crashes

Crash Modification Factor - Installation of RCI Intersection

0.65	Fatal (K) Crashes	Reference	http://www.cmfclearinghouse.org/detail.cfm?facid=5555
0.46	Serious Injury (A) Crashes		
0.46	Moderate Injury (B) Crashes	Crash Type	All
0.46	Possible Injury (C) Crashes		
0.65	Property Damage Only Crashes		

Crash Modification Factor - Installation of Intersection Illumination

0.23	Fatal (K) Crashes	Reference	http://www.cmfclearinghouse.org/detail.cfm?facid=437
0.50	Serious Injury (A) Crashes		
0.50	Moderate Injury (B) Crashes	Crash Type	All
0.50	Possible Injury (C) Crashes		
0.52	Property Damage Only Crashes		

Multiple CMF Calculation

CMF (K) = CMF 1 * CMF 2 = 0.65 * 0.23 = 0.1495	0.15	Fatal (K) Crashes
CMF (A) = CMF 1 * CMF 2 = 0.46 * 0.50 = 0.23	0.23	Serious Injury (A) Crashes
CMF (B) = CMF 1 * CMF 2 = 0.46 * 0.50 = 0.23	0.23	Moderate Injury (B) Crashes
CMF (C) = CMF 1 * CMF 2 = 0.46 * 0.50 = 0.23	0.23	Possible Injury (C) Crashes
CMF (PDO) = CMF 1 * CMF 2 = 0.65 * 0.52 = 0.338	0.34	Property Damage Only Crashes

Multiple CMF Calculation - Segments

Crash Modification Factor - Convert 2-lane to 4-lane Roadway

0.55	Fatal (K) Crashes	Reference	http://www.cmfclearinghouse.org/detail.cfm?facid=7571
0.55	Serious Injury (A) Crashes		
0.55	Moderate Injury (B) Crashes	Crash Type	All
0.55	Possible Injury (C) Crashes		
0.69	Property Damage Only Crashes		

Crash Modification Factor - Resurface Pavement

0.95	Fatal (K) Crashes	Reference	http://www.cmfclearinghouse.org/detail.cfm?facid=2976
0.95	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	Crash Type	All
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		

Multiple CMF Calculation

CMF (K) = CMF 1 * CMF 2 = 0.55 * 0.95 = 0.5225

CMF (A) = CMF 1 * CMF 2 = 0.55 * 0.95 = 0.5225

0.52	Fatal (K) Crashes
0.52	Serious Injury (A) Crashes
0.55	Moderate Injury (B) Crashes
0.55	Possible Injury (C) Crashes
0.69	Property Damage Only Crashes

▾ Countermeasure: Install J-Turn intersection

Compare	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
☐	0.652	34.8	★★★★☆	All	All	Rural	EDARA ET AL., 2013	
☐	0.463	53.7	★★★☆☆	All	Serious injury,Minor injury	Rural	EDARA ET AL., 2013	
☐	0	100	★★☆☆☆	All	Fatal	Rural	HOCHSTEIN ET AL., 2009	
☐	0	100	★★☆☆☆	All	Serious injury,Minor injury	Rural	HOCHSTEIN ET AL., 2009	
☐	0	100	★★☆☆☆	Angle	All	Rural	HOCHSTEIN ET AL., 2009	
☐	0	100	★★☆☆☆	Angle	All	Rural	HOCHSTEIN ET AL., 2009	
☐	0	100	★★☆☆☆	Angle	All	Rural	HOCHSTEIN ET AL., 2009	
☐	0	100	★★☆☆☆	Frontal and opposing direction sideswipe,Head on	All	Rural	HOCHSTEIN ET AL., 2009	
☐	0.39	60.57	★★☆☆☆	All	All	Not specified	HOCHSTEIN ET AL., 2009	
☐	0.63	36.63	★★☆☆☆	All	Property damage only (PDO)	Not specified	HOCHSTEIN ET AL., 2009	
☐	0	100	★★☆☆☆	Angle	All	Not specified	HOCHSTEIN ET AL., 2009	
☐	0	100	★★☆☆☆	Angle	All	Not specified	HOCHSTEIN ET AL., 2009	

▼ Countermeasure: Provide intersection illumination

Compare	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
☐	0.62 [B]	38	★★★★☆	Nighttime	Serious Injury,Minor Injury	Not Specified	ELVIK, R. AND VAA, T., 2004	Countermeasure name changed to match ... [READ MORE]
☐	0.58 [I]	42	★★★★☆	Nighttime,Vehicle/pedestrian	Serious Injury,Minor Injury	Not Specified	ELVIK, R. AND VAA, T., 2004	Countermeasure name changed to match ... [READ MORE]
☐	0.41	59	★★★★☆	Vehicle/pedestrian	Serious injury,Minor injury	Not specified	ELVIK, R. AND VAA, T., 2004	Countermeasure name has been slightly ... [READ MORE]
☐	0.69	31	★★★☆☆	All	Property damage only (PDO)	Not specified	ELVIK, R. AND VAA, T., 2004	Countermeasure name has been slightly ... [READ MORE]
☐	0.23	77	★★★☆☆	All	Fatal	Not specified	ELVIK, R. AND VAA, T., 2004	Countermeasure name has been slightly ... [READ MORE]
☐	0.5	50	★★★☆☆	All	Serious injury,Minor injury	Not specified	ELVIK, R. AND VAA, T., 2004	Countermeasure name has been slightly ... [READ MORE]
☐	0.52	49	★★★☆☆	All	Property damage only (PDO)	Not specified	ELVIK, R. AND VAA, T., 2004	Countermeasure name has been slightly ... [READ MORE]
☐	0.19	82	★★★☆☆	Vehicle/pedestrian	Fatal	Not specified	ELVIK, R. AND VAA, T., 2004	Countermeasure name has been slightly ... [READ MORE]
☐	0.67	32.6	★★★☆☆	Angle	All	Rural	YE ET AL., 2008	Countermeasure name has been slightly ... [READ MORE]
☐	0.56	43.8	★★★☆☆	Vehicle/pedestrian	All	Rural	YE ET AL., 2008	Countermeasure name has been slightly ... [READ MORE]

Countermeasure: Convert 2 lane roadway to 4 lane divided roadway

Compare	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
☐	0.341	65.88	★★★★☆	All	All	Urban	AHMED ET AL., 2015	
☐	0.712	28.79	★★★★☆	All	All	Rural	AHMED ET AL., 2015	
☐	0.691	30.88	★★★★☆	All	Property damage only (PDO)	Rural	AHMED ET AL., 2015	
☐	0.549	45.13	★★★★☆	All	Fatal,Serious injury,Minor injury	Rural	AHMED ET AL., 2015	
☐	0.351	64.89	★★★☆☆	All	Property damage only (PDO)	Urban	AHMED ET AL., 2015	
☐	0.367	63.27	★★★☆☆	All	Fatal,Serious injury,Minor injury	Urban	AHMED ET AL., 2015	
☐	0.236	76.4	★★★☆☆	All	All	Urban	AHMED ET AL., 2015	Applies to roadways with AADT ... [READ MORE]
☐	0.466	53.36	★★★☆☆	All	All	Urban	AHMED ET AL., 2015	Applies to roadways with AADT ... [READ MORE]
☐	0.714	28.59	★★★☆☆	All	All	Rural	AHMED ET AL., 2015	Applies to roadways with AADT ... [READ MORE]
☐	0.79	21.04	★★★☆☆	All	All	Rural	AHMED ET AL., 2015	Applies to roadways with AADT ... [READ MORE]

Countermeasure: Resurface pavement

Compare	CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
☐	1.01	-1	★★★★☆	All	All		ABDEL-ATY ET AL., 2009	
☐	0.95	5	★★★★☆	All	Fatal,Serious injury		ABDEL-ATY ET AL., 2009	
☐	0.99	1	★★★★☆	Rear end	All		ABDEL-ATY ET AL., 2009	
☐	0.858	14.2	★★★★☆	All		Urban	PARK ET AL., 2017	
☐	0.929	7.1	★★★★☆	All		Urban	PARK ET AL., 2017	
☐	0.894	10.6	★★★★☆	All		Urban	PARK ET AL., 2017	
☐	0.901	9.9	★★★★☆	All		Urban	PARK ET AL., 2017	Heavy vehicle volume rate > ... [READ MORE]
☐	0.766	23.4	★★★★☆	All		Urban	PARK ET AL., 2017	First year after treatment implementation ... [READ MORE]
☐	0.853	14.7	★★★★☆	All		Urban	PARK ET AL., 2017	Second year after treatment implementation ... [READ MORE]
☐	1.153	-15.3	★★★★☆	All		Urban	PARK ET AL., 2017	Fourth year after treatment implementation ... [READ MORE]
☐	0.688	31.2	★★★★☆	All		Urban	PARK ET AL., 2017	First year after treatment implementation ... [READ MORE]

Hwy 212 Segment Crashes - Raw Data

objectid	Incident ID	Date and Time	Year	Hour	Crash Severity	Number Kil	Number of	Officer Narrative	Constructio	County	City	Township	Route Type	Route ID	Route Mea	Roadway N	Manner of Collision	First Harmf	Relative Tr	Lighting Co	Road Circu	Relative Intersection Location	Traffic Contro	Weather P	Weather S	Surface Co	Work Zone	Work Zone Workers Pr	Unit1 Type	Unit1 Vehic	Unit1 Direction	Unit1 Facto	Unit1 Facto	Unit1 Most	Unit1 Vehicle Maneuver	Unit1 Trafficway Desig	Unit1 Poste	Unit1 Horiz	Unit1 Road	Unit1 Injur	Unit1 Physi	Unit1 A	Unit1 Sex	Unit2 Ty	Unit2 V	Unit2 Dir	Unit2 Fa	Unit	Unit2 Most	Unit2 Vehic	Unit2 Nonn	Unit2 Injur	Unit2 Physi	Unit2 Age	Unit2 Sex	city_section_name
1790161	430017	3/17/2017, 12:30 PM	2017	12	Property Damage Only Crash	0	2	Driver of vehicle one was heading west bound on Hwy 212 and pulled to shoulder/driveway to make a U-turn to go back east bound on roadway. Driver of vehicle one said he believed the roadway to be clear of traffic approaching from either direction after checking. Driver one said when he proceeded to make the U-turn he was struck on the rear driver side by a vehicle approaching from the east going west bound. Driver of vehicle two said driver of vehicle one was making a U-turn to go back east bound and driver two struck vehicle one while vehicle one was making the U-turn.	M	CARVER		Benton	U.S. Trunk	020000000	134.3143	USTH 212	Front to Rear	Motor Veh	On Roadwa	Daylight	None	Driveway Access Related	No Controls	Clear		Dry	2	NOT APPLICABLE	Motor Veh	Passenger	Westbound	Improper Turn/Merge		Motor Vehi	Making a U Turn	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	72	Male	Motor V	Cargo V	Westbou	No Clear Con		Motor Vehi	Moving Forward		No Appare	Apparently	29	Male	US212 From Norwood You
1811264	656662	10/30/2018, 3:30 PM	2018	15	Property Damage Only Crash	0	2	ON 10/30/2018, I responded to a call of a hit and run involving two vehicles on westbound Hwy 212 in Cologne, MN. I spoke with the driver of Unit 1 who stated he was in the right lane of Hwy 212 as it merged from two lanes to one. While maintaining his lane, the driver of Unit 2 failed to merge correctly, side swiping Unit 1. Unit 1 pulled onto the side of the highway to exchange information while Unit 2 continued westbound on Hwy 212. While speaking with the driver of Unit 1, I received information from my dispatch that an officer from Glencoe Police Department had stopped a vehicle matching the description of Unit 2. I took pictures of the damage to Unit 1 and drove to the scene of the traffic stop in Glencoe, MN. I matched the vehicle stopped to Unit 2 of the accident via registration number and matching damage. I spoke with the driver of Unit 2 who stated that he had known he was involved in an accident in Cologne but did not stop because he believed "it was not that bad". In addition, the driver of Unit 2 did not have any proof of insurance for the vehicle. I cited the driver of Unit 2 with	M	CARVER		Benton	U.S. Trunk	020000000	137.1516	USTH 212	Sideswipe - Same Directi	Motor Veh	On Roadwa	Sunset	None	Not at Intersection, Interchange or Jun	No Controls	Clear		Dry	2	NOT APPLICABLE	Motor Veh	Passenger	Westbound	Unknown		Motor Vehi	Moving Forward	Two-Way, Divided, Me	60	Straight	Level	No Appare	Apparently	57	Male	Motor V	Passen	Westbou	Improper Tu		Motor Vehi	Changing Lanes		No Appare	Apparently	49	Male	
1889082	591264	4/15/2018, 10:50 PM	2018	22	Fatal Crash	1	1	Vehicle EB 212 just west of Co Rd 51. Roads glare ice with blowing snow. Witness 100 yards behind vehicle said the vehicle lost control on the road and spun out into the ditch. Witness estimated highway speed of 50mph. Vehicle spun out and came to rest facing WB in the north ditch, taking out a HWY 212 road sign. Driver complained of chest pains. Leonarda in the rear passenger seat did not speak English, but complained of back pain to Hilda. Both transported to Ridgeview by Ridgeview. Jose was uninjured.	M	CARVER		Benton	U.S. Trunk	020000000	134.8116	USTH 212		Ditch	On Roadwa	Dark (No St	Road Surfa	Not at Intersection, Interchange or Jun	No Controls	Snow	Blowing Sa	Ice/Frost	2	NOT APPLICABLE	Motor Veh	Sport Utilit	Eastbound	Ran Off Road		Ditch	Moving Forward	Two-Way, Not Divided	60	Straight	Level	Possible Inj	Apparently	46	Female													US212 From Norwood You
1914276	432488	3/31/2017, 9:00 AM	2017	9	Possible Injury Crash	0	2	Driver of vehicle 1 was pulling a trailer with plywood in the trailer. Plywood was not secured in the trailer. Plywood flew out of the trailer hitting vehicle 2 causing damage to the hood and windshield of the car. Driver and passenger of vehicle 2 had glass fly at them from the windshield breaking.	M	CARVER		Benton	U.S. Trunk	020000000	134.2448	USTH 212		Struck by F	On Roadwa	Daylight	None	Not at Intersection, Interchange or Jun	No Controls	Clear		Dry	2	NOT APPLICABLE	Motor Veh	Sport Utilit	Eastbound	Other Contributing Act		Struck by F	Moving Forward	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	38	Male	Motor V	Passen	Eastboun	No Clear Con		Struck by F	Moving Forward		Possible Inj	Apparently	50	Female	US212 From Norwood You
1947618	590835	4/14/2018, 12:00 PM	2018	12	Property Damage Only Crash	0	2	Driver of vehicle 1 was west on Hwy 212 and observed a vehicle in the ditch. Vehicle 2 was stopped in front of the vehicle in the ditch. Vehicle 2 was off on the shoulder when driver of vehicle 1 was slowing and hit ice on the roadway causing him to start losing traction and hit vehicle 2 stopped on the shoulder to check on driver of the vehicle in the ditch.	M	CARVER		Benton	U.S. Trunk	020000000	134.2737	USTH 212	Front to Rear	Motor Veh	On Shoulde	Daylight	Road Surfa	Not at Intersection, Interchange or Jun	No Controls	Blowing Sand/Soil/Dir		Ice/Frost	2	NOT APPLICABLE	Motor Veh	Passenger	Westbound	Swerved or	Over-corre	Motor Vehi	Swerved or Attempt to Avoid	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	34	Male	Motor V	Pickup	Westbou	No Clear Con		Motor Vehi	Parked or Entering or L		No Appare	Apparently	51	Male	US212 From Norwood You
2048940	522648	12/4/2017, 11:58 PM	2017	23	Property Damage Only Crash	0	1	-CRASH OCCURRED ON HWY 212 NEAR SALEM AVE -AT THE TIME OF THE CRASH, BLIZZARD CONDITIONS EXISTED WITH VISIBILITY VERY LIMITED DUE TO BLOWING SNOW -V1 WAS EB ON HWY 212 WHEN A TREE FELL AND STRUCK HIS CAB	M	Carver		Benton	U.S. Trunk	020000000	134.1668	USTH 212		Standing Tr	On Roadwa	Dark (No St	Obstructio	Not at Intersection, Interchange or Jun	No Controls	Blowing Sa	Severe Cro	Snow	2	NOT APPLICABLE	Motor Veh	Medium /	Eastbound	No Clear Contributing Action			Moving Forward	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	56	Male													US212 From Norwood You
2051056	586085	3/20/2018, 8:30 AM	2018	8	Property Damage Only Crash	0	1	Vehicle #1 was traveling eastbound on Hwy 212, near co rd 36, when the vehicle lost control and slid off of the roadway. vehicle #1 hit several sign posts and a mile marker. Driver #1 stated he did not have an insurance card agreed to provide me with insurance info. Driver #1 stated after losing control and hitting the posts, he tried to drive down the hill to co Rd 36. Citation issued to Driver #1 for no proof of ins.	M	CARVER	Cologne		U.S. Trunk	020000000	137.7099	USTH 212		Other Post,	On Shoulde	Daylight	Road Surfa	Not at Intersection, Interchange or Jun	No Controls	Sleet, Hail (Freezing R		Ice/Frost	2	NOT APPLICABLE	Motor Veh	Pickup	Eastbound	Driver Speeding		Mailboxes/	Moving Forward	Two-Way, Divided, Median Barrier		Curve Right	Uphill	No Appare	Apparently	18	Male													US212@Cologne
2052908	657261	11/6/2018, 11:16 AM	2018	11	Property Damage Only Crash	0	2	v2 was stopped on 212eb making a left turn onto a side street. v1 was a semi truck fully loaded. v1 was on 212eb as well traveling the posted speed limit. d1 said he saw v2 stopped too late and swerved to not rear end him and went into the right ditch. v1's trailer made contact with v2 right rear bumper. no injuries, v1 was towed.	M	Carver		Benton	U.S. Trunk	020000000	134.8574	USTH 212	Front to Rear	Motor Veh	On Roadwa	Daylight	None	Not at Intersection, Interchange or Jun	No Controls	Clear		Dry	2	NOT APPLICABLE	Motor Veh	Medium /	Eastbound	Failed to Keep in Prope		Motor Vehi	Swerved or Attempt to Avoid	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	37	Male	Motor V	Passen	Eastboun	No Clear Contributing Ac			Vehicle Stopped or Sta		No Appare	Apparently	52	Male	US212 From Norwood You
2075728	368632	8/3/2016, 10:40 AM	2016	10	Property Damage Only Crash	0	2	Driver of vehicle two following roadway when driver of vehicle one attempted to merge right. Vehicle one in an attempt to merge right per the sign hit vehicle two which was already in the right lane.	M	CARVER		Benton	U.S. Trunk	020000000	137.1637	USTH 212	Sideswipe - Same Directi	Motor Veh	On Roadwa	Daylight	None	Not at Intersection, Interchange or Jun	No Controls	Clear		Dry	2	NOT APPLICABLE	Motor Veh	Passenger	Westbound	Improper Turn/Merge		Motor Vehi	Changing Lanes	Two-Way, Divided, Un	60	Straight	Level	No Appare	Apparently	73	Male	Motor V	Mediur	Westbou	No Clear Con		Motor Vehi	Moving Forward		No Appare	Apparently	46	Male	US212@Cologne
2095066	326053	2/3/2016, 9:15 PM	2016	21	Property Damage Only Crash	0	1	Unit #1 was travelling WB on Hwy. 212. Unit #1 lost control on icy road and spun into ditch. Unit #1 collided with power pole causing damage to right front area of vehicle. Driver unit #1 not injured and no ambulance requested by Driver #1.	M	CARVER		Benton	U.S. Trunk	020000000	136.4744	USTH 212		Light Pole/	On Roadsid	Dark (No St	Road Surfa	Not at Intersection, Interchange or Jun	No Controls	Cloudy		Ice/Frost	2	NOT APPLICABLE	Motor Veh	Pickup	Westbound	No Clear Contributing		Utility Pole	Moving Forward	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	65	Female													US212@Cologne
2099029	519692	11/25/2017, 1:40 AM	2017	1	Unknown Severity Crash	0	0	Located Vehicle #1 in the ditch on the south side of Hwy 212 just west of Co Rd 36. Vehicle #1 ran off the road, struck a metal sign post and the driver left the scene. I attempted to contact owner by phone and all numbers have been disconnected. Unknown who the driver is. The vehicle sustained moderate damage. The post was yellow tagged.at this time it is unknown who the driver or how occupants were in the vehicle.	M	CARVER		Benton	U.S. Trunk	020000000	137.0939	USTH 212		Other Post,	On Roadsid	Dark (No St	Road Surfa	Not at Intersection, Interchange or Jun	No Controls	Clear		Dry	2	NOT APPLICABLE	Hit-And-Ru	Passenger	Eastbound			Other Post,	Moving Forward	Two-Way, Divided, Me	60	Curve Left	Level																	US212@Cologne
2158934	448295	4/28/2017, 10:35 AM	2017	10	Property Damage Only Crash	0	1	Unit #1 was travelling WB on Hwy. 212 west of Co Rd. 51. Unit #2 was travelling EB on Hwy. 212 west of Co Rd. 51. Unit #1 and Unit #2 came into contact as they passed each other, causing damage to unit #1 left side view mirror. Both units continued and did not stop. Driver unit #1 stated she did not cross centerline and was not speeding. Driver unit #1 said she only heard the contact with unit #1 side mirror and looked to see if unit #2 was stopping. Driver unit #1 said not vehicles pulled to shoulder, so she continued WB.	M	CARVER		Benton	U.S. Trunk	020000000	134.7076	USTH 212	Sideswipe - Opposing	Motor Veh	On Roadwa	Daylight	None	Not at Intersection, Interchange or Jun	No Controls	Clear		Dry	2	NOT APPLICABLE	Motor Veh	Sport Utilit	Westbound	No Clear Contributing Action			Moving Forward	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	43	Female	Hit-And-	Mediur	Eastbound			Motor Vehi	Moving Forward						US212 From Norwood You
2165123	622496	7/20/2018, 6:14 PM	2018	18	Possible Injury Crash	0	3	Unit one was west highway 212 in the left lane. Unit two was west highway 212 in right lane. Signs posted on right and left side of highway roadway divided highway ends and left lane ends merge right. Driver one stated he saw unit two in his mirror and driver one was slowing his vehicle. Scuff mark on roadway indicates that contact was made between unit one and unit two well into the 2 lane undivided portion of the roadway. Unit one made contact with unit two and pushed unit two into unit three traveling east on highway 212.	M	Carver		Benton	U.S. Trunk	020000000	137.0783	WB USTH 2	Sideswipe - Same Directi	Motor Veh	On Roadwa	Daylight	None	Other	Other	Cloudy		Dry	2	NOT APPLICABLE	Motor Veh	Medium /	Westbound	Other Contributing Act		Motor Vehi	Other	Other	60	Straight	Level	No Appare	Apparently	37	Male	Motor V	Passen	Westbou	Other Contri		Motor Vehi	Moving Forward		Possible Inj	Apparently	26	Male	US212@Cologne
2241968	581897	3/5/2018, 8:40 AM	2018	8	Minor Injury Crash	0	1	Vehicle #1 was traveling eastbound on Highway 212. vehicle #1 lost control on the snow/icy roadway. Vehicle #1 hit a metal guardrail and than the bridge wall. Driver #1 appeared to sustain minor injuries from this accident. Vehicle #1 was purchased with'in the past 2 weeks by Driver #1	M	CARVER		Benton	U.S. Trunk	020000000	137.7693	USTH 212		Guardrail F	On Roadwa	Daylight	Road Surfa	Not at Intersection, Interchange or Jun	Not Applicabl	Snow		Ice/Frost	2	NOT APPLICABLE	Motor Veh	Pickup	Eastbound	Over-correcting / Over		Guardrail (I	Moving Forward	Two-Way, Divided, Un	65	Curve Right	Uphill	Suspected	Apparently	19	Female													US212@Cologne
2264956	512220	10/27/2017, 5:35 PM	2017	17	Property Damage Only Crash	0	2	Vehicle#1 was EB on Hwy 212 1/2 mile west of County Road 51. Vehicle#2 was directly behind vehicle #1. Vehicle number #1 began slowing in traffic. Vehicle #2 could not slow in time and struck Vehicle #1. Vehicle #1 sustained minor damage to the rear. Vehicle #2 had minor damage to the front. No injuries. It was snowing and raining at the time of the crash and the road surface was wet. Both driver's worked at Screamtown and reported the incident one half hour after it happened while they were at work. No citations issued.	M	CARVER		Benton	U.S. Trunk	020000000	134.3567	USTH 212	Front to Rear	Motor Veh	On Roadwa	Daylight	Road Surfa	Not at Intersection, Interchange or Jun	No Controls	Snow	Rain	Wet	2	NOT APPLICABLE	Motor Veh	Passenger	Eastbound	No Clear Contributing		Motor Vehi	Slowing	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	34	Male	Motor V	Passen	Eastboun	Following To		Motor Vehi	Slowing		No Appare	Apparently	17	Female	US212 From Norwood You
2362789	486694	7/13/2017, 12:09 PM	2017	12	Property Damage Only Crash	0	3	212 WEST, WEST OF CR-153. V/1, A PICK-UP PULLING A TRAILER, WEST BOUND USTH 212. V/1 DRIVER TOLD ME THAT HE LOOKED DOWN FOR A SECOND, AND WHEN HE LOOKED UP, HE NOTICED A VEHICLE MAKING A LEFT TURN INTO A DRIVEWAY. NOT ABLE TO STOP IN TIME, V/1 VEERED TO THE RIGHT IN AN ATTEMPT TO MISS THE TURNING VEHICLE.V/1 HIT V/2. V/2 WAS PUSHED INTO THE E/B LANE, HITTING V/3. AT THE CRASH SCENE, I OBSERVED THE LEFT SIGNAL STILL BLINKING ON V/2.	M	Carver		Benton	U.S. Trunk	020000000	135.6613	USTH 212	Front to Rear	Motor Veh	On Roadwa	Daylight	None	Driveway Access Related	No Controls	Cloudy		Dry	2	NOT APPLICABLE	Motor Veh	Pickup	Westbound	Operated Motor Vehicle in Careles			Moving Forward	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	42	Male	Motor V	Pickup	Westbou	No Clear Contributing Ac			Vehicle Stopped or Sta		No Appare	Apparently	37	Male	US212 From Norwood You
2414718	398095	11/26/2016, 5:15 AM	2016	5	Minor Injury Crash	0	1	Unit 1 was travelling E/B on Hwy 212 west of Hwy 284. Unit 1 lost control of the vehicle on an icy bridge deck, due to Freezing conditions. Unit 1 went off the south side of the roadway and rolled approximately 150Ft down into the Ditch. The driver of unit 1 was partially trapped and had to be extricated. The driver suffered neck pain and a possible broken ankle. The driver was transported to Ridgeview in Waconia by Ridgeview ambulance. No Citations were issues. The crash was witness and they stated the driver lost control on the icy bridge deck.	M	CARVER		Benton	U.S. Trunk	020000000	137.8165	USTH 212		Ditch	On Roadsid	Dark (No St	Road Surfa	Not at Intersection, Interchange or Jun	No Controls	Fog/Smog/Smoke		Ice/Frost	2	NOT APPLICABLE	Motor Veh	Pickup	Eastbound	No Clear Contributing		Ditch	Moving Forward	Two-Way, Divided, Unprotected M		Straight	Level	Suspected	Apparently	31	Female													US212@Cologne
2415011	516398	11/10/2017, 5:24 PM	2017	17	Property Damage Only Crash	0	3	212, 1/2 MILE EAST OF CR-53. WEST BOUND TRAFFIC HAD SLOWED FOR A TRACTOR PULLING A RATHER LARGE PIECE OF EQUIPMENT. THIS CAUSED WEST BOUND TRAFFIC TO BACK UP. V/1 AND V/2 WERE WEST ON 212, WITH V/2 AHEAD OF V/1. V/2 HAD SLOWED FOR THE TRAFFIC BACK UP. TOPPING THE SLIGHT HILL, AND NOT REALIZING THAT THE TRAFFIC WAS BACKED UP, V/1 HIT V/2. THIS HIT CAUSED V/2 TO VEER INTO THE EAST BOUND LANE SIDEWAYS. WITH NO ADVANCED WARNING, V/3 RAN INTO THE SIDE OF V/2.	M	Carver		Benton	U.S. Trunk	020000000	135.3876	USTH 212	Front to Rear	Motor Veh	On Roadwa	Sunset	None	Not at Intersection, Interchange or Jun	No Controls	Cloudy		Dry	2	NOT APPLICABLE	Motor Veh	Cargo Van	Westbound	Following Too Closely		Motor Vehi	Moving Forward	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	32	Male	Motor V	Sport U	Westbou	Operated Motor Vehicle			Slowing		No Appare	Apparently	34	Female	US212 From Norwood You
2417305	651290	10/11/2018, 7:29 PM	2018	19	Property Damage Only Crash	0	1	The vehicle was traveling westbound on USTH 212 near CR 51. The driver stated that he thought it was a four lane highway, so he changed lanes to the left. When he realized he was in the oncoming lanes, he quickly corrected back to the right. He overcorrected and the vehicle began to fishtail. The driver lost control of the vehicle and it rolled over when it hit the edge of the shoulder. There were no reported injuries. The vehicle was towed from the scene.	M	Carver		Benton	U.S. Trunk	020000000	135.1465	USTH 212		Overturn/R	On Roadwa	Dark (No St	None	Not at Intersection, Interchange or Jun	No Controls	Cloudy		Dry	2	NOT APPLICABLE	Motor Veh	Pickup	Westbound	Operated Motor Vehic		Overturn/R	Overtaking/Passing	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	20	Male													US212 From Norwood You
2456326	663727	11/28/2018, 10:55 PM	2018	22	Property Damage Only Crash	0	1	Vehicle #1 was westbound on HWY 212 west of County Road 51. The road was snow packed at the time. Vehicle #1 lost control and ran off the right hand side of the road. Vehicle #1 then struck a power pole. No injuries. Xcel Energy notified of damaged pole.	M	CARVER		Benton	U.S. Trunk	020000000	134.5392	USTH 212		Light Pole/	Outside of T	Dark (No St	Road Surfa	Not at Intersection, Interchange or Jun	No Controls	Snow		Snow	2	NOT APPLICABLE	Motor Veh	Sport Utilit	Westbound	Other Contributing Act		Utility Pole	Moving Forward	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	29	Female													US212 From Norwood You
2476016	492989	8/10/2017, 6:37 AM	2017	6	Property Damage Only Crash	0	1	the driver and witness reported that he went off the road to the right because the driver fell asleep. The honda went down a deep ditch causing the front bumper cover to become detached. The vehicle was unable to drive out of the ditch. Colony Plaza towing	M	Carver		Benton	U.S. Trunk	020000000	136.7978	USTH 212		Ditch	On Shoulde	Daylight	None	Not at Intersection, Interchange or Jun	No Controls	Cloudy		Wet	2	NOT APPLICABLE	Motor Veh	Passenger	Westbound	Other Contributing Act		Ditch	Moving Forward	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	22	Male													US212@Cologne
2500150	409708	12/29/2016, 9:35 AM	2016	9	Property Damage Only Crash	0	1	Unit # 1 was westbound US Hwy. 212 about 1/4 west of CSAH 36 (West). Road condition was icy. Driver stated his rear tires lost traction and the vehicle slid off roadway to the right. Vehicle overturned onto right side in the ditch.	M	CARVER		Benton	U.S. Trunk	020000000	136.9001	USTH 212		Overturn/R	On Roadwa	Daylight	Road Surfa	Not at Intersection, Interchange or Jun	No Controls	Cloudy		Ice/Frost	2	NOT APPLICABLE	Motor Veh	Pickup	Westbound	No Clear Contributing		Overturn/R	Moving Forward	Two-Way, Not Divided	60	Straight	Level	No Appare	Apparently	31	Male													US212@Cologne

Hwy 212 & Hwy 51 Crashes - Raw Data

objectid	Incident ID	Date and Time	Year	Hour	Crash Severity	Number Ki	Number of	Officer Narrative	Constructio	County	City	Township	Route Type	Route ID	Route Mea	Roadway N	Divided Ro	Intersectio	Manner of Collision	First Harm	Relative Tr	Lighting Co	Road Circu	road_circu	Road Circu	road_circu	Relative In	Traffic Con	Weather P	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1 Type	Unit1 Vehi	Unit1 Direc	Unit1 Facto	Unit1 Facto	Unit1 Most	Unit1 Vehi	Unit1 Traff	Unit1 Poste	Unit1 Horiz	Unit1 Road	Unit1 Nonr	Unit1 Injur	Unit1 Phys	Unit1 Age	Unit1 Sex	Unit2 Type	Unit2 Vehi	Unit2 Direc	Unit2 Facto	Unit2 Facto	Unit2 Most	Unit2 Vehi	Unit2 Nonr	Unit2 Injur	Unit2 Phys	Unit2 Age	Unit2 Sex	otst_inters	city_sec
1967155	630875	8/28/2018, 7:44 AM	2018	7	Fatal Crash	1	2	The witnesses reported that the Chevy HHR stopped at the stop sign at northbound CR 51 at 212 and pulled out in front of the semi truck that was traveling west on 212 and was struck in the passenger side door. After the impact the Chevy HHR struck a light pole. The driver of the HHR was killed. No injuries reported from the driver of the Semi. Smith Oil towing for the HHR Jerry's Transmission Towing for the Semi.	M	Carver	Norwood Young Amer		U.S. Trunk	02000000(	134.8834	USTH 212	West		Angle	Motor Veh	On Roadwa	Daylight	None				Four-Way I	No Control	Cloudy	Rain	Wet	2		NOT APPLICABLE		Motor Veh	Medium /	Westbound	No Clear Contributing		Motor Veh	Moving Fo	Two-Way,	60	Straight	Level		No Appare	Apparently	52	Male	Motor Veh	Sport Utili	Northbour	Failure to Yield Right-o		Motor Veh	Moving Forward		Killed	Unknown	20	Female	USTH 212	US212 F
2049159	543109	2/5/2018, 9:30 AM	2018	9	Property Damage Only Crash	0	2	Unit 1 was eastbound on Hwy 212 and Unit 2 was directly behind it, with both vehicles approaching Co Rd 51. Both drivers, and a witness, said a tractor/trailer pulled out and turned left from northbound Co Rd 51 to westbound Hwy 212. The drivers said the truck did not yield the right of way to them. The Unit 1 driver said she was forced to slam on the brakes to avoid hitting the side of the truck. The Unit 2 driver said he had little time to react, slammed his brakes on, and the front of Unit 2 struck the rear of Unit 1.	M	CARVER		Benton	U.S. Trunk	02000000(	134.8852	USTH 212		CSAH 51	Front to Rear	Motor Veh	On Roadwa	Daylight	None				Four-Way I	No Control	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Eastbound	No Clear Contributing		Motor Veh	Moving Fo	Two-Way,	60	Straight	Level		No Appare	Apparently	26	Female	Motor Veh	Sport Utili	Eastbound	No Clear Contributing		Motor Veh	Moving Forward		No Appare	Apparently	39	Male	USTH 212	US212 F
1777789	496484	8/24/2017, 5:30 PM	2017	17	Property Damage Only Crash	0	2	Vehicle #1 was stopped at the stop sign on County Road 51 facing north. Vehicle #1 was attempting to make left hand turn to go west on Hwy 212. Vehicle #2 was eastbound on Hwy 212. Vehicle #1 pulled onto Hwy 212 and Vehicle #2 struck Vehicle #1. Vehicle #2 had the right away. Moderate damage. No injuries. Driver of Vehicle #1 was issued a citation for fail to yield.	M	CARVER		Benton	County Sta	04000065S	5.508872	CSAH 51	North		Angle	Motor Veh	On Roadwa	Daylight	None				Four-Way I	Stop Sign	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Pickup	Northbour	Failure to Yield Right-o		Motor Veh	Turning Le	Two-Way,	60	Straight	Level		No Appare	Apparently	30	Male	Motor Veh	Passenger	Eastbound	No Clear Contributing		Motor Veh	Moving Forward		No Appare	Apparently	28	Male		
1855646	390608	10/29/2016, 5:32 AM	2016	5	Property Damage Only Crash	0	2	CRASH LOCATION WB 212 / CR 51. DRIVER UNIT 1 STATED WB 212. DRIVER UNIT 1 STATED OBSERVED UNIT 2 APPROACHING FROM REAR AT HIGH RATE OF SPEED. DRIVER UNIT 1 STATED SHE WAS MAINTAINING HER LANE AND WAS REAR ENDED BY UNIT 2. DRIVER UNIT 2 WB 212 DIRECTLY BEHIND UNIT 1. DRIVER UNIT 2 STATED DID NOT KNOW HOW CRASH OCCURRED AND SUDDENLY HIT UNIT 1 FROM THE REAR. DRIVER UNIT 2 CITED FOR NO MINNESOTA DRIVERS LICENSE, NO INSURANCE ON MOTOR VEHICLE AND UNDER 21 DRINK AND DRIVE.	M	Carver		Benton	U.S. Trunk	02000000(	134.9668	USTH 212	West		Front to Rear	Motor Veh	On Roadwa	Dark (No S	None				Not at Inte	No Control	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Sport Utilit	Westbound	No Clear Contributing		Motor Veh	Moving Fo	Two-Way,	60	Straight	Level		No Appare	Apparently	59	Female	Motor Veh	Pickup	Westboun	Operated Motor Vehi		Motor Veh	Moving Forward		No Appare	Has Been D	19	Male		US212 F

US 212 & CSAH 153 Crashes - Raw Data

objectid	Incident ID	Date and Tir	Year	Hour	Crash Severity	Number Kil	Number of	Officer Narrative	Constructio	County	Township	Route Type	Route ID	Route Mea	Roadway N	Divided Roa	Intersectior	Manner of Collision
1831097	648096	9/28/2018,	2018	15	Property Damage Only Crash	0	2	Vehicle 2/Driver 2 was slowing for a vehicle in front of him that was turning from EB 212 to NB County Road 153. Vehicle 1/Driver 1 was speaking with the passengers in his vehicle, and was not looking at roadway and rear ended V2. D1 admitted fault in accident. Front airbags were deployed in V1. it should be noted that I did not smell the common scent of deployed airbags, which is normally very prominent when deployed. D1 stated that the vehicle had previously been in an front end accident. There was very minor damage to both vehicles, and the airbag deployment may have been due to previous damage weakening the crush points/sensors.	M	CARVER	Benton	U.S. Trunk	020000000	135.8616	USTH 212	Not Applicable		Front to Rear
2047007	328529	2/12/2016,	2016	12	Minor Injury Crash	0	2	Unit one was west bound on Hwy 212. Unit one was observed passing and speeding prior to crash. Unit two had pulled off of Co Rd 153 and was east bound getting up to Hwy speed on Hwy 212. Unit one drifted into the east bound lane and struck unit two. Driver of unit one had injured her left leg and was transported by Ridgeview to Glencoe HSP. Driver of unit two was not injured. Unit two was pulling cattle trailer and both axels were broken at th driver side. Unknown if unit two trailer was towed. Driver to unit one cited for fail to drive with due care after admitting to falling asleep at the wheel.	M	CARVER	Benton	U.S. Trunk	020000000	135.8914	USTH 212			Sideswipe - Opposing

objectid	First Harmf	Relative Tra	Lighting Co	Road Circu	Relative Int	Traffic Cont	Weather Pr	Surface Cor	Work Zone	Work Zone Workers Pr	Unit1 Type	Unit1 Vehic	Unit1 Direc	Unit1 Facto	Unit1 Facto	Unit1 Most	Unit1 Vehic	Unit1 Traffi	Unit1 Poste	Unit1 Horiz	Unit1 Road	Unit1 Injury	Unit1 Physi	Unit1 Age	Unit1 Sex
1831097	Motor Veh	On Roadwa	Daylight	None	Four-Way I	No Control	Clear	Dry	2	NOT APPLICABLE	Motor Veh	Passenger (	Eastbound	Driver Distracted		Motor Veh	Moving For	Two-Way, I	60	Straight	Level	No Appare	Apparently	17	Male
2047007	Motor Veh	On Roadwa	Daylight	None	Not at Inte	No Control	Clear	Dry	2	NOT APPLICABLE	Motor Veh	Passenger (	Westbound	Other Contributing Act		Motor Veh	Moving For	Two-Way, I	60	Straight	Level	Suspected	Asleep or F	20	Female

objectid	Unit2 Type	Unit2 Vehic	Unit2 Direc	Unit2 Facto	Unit2 Facto	Unit2 Most	Unit2 Vehic	Unit2 Nonn	Unit2 Injur	Unit2 Physi	Unit2 Age	Unit2 Sex	otst_inters	city_sectior	utmx	utmy	x	y
1831097	Motor Veh	Passenger (	Eastbound	No Clear Contributing /		Motor Veh	Slowing		No Appare	Apparently	43	Male		US212 Fror	434395.1	4957473	434395.1	4957473
2047007	Motor Veh	Pickup	Eastbound	No Clear Contributing /		Motor Veh	Moving Forward		No Appare	Apparently	50	Male	USTH 212 A	US212 Fror	434444.4	4957473	434444.4	4957473

US 212 & Carver County Access - Raw Data

FID	OBJECTID	incident_i	date_time_	incident_y	incident_h	constdistr	county_nar	city_name	roadway_t	route_type	route_id	route_mea	roadway_n	crash_seve	number_kil	number_of	manner_of	crash_type	relative_l	light_cond	road_circu	relative_1	weather_p	surface_co	workzone_	work_zone
0	69081	659111	11/7/2018 0:00	2018	5	M	Carver	Cologne	2	U.S. Trunk	020000000	136.7669	USTH 212	Possible Injury Crash	0	2	Angle	Motor Vehi	On Roadwa	Dark (No St	Road Surfa	Not at Inte	Cloudy	Ice/Frost	2	NOT APPLI

FID	narrative	utmx	utmy	latitude	longitude	u1_traffic	u1_unit_ty	u1_directi	u1f1_facto	v1_traffic	v1_posted_	v1_horizon	v1_roadwa	v1_vehicle	v1_vehic_1	p1_injury_
0	USTH 212 WEST OF COLOGNE Unit 1, a Carver County squad, was traveling west bound 212 when the deputy received a call for service in Cologne. Unit 1 driver pulled over into the turn lane at 11369 Highway 212 and activated the lights to do a U turn to hea	435852.2	4957477	44.76781	-93.8106	No Control	Motor Veh	Westbound	Unknown	Two-Way, I	60	Straight	Level	Sport Utility	Making a U	No Appare

FID	p1_physica	p1_age	p1_sex_de	u2_unit_ty	u2_directi	u2f1_facto	v2_vehicle	v2_vehic_1	p2_injury_	p2_physica	p2_age	p2_sex_de
0	Apparently	31	Female	Motor Vehi	Eastbound	No Clear Co	Pickup	Moving For	Possible Inj	Apparently	37	Male

Attachment B – MnDOT HSIP guidance

Use of Fatal Crashes

Type of Crash	Crash Severity	Cost per Crash
Fatal (F)	1 Fatal Crash	$12,300,000
Personal Injury (PI)	2 Serious Injury	$680,000
Personal Injury (PI)	3 Minor Injury	$210,000
Personal Injury (PI)	4 Possible Injury	$110,000
Property Damage (PD)	5 Property Damage Only	$12,000

Since fatal crashes are often randomly located, there is considerable debate as to whether they should be treated as personal injury crashes or as fatalities. Furthermore, the value assigned is subject to many considerations. With the above in mind, the following criteria shall be used when computing expected crash reduction benefits:

1. The cost assigned to a fatal crash may be used if there are two or more "correctable" fatal crashes within a three-year period (correctable is defined as the type of crash that the improvement is designed to correct).

OR

2. The cost per fatal crash may be used when there is at least one correctable fatal crash **and** two or more type "serious injury" crashes within a three-year period.

If the above criteria are not satisfied, the correctable fatal crash shall be treated as two "Serious Injury" type crashes (Fatal Crash = 2 x Serious Injury) when computing the benefit-cost ratio. To do this, enter the correctable fatal crash as two "Serious Injury" crashes in the "2" category on the HSIP B/C worksheet.

Attachment C - Technical references

U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

NHTSA
www.nhtsa.gov

DOT HS 811 232

November 2009

Factors Related to Fatal Single-Vehicle Run-Off-Road Crashes

5. Conclusions

Run-off-road crashes account for a significant percentage (around 70%) of all fatal single-vehicle crashes. FARS data (1991 to 2007) that includes detailed information about ROR crashes provided sufficient statistical evidence to conclude that certain roadway-, driver-, environment-, and vehicle-related factors closely associated with the occurrence of these crashes. Appropriate crash countermeasures based on the identified factors can reduce the occurrence of single-vehicle ROR crashes and hence of the fatalities.

Curved road segments, rural roads, high-speed-limit roadways, and roadways with fewer lanes (divided or undivided) are found to be more likely to be the scene of fatal single-vehicle ROR crashes as compared to the fatal single-vehicle OR crashes. Similarly, among environmental factors, adverse weather and night time periods are the factors associated with high risk of fatal single-vehicle ROR crashes.

Vehicles with high occupancy (two and more occupants), male driver, younger driver, and alcohol used by driver, are more likely to be involved in fatal single-vehicle ROR crashes as compared to the fatal single-vehicle OR crashes. Drivers with performance-related factors (sleepy, inattentive, over-correction, avoiding, etc.) are more likely to be involved in the fatal single-vehicle ROR crashes. Speeding vehicles and passenger cars are also associated with high risks of the fatal single-vehicle ROR crashes.

In the adverse weather condition and for the younger drivers (15 to 24 and 25 to 44), the speeding vehicle would increase the risk of fatal single-vehicle ROR crashes by an additional factor.

The above facts based on statistical evidence suggest several crash countermeasures. For example, improving roadway design such as flattening curves and installing shoulder rumble strips, or rehabilitation strategies such as building wide lanes or adding additional unpaved shoulder width on entire system, providing skid-resistant pavement surfaces, could reduce the likelihood of ROR crashes.

A Pilot Study on Mitigating Run-Off-Road Crashes

Final Report

Prepared by:

Christopher Edwards
Nichole Morris
Michael Manser

HumanFIRST Program
Department of Mechanical Engineering
University of Minnesota

CTS 13-23

Chapter 3. Run-Off-Road Countermeasures

Phase one of this pilot project consisted of a review of relevant literature examining the array of infrastructure/environmental and driver related factors contributing to fatal and injurious ROR crashes. Results of Phase One indicated that infrastructure/environmental factors such as rural two lane roadways and driver related factors such as inattention and poor responses to an ROR event can contribute to the unacceptably high rate of ROR crash related fatalities and injuries. The results begin to indicate that several of the factors (e.g., inattention, distraction) can be addressed by ROR countermeasure through improved driver feedback and warnings while other factors (e.g., poor driver responses to ROR events) are more difficult to address.

The purpose of Phase Two was to review and briefly summarize the existing scientific literature to identify any new or insufficiently examined ROR countermeasure that may significantly reduce ROR fatalities and injuries. We employed taxonomies that categorized the review of literature results into infrastructure/environmental countermeasures and driver countermeasures. Similar to Phase One, the review of literature was not meant to be exhaustive but rather to briefly summarize primary countermeasures in these areas so that underutilized but promising ROR countermeasures could be identified. To accomplish this the research team scanned technical reports and articles published by transportation safety journals, federal and state agencies, and private agencies.

3.1 Infrastructure and Environmental Countermeasures

Engineers have applied, with varying success, a number of different countermeasures to negate the environmental and driver related factors that contribute to ROR events. An initial approach to minimize the occurrence of ROR events was to employ infrastructure-based countermeasures (see Table 5). These included countermeasures such as flattening and widening side slopes to prevent rollovers, eliminating shoulder drop-offs, providing skid-resistant pavement to increase traction, flattening curves, and installing shoulder and center lane rumble strips (which create a vibration in the vehicle, alerting the driver to the fact that he or she has crossed over a lane). Another factor that led to an increased severity of ROR crashes was the likelihood of colliding with a stationary object (e.g. pole, tree) off the road after a ROR event. To reduce the severity of ROR crashes, objects are removed or relocated away from particularly high-risk areas.

The variety of the infrastructural improvements employed has yielded some promising reductions in ROR crashes. The FHWA conducted a before-after research effort using Highway Safety Information System (HSIS) data for intersections in Illinois. The report identified a reduction in single vehicle rural ROR events by a total of 21.1% with a decrease in injury accidents of 7.3% (FHWA, 1999).

The infrastructure and environmental countermeasures review of literature indicated that these countermeasures could have a marked impact on reducing the rate of ROR crashes. These positive findings are encouraging but should also be placed within a larger transportation safety context that acknowledges their true potential. In particular, it is noted that ROR crash rates have failed to decline significantly from 2004 to 2009 (FHWA Roadway Departure Strategic Plan, 2013), thus suggesting that the benefits of infrastructure and environmental

countermeasures may have been maximized and, as a result, it is necessary to develop and deploy new ROR countermeasures.

Table 5: Infrastructure/Environmental mitigation countermeasures.

COUNTER-MEASURES	LITERATURE	GOALS	CONCLUSIONS
Rumble strips on shoulder	Neuman et al. (2003), Patel et al. (2007), Lord et al., (2011)	The goal was to prevent vehicles from leaving roadway. It has a low cost to implement and a short time frame to do so (less than a year).	Identified that rumble strips could reduce ROR crash rate by 20-50 percent. Reduction in Minnesota ROR events by 13 percent.
Shoulder widening and paving	Neuman et al. (2003), Lord et al. (2011).	The goal was to prevent vehicles from leaving roadway.	ADT impacts the effectiveness of shoulder widening. One study noted an ROR reduction of up to 50 percent with a 4ft widening. Nominal width extensions (e.g., 2ft) can reduce crashes by 4%.
Reduction of pavement edge drops	Lord et al (2011), Hallmark et al., (2006).	The goal was to prevent abrupt drop-off when vehicles depart roadway and eliminate re-entering problems.	Drop-offs greater than 2-inches promote increased severity of crashes. Providing sloped pavement edge promotes easier roadway re-entry.
Removing trees/poles in high-risk areas	Neuman et al. (2003).	The goal was to minimize the likelihood of crashing into an object. It has a low cost to implement and a short time frame to do so.	Increase in clear zones reflected decreases in crashes. For example, clearing an additional 5ft reduced crash likelihood of 13%.
Enhanced delineation on road curvatures	Neuman et al. (2003).	The goal was to prevent vehicles from leaving the roadway. It has a low cost to implement and short time frame to do so.	Increasing roadway curve delineation reduced the ROR crashes rate by 15%.
Enhanced pavement markings	Neuman et al. (2003), Lord et al., (2011)	The goal was to prevent vehicles from leaving the roadway. It has a low cost to implement and a short time frame to do so.	Effective in highlighting the lane edge and may reduce ROR crashes by 10-15%.
Maintaining/improving existing guardrails	Lord et al., (2011)	The goal was to reduce the severity of the crash. It has a moderate to high cost to implement and a medium length time frame to do so.	Decrease in collision speeds from 50-75 percent thought to aid ROR crashes, presents an additional roadside object.

Fatal Run off the Road Crashes on Rural Two-Lane Two-Way Highways in Minnesota

A Report Prepared

By

Derek Leuer, PE
Office of Traffic, Safety, and Technology
Minnesota Department of Transportation

August 4, 2015

Strategies to Address Run-off-the-Road Crashes

The majority of fatal run-off-the-road crashes occur from drivers drifting or losing control of the vehicle and leaving the designated lane. An effort should be made to increase the visibility and awareness of each driver's respective lane. This includes:

Edgeline and Centerline Rumble Strips

Edgeline Rumble Strips are indentations that are milled into the pavement outside of the lane edge, or on the lane's white marking (formerly known as rumble stripEs). They provide immediate auditory and tactile lane departure warning to the driver as the vehicle approaches and crosses the edgeline. Edgeline rumble strips effectively reduce fatal and severe injury crashes by 17-36% (Torbic, et al. 2009. NCHRP Report 641). Edgeline Rumble Strips are one of the nine proven safety countermeasures according to the Federal Highway Administration (FHWA). Edgeline Rumble strips are a low cost strategy; current construction costs are roughly $3,000 per mile. Centerline Rumble Strips (CLRS) are also an important strategy, as they can mitigate the run-off-the-road left, head-on, and sideswipe crash problems. The fact that vehicles are just as likely to depart left as they are to depart right makes CLRS just as important as edge line rumble strips. Centerline Rumble strips are a low cost strategy; current construction costs are roughly $3,500 per mile The noise caused by vehicles that cross edge line and centerline rumbles can produce intermittent, noise that can impact residents proximal to centerline rumble strip installations. MnDOT is currently working to address this concern and is developing a rumble strip that produces less external noise.

6-8" Wide white edgelines

The typical pavement marking is 4" for the yellow centerline and the white edge line. Widening the pavement marking and/or using materials with higher retro-reflectivity (retro-reflectivity is a measure of how much light is reflected back to a driver from a sign or pavement marking) can help to provide increased delineation and guidance for drivers in dark and/or adverse weather conditions. Recent studies have found a 10% or greater crash reduction (Carlson et al, 2013 and Fleming, 2013) versus the control sites. The cost on the wider lines is around $800 per mile. Wider edge lines help drivers navigate the road, but provide no direct auditory or tactile feedback to alert the driver.

Clear Zone

The clear zone is defined as the area outside of the travel lane that should be kept clear of objects that are not breakaway or defined as crashworthy, and slopes should be traversable. Breakaway and crashworthy devices are those that have been designed and tested to reduce the chance for serious injuries or fatal crashes if impacted by an errant vehicle at high speeds. For most rural two-lane two-way highways, this zone ranges from 15'-40' outside of the lane. Removing objects in the clear zone can be politically charged at times due to the removal of trees, utility poles, and other residential objects. Creating clear zones can be difficult. However, this is important, especially on rural roads with traffic volumes above 400 vehicles/day. Recently, the FHWA has put a renewed emphasis on this strategy.

Attachment D – Pages from submitted application

Application

13860 - 2020 Roadway Expansion

14049 - US 212 Freight Mobility and Safety Project from CSAH 51 to CSAH 36

Regional Solicitation - Roadways Including Multimodal Elements

Status: Editing

Submitted Date:

Primary Contact

Name:*

Salutation	First Name	Middle Name	Last Name
	Angie		Stenson

Title: Sr. Transportation Planner

Department: Public Works Division

Email: astenson@co.carver.mn.us

Address: 11360 Highway 212

Suite 1

*

City	State/Province	Postal Code/Zip
Cologne	Minnesota	55322

Phone:*

Phone	Ext.
952-466-5273	

Fax: 952-466-5223

What Grant Programs are you most interested in? Regional Solicitation - Roadways Including Multimodal Elements

Organization Information

Name: CARVER COUNTY

Jurisdictional Agency (if different):

Organization Type: County Government

Organization Website:

Address: PUBLIC WORKS

11360 HWY 212 W #1

*			
	COLOGNE	Minnesota	55322-9133
	City	State/Province	Postal Code/Zip

County: Carver

Phone:* Ext.

Fax:

Project Information

Project Name US 212 Freight Mobility and Safety Project from CSAH 51 to CSAH 36

Primary County where the Project is Located Carver

Cities or Townships where the Project is Located: Benton Township

Jurisdictional Agency (If Different than the Applicant): MnDOT

Brief Project Description (Include location, road name/functional class, type of improvement, etc.)

The US 212 Expansion Project in Carver County between CSAH 51 and CSAH 36 will expand the existing Principal Arterial from a rural two-lane undivided highway to a four-lane expressway. The project will address high crash rates and unsafe pedestrian crossings through the implementation of additional lanes, Reduced Conflict Intersections (RCIs), medians, and wider shoulders. These improvements will eliminate freight inefficiencies, reduce rural highway fatalities, and strengthen rural access to economic opportunities in the Twin Cities Metropolitan Area. The project design provides a cost effective high-benefit solution to address safety and enhance access and mobility for the US 212 corridor.

US 212 is a vital corridor on the National Highway System (NHS), identified as a Critical Rural Freight Corridor, facilitating freight movements between rural Minnesota, South Dakota, Wyoming, and Montana. The corridor:

- Provides highway freight mobility and connectivity for over 22,000 square miles of southwest Minnesota and South Dakota that is not currently served by the Interstate System or freeways.

- Carries more trucks daily (1,900) than the total traffic volume (both cars and trucks) on 40 percent of Minnesota highways.

- Truck volumes significantly exceed typical truck percentages on state highways.

- The corridor serves over 65 major freight generators providing access to ports, rail and other modes.

- Only high priority interregional corridor in the metro area that still has two-lane segments.

In addition, this roadway segment needs pavement improvements in order to maintain a state of good repair. US 212 was originally constructed in 1929, with no expansion or reconstruction completed on the corridor since that time, resulting in freight cost and time inefficiencies.

The existing roadway between CSAH 51 and Cologne is currently at capacity and is identified as a future Congested Principal Arterial in the Metropolitan Council's 2040 Regional Travel Demand Model. In comparison, the adjacent four-lane US 212 segments are not congested today or by 2040, suggesting that modernizing the highway and adding capacity will improve mobility for the corridor. The proposed roadway segment will be converted into a four-lane, divided facility to eliminate the current two-lane conflict merge points at both ends of the corridor. The improvements proposed by this project will facilitate safer and more efficient movement of traffic through this congested segment of US 212, benefiting the regional, state, and national transportation system and improving rural and freight access to the regional trade market area.

(Limit 2,800 characters; approximately 400 words)

TRANSPORTATION IMPROVEMENT PROGRAM (TIP) DESCRIPTION - will be used in TIP if the project is selected for funding. See MnDOT's TIP description guidance.

US 212 from CSAH 51 to CSAH 36. Reconstruct and Expand 2 lane to 4 lane and access management

Project Length (Miles)

to the nearest one-tenth of a mile

3.3

Project Funding

Are you applying for competitive funds from another source(s) to implement this project?

Yes

If yes, please identify the source(s)

USDOT Infrastructure for Rebuilding America (INFRA) grant program submitted on February 25, 2020

Federal Amount $10,000,000.00

Match Amount $15,977,000.00

Minimum of 20% of project total

Project Total $25,977,000.00

For transit projects, the total cost for the application is total cost minus fare revenues.

Match Percentage 61.5%

Minimum of 20%
Compute the match percentage by dividing the match amount by the project total

Source of Match Funds County and State Funds

A minimum of 20% of the total project cost must come from non-federal sources; additional match funds over the 20% minimum can come from other federal sources

Preferred Program Year

Select one: 2024

Select 2022 or 2023 for TDM projects only. For all other applications, select 2024 or 2025.

Additional Program Years: 2021, 2022, 2023

Select all years that are feasible if funding in an earlier year becomes available.

Project Information-Roadways

County, City, or Lead Agency Carver County

Functional Class of Road Principal Arterial

Road System TH

TH, CSAH, MSAS, CO. RD., TWP. RD., CITY STREET

Road/Route No. 212

i.e., 53 for CSAH 53

Name of Road NA

Example; 1st ST., MAIN AVE

Zip Code where Majority of Work is Being Performed 55368

(Approximate) Begin Construction Date 07/01/2022

(Approximate) End Construction Date 11/30/2024

TERMINI:(Termini listed must be within 0.3 miles of any work)

From:
(Intersection or Address) CSAH 51

To:
(Intersection or Address) CSAH 36

DO NOT INCLUDE LEGAL DESCRIPTION

Or At

Miles of Sidewalk (nearest 0.1 miles) 0

Miles of Trail (nearest 0.1 miles) 0

Miles of Trail on the Regional Bicycle Transportation Network (nearest 0.1 miles) 0

Primary Types of Work Grading, Agg base, Agg surface, Bit base, Bit surface, Storm sewer, Intersection curb & gutter, Turf/landscaping, Lighting, Access management

Examples: GRADE, AGG BASE, BIT BASE, BIT SURF, SIDEWALK, CURB AND GUTTER,STORM SEWER, SIGNALS, LIGHTING, GUARDRAIL, BIKE PATH, PED RAMPS, BRIDGE, PARK AND RIDE, ETC.

BRIDGE/CULVERT PROJECTS (IF APPLICABLE)

Old Bridge/Culvert No.:

New Bridge/Culvert No.:

Structure is Over/Under (Bridge or culvert name):

Requirements - All Projects

All Projects

1.The project must be consistent with the goals and policies in these adopted regional plans: Thrive MSP 2040 (2014), the 2040 Transportation Policy Plan (2018), the 2040 Regional Parks Policy Plan (2018), and the 2040 Water Resources Policy Plan (2015).

Check the box to indicate that the project meets this requirement. Yes

2.The project must be consistent with the 2040 Transportation Policy Plan. Reference the 2040 Transportation Plan goals, objectives, and strategies that relate to the project.

Briefly list the goals, objectives, strategies, and associated pages:

Goal A, Strategy A1, pg. 2.2

Goal B, Strategies B1, B3, B6, pg. 2.5, 2.6, 2.8

Goal C, Strategies C1 & C10, pg. 2.10, 2.18

Goal D, Strategies D1 & D3, pg. 2.26, 2.27

Goal E, Strategy E3, pg. 2.31

Goal F, Strategies F5 & F7, pg. 2.37

Limit 2,800 characters, approximately 400 words

3.The project or the transportation problem/need that the project addresses must be in a local planning or programming document. Reference the name of the appropriate comprehensive plan, regional/statewide plan, capital improvement program, corridor study document [studies on trunk highway must be approved by the Minnesota Department of Transportation and the Metropolitan Council], or other official plan or program of the applicant agency [includes Safe Routes to School Plans] that the project is included in and/or a transportation problem/need that the project addresses.

Carver County 2040 Comprehensive Plan Page 4.7

List the applicable documents and pages:

Carver County Transportation Tax Plan (2017)

Limit 2,800 characters, approximately 400 words

4.The project must exclude costs for studies, preliminary engineering, design, or construction engineering. Right-of-way costs are only eligible as part of transit stations/stops, transit terminals, park-and-ride facilities, or pool-and-ride lots. Noise barriers, drainage projects, fences, landscaping, etc., are not eligible for funding as a standalone project, but can be included as part of the larger submitted project, which is otherwise eligible.

Check the box to indicate that the project meets this requirement. Yes

5.Applicants that are not State Aid cities or counties in the seven-county metro area with populations over 5,000 must contact the MnDOT Metro State Aid Office prior to submitting their application to determine if a public agency sponsor is required.

Check the box to indicate that the project meets this requirement. Yes

6.Applicants must not submit an application for the same project elements in more than one funding application category.

Check the box to indicate that the project meets this requirement. Yes

7.The requested funding amount must be more than or equal to the minimum award and less than or equal to the maximum award. The cost of preparing a project for funding authorization can be substantial. For that reason, minimum federal amounts apply. Other federal funds may be combined with the requested funds for projects exceeding the maximum award, but the source(s) must be identified in the application. Funding amounts by application category are listed below.
Strategic Capacity (Roadway Expansion): *$1,000,000 to $10,000,000*
Roadway Reconstruction/Modernization: *$1,000,000 to $7,000,000*
Traffic Management Technologies (Roadway System Management): *$250,000 to $3,500,000*
Spot Mobility and Safety: *$1,000,000 to $3,500,000*
Bridges Rehabilitation/Replacement: *$1,000,000 to $7,000,000*

Check the box to indicate that the project meets this requirement. Yes

8.The project must comply with the Americans with Disabilities Act (ADA).

Check the box to indicate that the project meets this requirement. Yes

9.In order for a selected project to be included in the Transportation Improvement Program (TIP) and approved by USDOT, the public agency sponsor must either have a current Americans with Disabilities Act (ADA) self-evaluation or transition plan that covers the public right of way/transportation, as required under Title II of the ADA. The plan must be completed by the local agency before the Regional Solicitation application deadline. For the 2022 Regional Solicitation funding cycle, this requirement may include that the plan is updated within the past five years.

The applicant is a public agency that employs 50 or more people and has a completed ADA transition plan that covers the public right of way/transportation.

Date plan completed: 02/18/2014

Link to plan: https://www.co.carver.mn.us/home/showdocument?id=1164

The applicant is a public agency that employs fewer than 50 people and has a completed ADA self-evaluation that covers the public right of way/transportation.

Date self-evaluation completed:

Link to plan:

Upload plan or self-evaluation if there is no link

Upload as PDF

10.The project must be accessible and open to the general public.

Check the box to indicate that the project meets this requirement. Yes

11.The owner/operator of the facility must operate and maintain the project year-round for the useful life of the improvement, per FHWA direction established 8/27/2008 and updated 6/27/2017.

Check the box to indicate that the project meets this requirement. Yes

12.The project must represent a permanent improvement with independent utility. The term independent utility means the project provides benefits described in the application by itself and does not depend on any construction elements of the project being funded from other sources outside the regional solicitation, excluding the required non-federal match. Projects that include traffic management or transit operating funds as part of a construction project are exempt from this policy.

Check the box to indicate that the project meets this requirement. Yes

13.The project must not be a temporary construction project. A temporary construction project is defined as work that must be replaced within five years and is ineligible for funding. The project must also not be staged construction where the project will be replaced as part of future stages. Staged construction is eligible for funding as long as future stages build on, rather than replace, previous work.

Check the box to indicate that the project meets this requirement. Yes

14.The project applicant must send written notification regarding the proposed project to all affected state and local units of government prior to submitting the application.

Check the box to indicate that the project meets this requirement. Yes

Roadways Including Multimodal Elements

1.All roadway and bridge projects must be identified as a principal arterial (non-freeway facilities only) or A-minor arterial as shown on the latest TAB approved roadway functional classification map.

Check the box to indicate that the project meets this requirement. Yes

Roadway Expansion and Reconstruction/Modernization and Spot Mobility projects only:

2.The project must be designed to meet 10-ton load limit standards.

Check the box to indicate that the project meets this requirement. Yes

Bridge Rehabilitation/Replacement and Strategic Capacity projects only:

3.Projects requiring a grade-separated crossing of a principal arterial freeway must be limited to the federal share of those project costs identified as local (non-MnDOT) cost responsibility using MnDOTs Cost Participation for Cooperative Construction Projects and Maintenance Responsibilities manual. In the case of a federally funded trunk highway project, the policy guidelines should be read as if the funded trunk highway route is under local jurisdiction.

Check the box to indicate that the project meets this requirement.

4.The bridge must carry vehicular traffic. Bridges can carry traffic from multiple modes. However, bridges that are exclusively for bicycle or pedestrian traffic must apply under one of the Bicycle and Pedestrian Facilities application categories. Rail-only bridges are ineligible for funding.

Check the box to indicate that the project meets this requirement.

Bridge Rehabilitation/Replacement projects only:

5.The length of the bridge must equal or exceed 20 feet.

Check the box to indicate that the project meets this requirement.

6. The bridge must have a National Bridge Inventory Rating of 6 or less for rehabilitation projects and 4 or less for replacement projects.

Check the box to indicate that the project meets this requirement.

Roadway Expansion, Reconstruction/Modernization, and Bridge Rehabilitation/Replacement projects only:

7. All roadway projects that involve the construction of a new/expanded interchange or new interchange ramps must have approval by the Metropolitan Council/MnDOT Interchange Planning Review Committee prior to application submittal. Please contact Michael Corbett at MnDOT (Michael.J.Corbett@state.mn.us or 651-234-7793) to determine whether your project needs to go through this process as described in Appendix F of the 2040 Transportation Policy Plan.

Check the box to indicate that the project meets this requirement.

Requirements - Roadways Including Multimodal Elements

Specific Roadway Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Mobilization (approx. 5% of total cost)	$1,001,000.00
Removals (approx. 5% of total cost)	$840,000.00
Roadway (grading, borrow, etc.)	$2,944,000.00
Roadway (aggregates and paving)	$7,725,000.00
Subgrade Correction (muck)	$4,133,000.00
Storm Sewer	$74,000.00
Ponds	$1,795,000.00
Concrete Items (curb & gutter, sidewalks, median barriers)	$74,000.00
Traffic Control	$601,000.00
Striping	$35,000.00
Signing	$245,000.00
Lighting	$75,000.00
Turf - Erosion & Landscaping	$1,914,000.00
Bridge	$0.00
Retaining Walls	$0.00
Noise Wall (not calculated in cost effectiveness measure)	$0.00
Traffic Signals	$0.00
Wetland Mitigation	$0.00
Other Natural and Cultural Resource Protection	$0.00
RR Crossing	$0.00
Roadway Contingencies	$2,362,000.00

Other Roadway Elements	$2,002,000.00
Totals	**$25,820,000.00**

Specific Bicycle and Pedestrian Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Path/Trail Construction	$143,000.00
Sidewalk Construction	$0.00
On-Street Bicycle Facility Construction	$0.00
Right-of-Way	$0.00
Pedestrian Curb Ramps (ADA)	$14,000.00
Crossing Aids (e.g., Audible Pedestrian Signals, HAWK)	$0.00
Pedestrian-scale Lighting	$0.00
Streetscaping	$0.00
Wayfinding	$0.00
Bicycle and Pedestrian Contingencies	$0.00
Other Bicycle and Pedestrian Elements	$0.00
Totals	**$157,000.00**

Specific Transit and TDM Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Fixed Guideway Elements	$0.00
Stations, Stops, and Terminals	$0.00
Support Facilities	$0.00
Transit Systems (e.g. communications, signals, controls, fare collection, etc.)	$0.00
Vehicles	$0.00
Contingencies	$0.00
Right-of-Way	$0.00
Other Transit and TDM Elements	$0.00
Totals	**$0.00**

Transit Operating Costs

Number of Platform hours	0
Cost Per Platform hour (full loaded Cost)	$0.00
Subtotal	$0.00
Other Costs - Administration, Overhead,etc.	$0.00

Totals

Total Cost	$25,977,000.00
Construction Cost Total	$25,977,000.00
Transit Operating Cost Total	$0.00

Congestion within Project Area:

The measure will analyze the level of congestion within the project area. Council staff will provide travel speed data on the "Level of Congestion" map. The analysis will compare the peak hour travel speed within the project area to fee-flow conditions.

Free-Flow Travel Speed:	60
Peak Hour Travel Speed:	52
Percentage Decrease in Travel Speed in Peak Hour compared to Free-Flow:	13.33%
Upload Level of Congestion map:	1589488578065_US212_Expansion_Congestion.pdf

Congestion on adjacent Parallel Routes:

Adjacent Parallel Corridor	TH 5/TH 25

Adjacent Parallel Corridor Start and End Points:

Start Point:	US 212
End Point:	0.1 mile west of TH 284
Free-Flow Travel Speed:	38

The Free-Flow Travel Speed is black number.

Peak Hour Travel Speed:	23

The Peak Hour Travel Speed is red number.

Percentage Decrease in Travel Speed in Peak Hour Compared to Free-Flow:	39.47%
Upload Level of Congestion Map:	1589488578065_US212_Expansion_Congestion.pdf

Principal Arterial Intersection Conversion Study:

Proposed interchange or at-grade project that reduces delay at a High Priority Intersection:

(80 Points)

Proposed at-grade project that reduces delay at a Medium Priority Intersection:

(60 Points)

Proposed at-grade project that reduces delay at a Low Priority Intersection:

(50 Points)

Proposed interchange project that reduces delay at a Medium Priority Intersection:

(40 Points)

Proposed interchange project that reduces delay at a Low Priority Intersection:

(0 Points)

Not listed as a priority in the study: Yes

(0 Points)

Measure B: Project Location Relative to Jobs, Manufacturing, and Education

Existing Employment within 1 Mile: 695

Existing Manufacturing/Distribution-Related Employment within 1 Mile: 368

Existing Post-Secondary Students within 1 Mile: 0

Upload Map 1589469916070_US212_Expansion_RegionalEconomy.pdf

Please upload attachment in PDF form.

Measure C: Current Heavy Commercial Traffic

RESPONSE: Select one for your project, based on the Regional Truck Corridor Study:

Along Tier 1: Yes

Miles: 3.3

(to the nearest 0.1 miles)

Along Tier 2:

Miles: 0

(to the nearest 0.1 miles)

Along Tier 3:

Miles: 0

(to the nearest 0.1 miles)

The project provides a direct and immediate connection (i.e., intersects) with either a Tier 1, Tier 2, or Tier 3 corridor:

None of the tiers:

Measure A: Current Daily Person Throughput

Location	US 212 west of CSAH 51
Current AADT Volume	12700
Existing Transit Routes on the Project	N/A

For New Roadways only, list transit routes that will likely be diverted to the new proposed roadway (if applicable).

Upload Transit Connections Map	1589470046327_US212_Expansion_Transit.pdf

Please upload attachment in PDF form.

Response: Current Daily Person Throughput

Average Annual Daily Transit Ridership	0
Current Daily Person Throughput	16510.0

Measure B: 2040 Forecast ADT

Use Metropolitan Council model to determine forecast (2040) ADT volume	No
If checked, METC Staff will provide Forecast (2040) ADT volume	
OR	
Identify the approved county or city travel demand model to determine forecast (2040) ADT volume	2040 Carver County Comprehensive Plan
Forecast (2040) ADT volume	22000

Measure A: Connection to disadvantaged populations and projects benefits, impacts, and mitigation

*1.**Sub-measure**: Equity Population Engagement: A successful project is one that is the result of active engagement of low-income populations, people of color, persons with disabilities, youth and the elderly. Engagement should occur prior to and during a projects development, with the intent to provide direct benefits to, or solve, an expressed transportation issue, while also limiting and mitigating any negative impacts. Describe and map the location of any low-income populations, people of color, disabled populations, youth or the elderly within a ½ mile of the proposed project. Describe how these specific populations were engaged and provided outreach to, whether through community planning efforts, project needs identification, or during the project development process. Describe what engagement methods and tools were used and how the input is reflected in the projects purpose and need and design. Elements of quality engagement include: outreach and engagement to specific communities and populations that are likely to be directly impacted by the project; techniques to reach out to populations traditionally not involved in community engagement related to transportation projects; feedback from these populations identifying potential positive and negative elements of the proposed project through engagement, study recommendations, or plans that provide feedback from populations that may be impacted by the proposed project. If relevant, describe how NEPA or Title VI regulations will guide engagement activities.*

Carver is a diverse County with approximately 4,100 Hispanic/Latino, 2,800 Asian, 1,800 Black/African American, and 200 American Indian residents, Within four miles of the project are four senior housing facilities, seven schools, five healthcare facilities, and eleven affordable housing sites with 155 units (providing services and housing for low-income, persons with disabilities, and youth/elderly populations (see attached map)). The Project improves a regionally significant corridor and provides direct economic, safety, and social benefits to these diverse populations.

Response:

These communities were engaged by surveys distributed to over 600 locations during project development. Locations were chosen to include senior/assisted living and low-income housing. Through direct mailing and targeted distribution online, surveys were targeted toward populations not typically involved in transportation projects (residents under age 18, disabled, and low-income). Online distribution was targeted by age (youth/elderly) and educational attainment.

The survey received 432 total responses, of which seventy respondents identified as members of diverse populations (over the age of 65 or Hispanic/Latino, Asian, Black/African American or American Indian). Over 60 percent of respondents listed turning on/off US 212 and the number of crashes as their top two concerns along the corridor. The Project purpose specifically addresses these concerns, calling for dramatic safety improvements to improve Highway access and reduce the crash rate. To address these concerns, the Project will implement RCIs to improve safety while entering or exiting US 212 and reduce crashes and will convert US 212 to a four-lane divided highway to reduce collisions. Roughly 40 percent of respondents listed safety concerns

while driving in snow as a primary concern, which was directly translated to a project need. The Project will install snow fencing along US 212, to prevent snow drifts and improve winter driving for residents.

To keep all residents informed and provide opportunities for feedback, a project website was created. The site displays information on design development, construction schedules, open houses, and other opportunities for informational meetings and feedback. The County will host additional public meetings as they move along in the project development process.

(Limit 2,800 characters; approximately 400 words)

*2.**Sub-measure**: Equity Population Benefits and Impacts: A successful project is one that has been designed to provide direct benefits to low-income populations, people of color, persons with disabilities, youth and the elderly. All projects must mitigate potential negative benefits as required under federal law. Projects that are designed to provide benefits go beyond the mitigation requirement to proactively provide transportation benefits and solve transportation issues experienced by Equity populations.*
a.Describe the projects benefits to low-income populations, people of color, children, people with disabilities, and the elderly. Benefits could relate to pedestrian and bicycle safety improvements; public health benefits; direct access improvements for residents or improved access to destinations such as jobs, school, health care or other; travel time improvements; gap closures; new transportation services or modal options, leveraging of other beneficial projects and investments; and/or community connection and cohesion improvements. Note that this is not an exhaustive list.

Response:

The project benefits low-income populations by improving access, safety, and efficiency for residents travelling to the Twin Cities for employment, healthcare or education. 61 percent of Carver County residents travel outside the County for work, most commute to the Twin Cities along US 212. Expanded capacity along US 212 will result in increased travel time reliability, fewer crashes, and decreased congestion for the 12,000 workers who live within one mile of US 212.

The project benefits children by improving safety at school bus stops within the project area. Currently, children wait in the shoulder of the existing two-lane undivided roadway with narrow shoulders. The bus then pulls onto the shoulder for pickup and cars in all lanes stop. With the proposed project, children will be able to wait along an expanded 8 ft. shoulder, providing greater distance from vehicular traffic. In addition, the median construction will prevent opposing lanes of traffic from interaction with the bus loading area. These separated lanes will also experience decreased congestion as they will no longer need to brake for a stopped bus.

The project benefits people with disabilities by improving accessibility along the corridor. The project will incorporate ADA compliant pedestrian ramps at all intersections along US 212. These improvements will ensure safe and accessible pedestrian crossings for residents of all abilities. With the introduction of RCIs the number of conflict points between pedestrian and vehicular traffic will be decreased. Instead of pedestrians crossing the roadway with four directions of vehicular traffic, pedestrians will only interact with two directions of vehicles.

The project will improve access for residents relying on public transit for employment, healthcare or education. Nearby transit and commuting facilities,

such as the SmartLink (TransitLink) bus garage (adjacent to US 212) and a Park and Ride (East of Project), will benefit from improved safety, efficiency, and travel time reliability along the roadway. Roadway benefits will translate to travel time savings, improved safety, and increased reliability for residents who utilize these services. As elderly, youth, low-income and disabled populations are often frequent users of public transit, the project will provide direct benefits to these equity populations with a connection to the park and ride a few miles east of the project area.

The conversion from two to four lanes will significantly improve travel time savings along US 212. The project will result in about $61 million in travel time benefits (between the years of 2018 and 2053). All users of US 212, including equity populations, will gain monetary or time benefits from these travel time savings.

(Limit 2,800 characters; approximately 400 words)

b. Describe any negative impacts to low-income populations, people of color, children, people with disabilities, and the elderly created by the project, along with measures that will be taken to mitigate them. Negative impacts that are not adequately mitigated can result in a reduction in points.
Below is a list of negative impacts. Note that this is not an exhaustive list.
Increased difficulty in street crossing caused by increased roadway width, increased traffic speed, wider turning radii, or other elements that negatively impact pedestrian access.
Increased noise.
Decreased pedestrian access through sidewalk removal / narrowing, placement of barriers along the walking path, increase in auto-oriented curb cuts, etc.
Project elements that are detrimental to location-based air quality by increasing stop/start activity at intersections, creating vehicle idling areas, directing an increased number of vehicles to a particular point, etc.
Increased speed and/or cut-through traffic.
Removed or diminished safe bicycle access.
Inclusion of some other barrier to access to jobs and other destinations.
Displacement of residents and businesses.
Mitigation of temporary construction/implementation impacts such as dust; noise; reduced access for travelers and to businesses; disruption of utilities; and eliminated street crossings.
Other

This project does not create any negative impacts for the low-income populations, people of color, children, people with disabilities, or the elderly in Carver County. The County is comprised of approximately eight percent people of color, 28 percent under age 18, 16 percent over the age of 60, and four percent below the poverty line. US 212 is a key connection for these communities and health, employment, and education opportunities, and the Project will provide a faster, safer, and more efficient connection.

Response:

Although the roadway is expanding from two to four lanes, pedestrian crossing will become safer due to ADA accessibility improvements, reduced conflict points with traffic, and the introduction of medians between eastbound and westbound traffic. Wider shoulders will also greatly improve the pedestrian and bicycle environment in this rural area as they provide a multimodal facility for all users. Populations with disabilities will be able to cross the roadway without obstacle, using accessible ramps and crossings. With the introduction of RCIs, pedestrians will only interact with two directions of traffic, greatly reducing conflict opportunities between pedestrian and vehicular traffic.

(Limit 2,800 characters; approximately 400 words)

Select one:

*3.**Sub-measure: Bonus Points** Those projects that score at least 80% of the maximum total points available through sub-measures 1 and 2 will be awarded bonus points based on the geographic location of the project. These points will be assigned as follows, based on the highest-scoring geography the project contacts:*
a.25 points to projects within an Area of Concentrated Poverty with 50% or more people of color
b.20 points to projects within an Area of Concentrated Poverty
c.15 points to projects within census tracts with the percent of population in poverty or population of color above the regional average percent
d.10 points for all other areas

Project is located in an Area of Concentrated Poverty where 50% or more of residents are people of color (ACP50):	
Project located in Area of Concentrated Poverty:	
Projects census tracts are above the regional average for population in poverty or population of color:	
Project located in a census tract that is below the regional average for population in poverty or populations of color or includes children, people with disabilities, or the elderly:	Yes

(up to 40% of maximum score)

Upload the "Socio-Economic Conditions" map used for this measure. The second map created for sub measure A1 can be uploaded on the Other Attachments Form, or can be combined with the "Socio-Economic Conditions" map into a single PDF and uploaded here.

Upload Map 1589470788103_US212_Expansion_SocioEconmic.pdf

Measure B: Part 1: Housing Performance Score

City	Segment Length (For stand-alone projects, enter population from Regional Economy map) within each City/Township	Segment Length/Total Project Length	Score	Housing Score Multiplied by Segment percent
Benton Township	3.3	1.0	39.0	39.0

Total Project Length

Total Project Length 3.3

Project length entered on the Project Information - General form.

Housing Performance Score

Total Project Length (Miles) or Population 3.3

Total Housing Score 39.0

Part 2: Affordable Housing Access

Reference Access to Affordable Housing Guidance located under Regional Solicitation Resources for information on how to respond to this measure and create the map.
If text box is not showing, click Edit or "Add" in top right of page.

Response:

The project directly serves 155 affordable units. They rely on US 212 as the primary connection to healthcare, education, and employment and benefit from the project (see attached map).

- Lakeside Villa: Existing w/12 units (11 1BR, 1 2BR), rent based on 30% income & families up to 50% AMI eligible. Has project-based Sec. 8 & no vouchers

- Villa at Peace Village: Existing w/61 units (33 1BR, 28 2BR), 33 units project-based Sec. 8, & rest pay 30% income. Rate guaranteed by USDA Rural Development & project-based Sec. 8, & no vouchers

- Poplar Ridge: Existing w/24 units (2 1BR, 14 2BR, 8 3BR), 12 units project-based Sec. 8, & rest pay 30% income. Rate guaranteed by USDA Rural Development, LIHTC, & project-based Sec. 8

- Oak Grove: Existing w/50 units (4 Stu., 25 1BR, 5 2BR), all affordable 60% AMI. Rate for 2 units guaranteed by project-based Sec. 8, & Housing GO Bonds. Vouchers accepted, & manager has agency-wide Fair Housing Plan.

- 8 scattered units (3 3BR, 3 4BR, 2 5BR), affordable at 30% AMI. Rate guaranteed as public housing, uses CDA Fair Housing Plan

The project improves access by adding ADA compliant ramps, medians, wide shoulders & reduced injury with RCIs. Residents can expect the following benefits from the Project: efficient connection to the Twin Cities for employment, healthcare & education. Increased capacity,

medians, and RCIs will reduce crashes & congestion & improve travel time reliability (TTR).

These units are within 4 miles of the Project, consistent w/usage for rural Principal Arterials (PA) & the Functional Classification System Criteria for Principal Arterials in Rural areas listed in App. D of the TPP. This is the only roadway connecting Norwood Young America to Cologne & critical regional services. The closest east-west PA (TH 7) is 10 miles north & the closest east-west Minor Arterial (TH 5) is 4 miles north. The scorer is strongly encouraged to use a 4-mile buffer instead of the 1/2 mile for evaluation, which is not relevant in the rural context and not consistent with the TPP.

(Limit 2,100 characters; approximately 300 words)

Upload map: 1589482345013_US212_Expansion_SocioEconomic(Supp).pdf

Measure A: Infrastructure Age

Year of Original Roadway Construction or Most Recent Reconstruction	Segment Length	Calculation	Calculation 2
1929.0	3.3	6365.7	1929.0
	3	**6366**	**1929**

Average Construction Year

Weighted Year 1929.0

Total Segment Length (Miles)

Total Segment Length 3.3

Measure A: Congestion Reduction/Air Quality

Total Peak Hour Delay Per Vehicle Without The Project (Seconds/ Vehicle)	Total Peak Hour Delay Per Vehicle With The Project (Seconds/ Vehicle)	Total Peak Hour Delay Per Vehicle Reduced by Project (Seconds/ Vehicle)	Volume without the Project (Vehicles per hour)	Volume with the Project (Vehicles Per Hour):	Total Peak Hour Delay Reduced by the Project:	Total Peak Hour Delay Reduced by the Project:	EXPLANATION of methodology used to calculate railroad crossing delay, if applicable.	Synchro or HCM Reports
5.0	7.0	-2	1543	1543	-3086	-3086	NA	1589490548587_US212_Expansion_synchro.pdf
						-3086		

Vehicle Delay Reduced

Total Peak Hour Delay Reduced	-3086
Total Peak Hour Delay Reduced	-3086

Measure B:Roadway projects that do not include new roadway segments or railroad grade-separation elements

Total (CO, NOX, and VOC) Peak Hour Emissions without the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions with the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):
4.23	5.83	-1.6
4	**6**	**-2**

Total

Total Emissions Reduced:	-1.6
Upload Synchro Report	1589488765956_US212_Expansion_synchro.pdf

Please upload attachment in PDF form. (Save Form, then click 'Edit' in top right to upload file.)

Measure B: Roadway projects that are constructing new roadway segments, but do not include railroad grade-separation elements (for Roadway Expansion applications only):

Total (CO, NOX, and VOC) Peak Hour Emissions without the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions with the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):
0	0	0

Total Parallel Roadway

Emissions Reduced on Parallel Roadways	0
Upload Synchro Report	

Please upload attachment in PDF form. (Save Form, then click 'Edit' in top right to upload file.)

New Roadway Portion:

Cruise speed in miles per hour with the project:	0
Vehicle miles traveled with the project:	0
Total delay in hours with the project:	0
Total stops in vehicles per hour with the project:	0
Fuel consumption in gallons:	0
Total (CO, NOX, and VOC) Peak Hour Emissions Reduced or Produced on New Roadway (Kilograms):	0
EXPLANATION of methodology and assumptions used:(Limit 1,400 characters; approximately 200 words)	
Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):	0.0

Measure B:Roadway projects that include railroad grade-separation elements

Cruise speed in miles per hour without the project:	0
Vehicle miles traveled without the project:	0
Total delay in hours without the project:	0
Total stops in vehicles per hour without the project:	0
Cruise speed in miles per hour with the project:	0
Vehicle miles traveled with the project:	0
Total delay in hours with the project:	0
Total stops in vehicles per hour with the project:	0
Fuel consumption in gallons (F1)	0
Fuel consumption in gallons (F2)	0
Fuel consumption in gallons (F3)	0

Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):	0
EXPLANATION of methodology and assumptions used:(Limit 1,400 characters; approximately 200 words)	

Measure A: Benefit of Crash Reduction

Crash Modification Factor Used:	The following crash modification factors were used: Install J-turn intersection, provide intersection lighting, resurface pavement, and expand roadway to 4 lanes and restrict side-street left-turns. Further information regarding the CMF is shown in the attached PDF.

(Limit 700 Characters; approximately 100 words)

Due to the roadway expansion, construction of the median area, eliminating a lane merge on a curve, and the restriction of left-turns, various crashes are expected to be 100 percent eliminated in the future due to the inability of the vehicles to interact after project completion.

Rationale for Crash Modification Selected:

Per MnDOT guidance if there are two or more correctable fatal crashes within a three-year period, then a cost benefit per crash of $12.3 million can be used (page 13 of the HSIP criteria document (http://www.dot.state.mn.us/metro/trafficeng/files/Highway_Safety_Improvement_Program_-_Metro_Criteria_2020.pdf). The proposed project includes adding a RCI at the intersection of CSAH 51 and US 212 and expanding the roadway, adding a median, adding snow fence, and ensuring adequate clear zone. The following provide further guidance on the correctability of the two fatalities at the intersection of CSAH 51 and US 212.

https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811232

http://www.dot.state.mn.us/trafficeng/safety/docs/fatalrunoffroadstudy.pdf

https://conservancy.umn.edu/bitstream/handle/11299/155993/CTS13-23.pdf?sequence=1&isAllowed=y

(Limit 1400 Characters; approximately 200 words)

Project Benefit ($) from B/C Ratio:	$136,232,835.00
Total Fatal (K) Crashes:	2
Total Serious Injury (A) Crashes:	0
Total Non-Motorized Fatal and Serious Injury Crashes:	0

Total Crashes:	30
Total Fatal (K) Crashes Reduced by Project:	2
Total Serious Injury (A) Crashes Reduced by Project:	0
Total Non-Motorized Fatal and Serious Injury Crashes Reduced by Project:	0
Total Crashes Reduced by Project:	17
Worksheet Attachment	1589483260336_US212_Expansion_BC.pdf

Please upload attachment in PDF form.

Roadway projects that include railroad grade-separation elements:

Current AADT volume:	0
Average daily trains:	0
Crash Risk Exposure eliminated:	0

Measure A: Multimodal Elements and Existing Connections

Response:

The project will improve safety for pedestrians along US 212. Pedestrian improvements include accessibility improvements, median construction, reduced conflict opportunities with vehicles, wide shoulders and improved safety for children who utilize a school bus stop along the roadway.

At each intersection within the project area, ADA compliant ramps and crossings will be implemented. This will ensure pedestrians of all abilities can cross US 212 safely without barriers. As there are several assisted living and group homes along the roadway, it is expected that many pedestrians crossing US 212 will require and utilize these accessible crossings.

During construction, medians will be built between the second and third lanes of US 212. The medians will provide respite for pedestrians crossing the roadway, and act as a barrier between opposing traffic flows. Medians are included in the "Proven Safety Countermeasures" as a suggested method to limit pedestrian injury and fatality. Median barriers installed along rural four-lane freeways resulted in a 97 percent reduction in cross-median crashes according to the FHWA. The DOT identified medians as one of the "Best Practices for Pedestrian/Bicycle Safety" and found a reduction in crashes up to 46 percent.

The addition of RCIs will decrease the number of conflict opportunities between pedestrian and vehicular traffic while crossing US 212. An RCI allows free traffic flow in two directions instead of all four, meaning pedestrians crossing the roadway will interact with only two directions of vehicles. The remaining two directions of travel are moved away from the intersection, where pedestrian crossing is not permitted. RCIs are included in the "Proven

Safety Countermeasures" as a suggested method to limit pedestrian injury and fatality. According to FHWA, implementation of RCIs (also known as R-CUTs) resulted in a 54 percent decrease in injury and fatal crashes.

Students who live along US 212 are picked up by school bus on the roadway. Current road conditions require students to wait on the narrow shoulder, while four lanes of traffic pass alongside them. With the proposed improvements, the shoulder width will be expanded meaning students can safely wait further from passing vehicles. In addition, the new median will divide opposing traffic flows, meaning only one direction of traffic is alongside students.

In rural areas, wide shoulders are often used by residents for bicycling and walking transportation as the only connection from point A to B. The existing roadway has a narrow shoulder of 3-4 ft. in most areas. This project will provide a much improved 8 ft. paved shoulder, providing a safer and more comfortable multimodal facility for bicycle and pedestrian usage.

(Limit 2,800 characters; approximately 400 words)

Measure A: Multimodal Elements and Existing Connections

Response:

This project positively impacts the multimodal system by improving pedestrian safety, transit efficiency, and bikeway access. ADA compliant ramps will be constructed along US 212, greatly improving the pedestrian experience. Medians will also be constructed, which will reduce vehicle/pedestrian conflicts and provide refuge areas at intersections. RCIs allow free flow of traffic in only two directions, significantly reducing the number of travel lanes the pedestrian must cross.

In rural areas, wide shoulders are used by residents for bicycling and walking as the only connection from point A to B. US 212 is the primary & most direct connection between the Cities of Norwood Young America and Cologne. The existing roadway has narrow shoulders of 3' in most areas. This project will provide an 8' paved shoulder as well as a second lane in each direction for passing width, providing a safer and more comfortable multimodal facility for bicycle and pedestrian use.

The project will improve transit access by providing more efficient connection to the Twin Cities for employment, healthcare and education. Doubling the number of lanes and introducing RCIs will result in fewer crashes, less congestion, and greater travel time reliability for transit vehicles and those traveling to the SouthWest Transit Park & Ride. Transit operators and users can expect cost savings from reduced congestion and idling, travel time savings by increased free flow speeds and travel time reliability, and decreased risk of property damage, injury or fatality while utilizing US 212 to reach jobs, healthcare, or schooling. The project also benefits SmartLink Transit. SmartLink vehicles are stored and operate at the Carver County PW facility (eastern end of project). SmartLink operates dial-a-ride transit service for the public and provides

Medical Assistance trips for qualified individuals. SmartLink serves rural residents along the corridor and provides transit connection anywhere in the seven-county metro area.

The project will benefit the planned regional bikeway rail with trail along the railroad line in Benton Township and the City of Cologne. The existing railroad line runs mostly parallel to the south of US 212. Within the project area, the rail is at most 1/2 mile from US 212, and at least 200 feet from the roadway. The pedestrian benefits mentioned above (ADA accessibility improvements, median construction, RCI introduction) will ensure pedestrians have a safe and efficient route to cross US 212 and access the future bikeway.

The RBTN and RBBS exclude this part of the Met Council planning area in analysis. However, this area may qualify as part of these studies if it were included.

(Limit 2,800 characters; approximately 400 words)

Transit Projects Not Requiring Construction

If the applicant is completing a transit application that is operations only, check the box and do not complete the remainder of the form. These projects will receive full points for the Risk Assessment.
Park-and-Ride and other transit construction projects require completion of the Risk Assessment below.

Check Here if Your Transit Project Does Not Require Construction

Measure A: Risk Assessment - Construction Projects

1)Layout (25 Percent of Points)

Layout should include proposed geometrics and existing and proposed right-of-way boundaries.

Layout approved by the applicant and all impacted jurisdictions (i.e., cities/counties that the project goes through or agencies that maintain the roadway(s)). A PDF of the layout must be attached along with letters from each jurisdiction to receive points.	Yes
100%	
Attach Layout	1589483782675_US212_Expansion_Layout.pdf

Please upload attachment in PDF form.

Layout completed but not approved by all jurisdictions. A PDF of the layout must be attached to receive points.

50%

Attach Layout

Please upload attachment in PDF form.

Layout has not been started

0%

Anticipated date or date of completion

2)Review of Section 106 Historic Resources (15 Percent of Points)

No known historic properties eligible for or listed in the National Register of Historic Places are located in the project area, and project is not located on an identified historic bridge Yes

100%

There are historical/archeological properties present but determination of no historic properties affected is anticipated.

100%

Historic/archeological property impacted; determination of no adverse effect anticipated

80%

Historic/archeological property impacted; determination of adverse effect anticipated

40%

Unsure if there are any historic/archaeological properties in the project area.

0%

Project is located on an identified historic bridge

3)Right-of-Way (25 Percent of Points)

Right-of-way, permanent or temporary easements either not required or all have been acquired

100%

Right-of-way, permanent or temporary easements required, plat, legal descriptions, or official map complete

50%

Right-of-way, permanent or temporary easements required, parcels identified Yes

25%

Right-of-way, permanent or temporary easements required, parcels not all identified

0%

Anticipated date or date of acquisition

4)Railroad Involvement (15 Percent of Points)

No railroad involvement on project or railroad Right-of-Way agreement is executed (include signature page, if applicable) Yes

100%

Signature Page

Please upload attachment in PDF form.

Railroad Right-of-Way Agreement required; negotiations have begun

50%

Railroad Right-of-Way Agreement required; negotiations have not begun.

0%

Anticipated date or date of executed Agreement

5) Public Involvement (20 percent of points)

Projects that have been through a public process with residents and other interested public entities are more likely than others to be successful. The project applicant must indicate that events and/or targeted outreach (e.g., surveys and other web-based input) were held to help identify the transportation problem, how the potential solution was selected instead of other options, and the public involvement completed to date on the project. List Dates of most recent meetings and outreach specific to this project:

Meeting with general public: 06/20/2019

Meeting with partner agencies: 06/12/2019

Targeted online/mail outreach: 05/08/2020

Number of respondents: 432

Meetings specific to this project with the general public and partner agencies have been used to help identify the project need. Yes

100%

Targeted outreach to this project with the general public and partner agencies have been used to help identify the project need.

75%

At least one meeting specific to this project with the general public has been used to help identify the project need.

50%

At least one meeting specific to this project with key partner agencies has been used to help identify the project need.

50%

No meeting or outreach specific to this project was conducted, but the project was identified through meetings and/or outreach related to a larger planning effort.

25%

No outreach has led to the selection of this project.

0%

Response (Limit 2,800 characters; approximately 400 words):

The Project has been through a public process with residents and other interested public entities. The County held monthly meetings with partner agencies from 11/2018 through 7/2019 and held a public meeting in June of 2019. The community was further engaged through physical surveys distributed to over 600 locations and online surveys available during project development. Survey mailing locations were chosen to include a cross section of residents, specifically targeting diverse populations not typically involved in transportation projects (residents under age 18, disabled, and low-income).

The survey received 432 total responses over a period of one month. Most respondents (over 60 percent) identified turning on/off US 212 and the number of crashes as their primary concerns. In response, the Project Purpose specifically addresses these concerns, stating the primary purpose is to reduce the crash rate in the corridor. To meet this goal, the County proposed a series of safety improvements to the public. According to survey responses, residents feel an RCI is a favorable option as it will increase driver safety while entering/exiting US 212. Additionally, conversion from an undivided two-lane road to a divided four-lane highway is strongly supported. Residents listed the high traffic volume, frequent collisions, and common congestion as reasons for supporting the conversion. The third most common concern was safety during snow events. Responses included notes of frequent snow drifts, icy road conditions and visibility concerns within the project area. In response, the County will install snow fencing parallel to the corridor, which will prevent snow drifts and ice accumulation, and improve visibility during snow events.

To keep all residents informed and provide

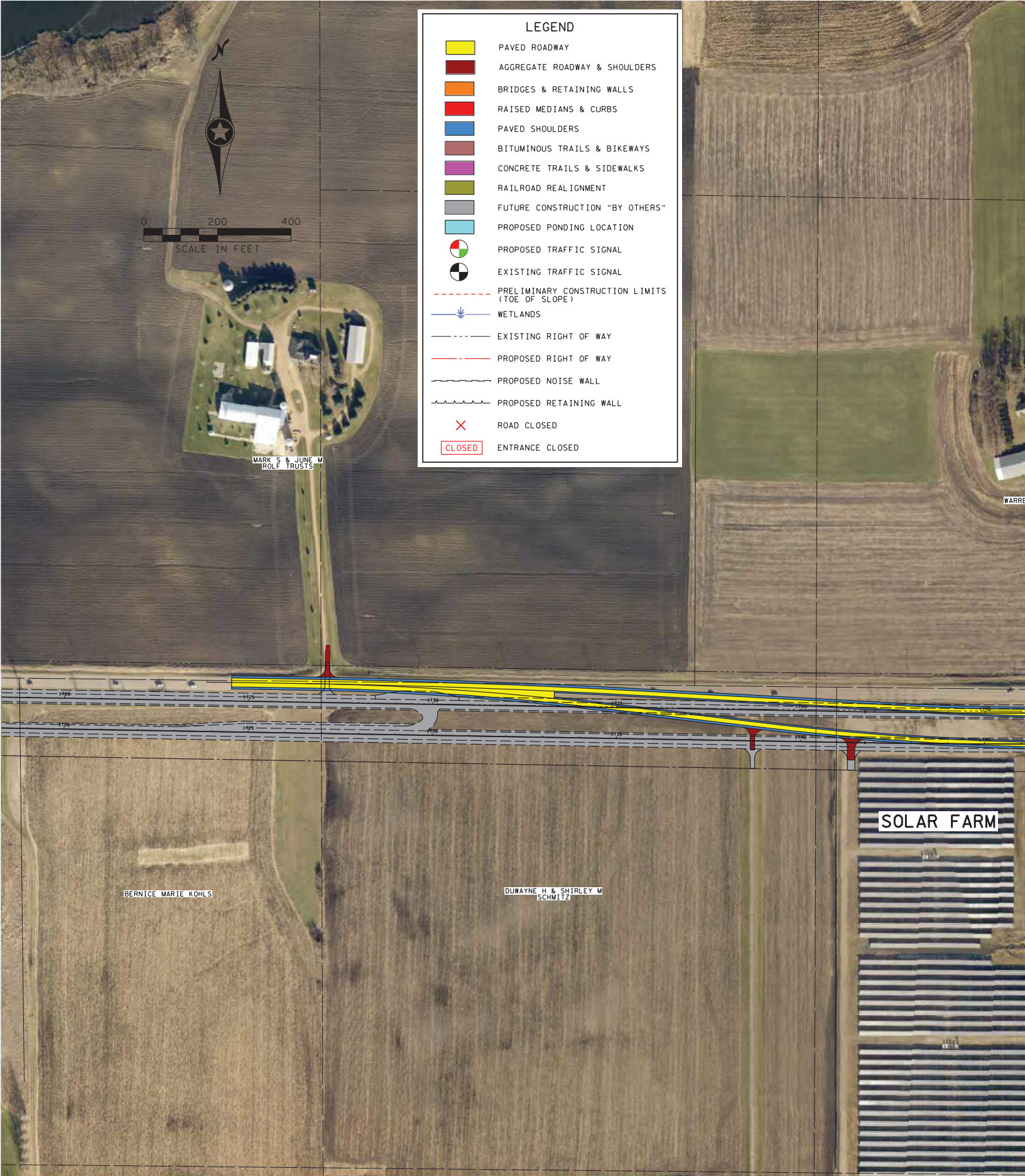
opportunities for feedback, a project website was created. The site displays information on design development, construction schedules, open houses, and other opportunities for informational meetings and feedback. The County will host additional public meetings as they move along in the project development process.

Measure A: Cost Effectiveness

Total Project Cost (entered in Project Cost Form):	$25,977,000.00
Enter Amount of the Noise Walls:	$0.00
Total Project Cost subtract the amount of the noise walls:	$25,977,000.00
Enter amount of any outside, competitive funding:	$0.00
Attach documentation of award:	
Points Awarded in Previous Criteria	
Cost Effectiveness	$0.00

Other Attachments

File Name	Description	File Size
US212_Expansion_1pager.pdf	One-page Project Summary	678 KB
US212_Expansion_ExistingConditionPhotos.pdf	Existing Condition Photos	2.3 MB
US212_Expansion_LOS_Bongards.pdf	Letter of Support - Bongards	371 KB
US212_Expansion_LOS_Carver.pdf	Letter of Support - Carver County	112 KB
US212_Expansion_LOS_MnDOT.pdf	Letter of Support - MnDOT	588 KB



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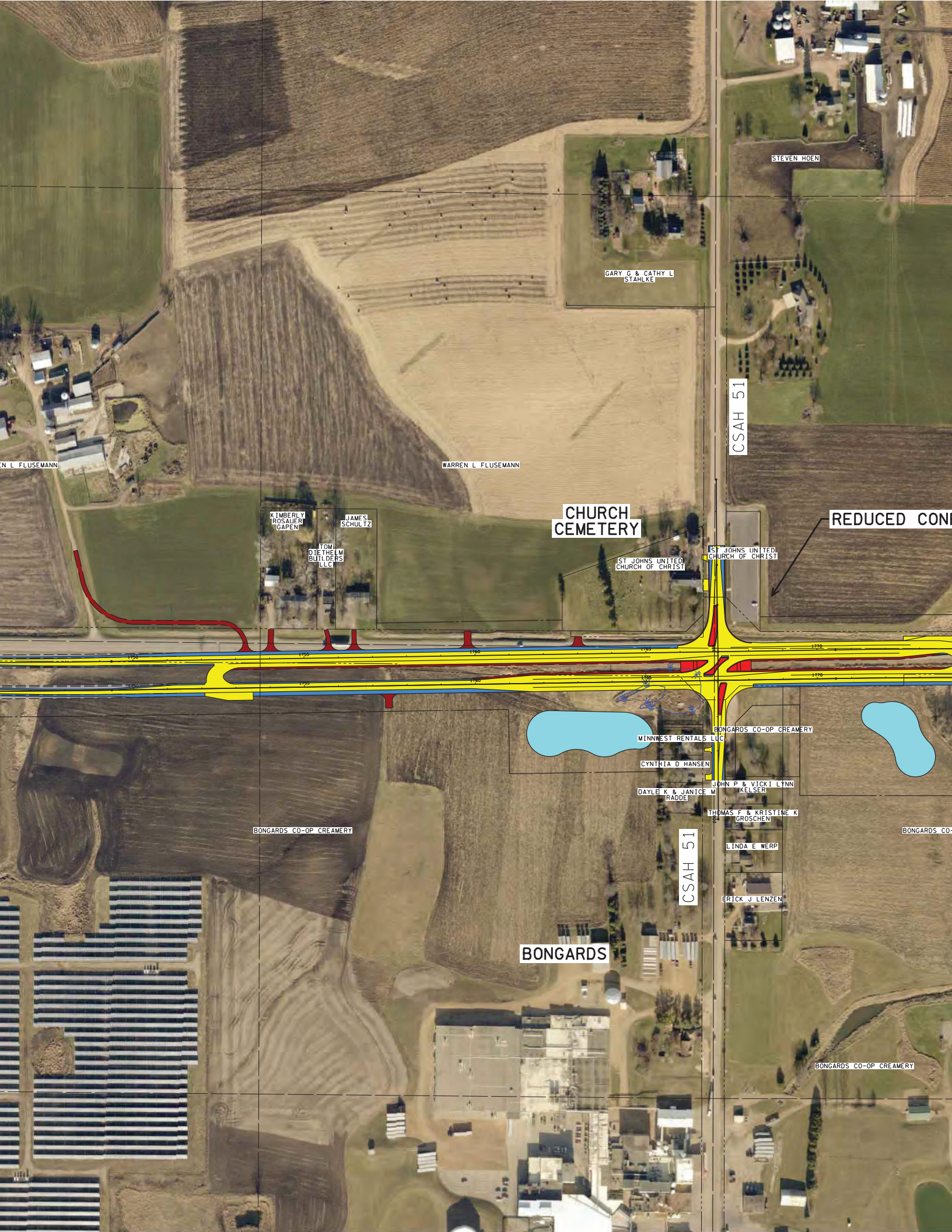
STEVEN HOEN
GARY G & CATHY L STAHLKE
CSAH 51
WARREN L FLUSEMANN
KIMBERLY ROSAUER GAPEN
JAMES SCHULTZ
TOM DIETHELM BUILDERS LLC
CHURCH CEMETERY
ST JOHNS UNITED CHURCH OF CHRIST
ST JOHNS UNITED CHURCH OF CHRIST
REDUCED CONE
BONGARDS CO-OP CREAMERY
MINNWEST RENTALS LLC
CYNTHIA D HANSEN
JOHN P & VICKI LYNN KELSER
DAYLE K & JANICE M RADDE
THOMAS F & KRISTINE K GROSCHEN
BONGARDS CO-OP CREAMERY
LINDA E WERP
CSAH 51
ERICK J LENZEN
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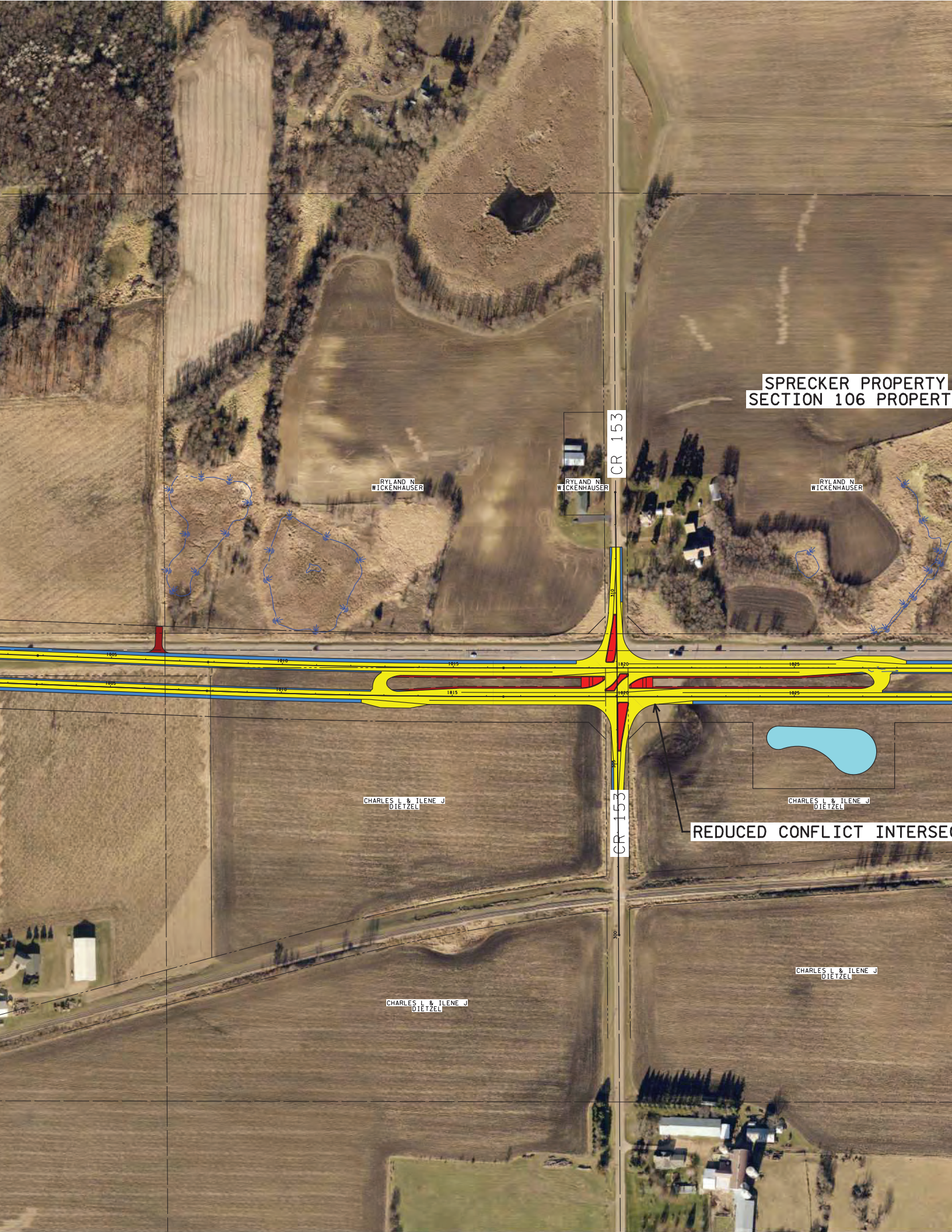
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DARRIN A DIETZEL


REDUCED CONFLICT INTERSECTION
KENNETH M TELLERS FAMILY TRUST
ALMEDA ROSE GUETHLING TRUST
LLOYD G VINKEMEIER JR CREDIT TRUST
GORDON R & HARRIET H TELLERS
GORDON R TELLERS FAMILY TRUST
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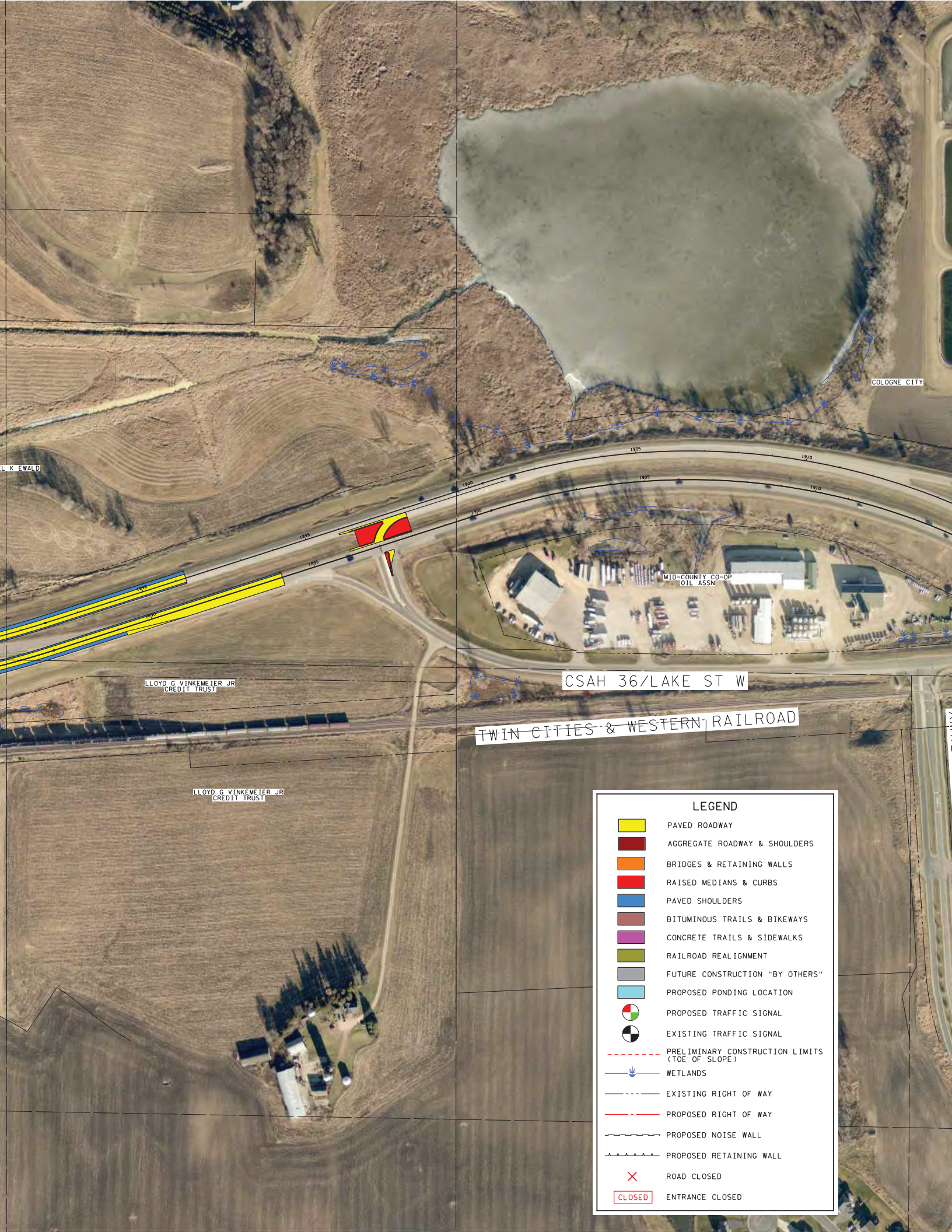
COLOGNE CITY
MID-COUNTY CO-OP OIL ASSN
CSAH 36/LAKE ST W
TWIN CITIES & WESTERN RAILROAD
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1905
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1895
LEGEND
PAVED ROADWAY
AGGREGATE ROADWAY & SHOULDERS
BRIDGES & RETAINING WALLS
RAISED MEDIANS & CURBS
PAVED SHOULDERS
BITUMINOUS TRAILS & BIKEWAYS
CONCRETE TRAILS & SIDEWALKS
RAILROAD REALIGNMENT
FUTURE CONSTRUCTION "BY OTHERS"
PROPOSED PONDING LOCATION
PROPOSED TRAFFIC SIGNAL
EXISTING TRAFFIC SIGNAL
PRELIMINARY CONSTRUCTION LIMITS (TOE OF SLOPE)
WETLANDS
EXISTING RIGHT OF WAY
PROPOSED RIGHT OF WAY
PROPOSED NOISE WALL
PROPOSED RETAINING WALL
ROAD CLOSED
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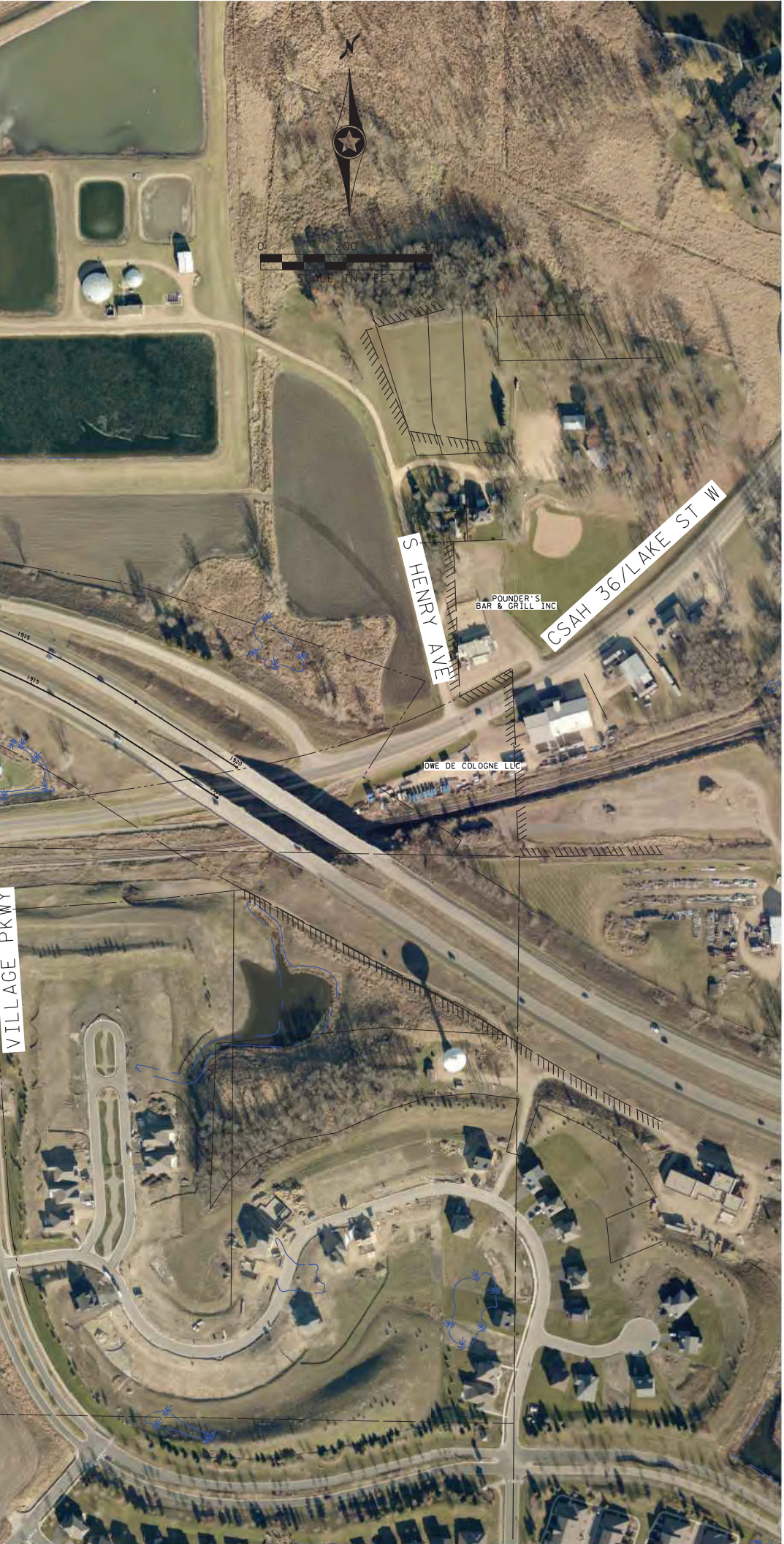
ENTRANCE CLOSED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CSAH 36/LAKE ST W
POUNDER'S
BAR & GRILL INC
OWE DE COLOGNE LLC
VILLAGE PKWY

Attachment E – Additional details on fatal crashes at US 212/CSAH 51 intersection

Carver County
Public Works
11360 Highway 212, Suite 1
Cologne, MN 55322

US 212: Traffic Safety Analysis of 2-Lane Gap Segments --including details on Fatal Crashes

A review of the 2-lane gap segments of US 212 from Carver to Cologne and Cologne to NYA
2009-2019
(based on available data)

[**Note:** This does not include data at the Cologne CSAH 53 / TH 284 intersection. Until major improvements there were built in 2012, there were three (3) traffic fatalities at this intersection in the reporting period from 2009-2011.]

Introduction: Minnesota TZD: Towards Zero Deaths

A key focus of the Minnesota Departments of Public Safety and Transportation is a statewide program called TZD: Towards Zero Deaths, the state's cornerstone traffic safety program employing an interdisciplinary approach to reducing traffic crashes, injuries, and deaths on Minnesota roads. The TZD mission is to create a culture for which traffic fatalities and serious injuries are no longer acceptable through the integrated application of education, engineering, enforcement, and emergency medical and trauma services. More info at: http://www.minnesotatzd.org/

Carver County supports the same TZD mission and looks to review and improve the traffic safety conditions of its highways to reduce fatalities and serious injuries on all its roads to zero. As part of TZD and its County Roadway Safety Plan, Carver County has prepared a focus on US Highway 212, a key, principal arterial serving the County and State.

Summary: Last 10 years – 9 Fatalities (total both 2-lane gap segments)

In the last 10 years, 2009-2019, there has been a total of nine (9) reported traffic fatality crashes (Type K Crash) and three severe crashes (Type A Crash) on the 2-lane gap segments of US 212 from Carver to Norwood Young America.

US 212 – Carver to Cologne (5 K's; 2 Type A Severe)
o Length: 4.17 miles; AADT: 13,400 vpd; Section Average Crashes per Year: 15+ crashes/year

- **2009 Fatal Crash (1 death) – West of Jonathan Carver Parkway – ROR (WB), Rollover**
- **2014 Fatal Crash (2 deaths) – Near Kelly Ave. – Head-On**
- **2018 Fatal Crash (1 death) -- at CSAH 43, Right-Angle (WB → SB)**
- **2019 Fatal Crash (1 death) – east of CSAH 43 – Right-Angle (WB →WB U-turn)**

2016 Severe Incapacitating Crash (Type A) – TH 212 at CSAH 43 – Right-Angle (EB → NB)
2017 Severe Incapacitating Crash (Type A) –West of Kelly Avenue – EB Rear End

US 212 – Cologne to Norwood Young America (4 K's; 1 Type A Severe)
o Length: 5.33 miles; AADT: 12,700 vpd; Section Average Crashes per Year: 15+ crashes/year

2009 Fatal Crash (2 deaths) – TH 212 at CSAH 51 (Bongards) – Rear End/Head On (on US 212)
2018 Fatal Crash (1 death), TH 212 at CSAH 51, ROR (EB), Ditch
2018 Fatal Crash (1 death), TH 212 at CSAH 51, Right-Angle (WB → NB)

2010 Severe Incapacitating Crash (Type A) – TH 212 at CSAH 51 (Bongards) – Right-Angle (EB → SB)

Summary: Last 5 Years – 6 Fatalities (total both 2-lane gap segments)

In the last 5 years, 2014-2018, there has been a total of four (4) reported traffic fatality crashes (Type K Crash) and two (2) severe crashes (Type A Crash) on the 2-lane segments of US 212 from Carver to Norwood Young America.

Details of each of the fatal crashes from the last 5 years and 10 years are noted below.

2014 Fatal Crash (2 deaths) – Near Kelly Ave. – Head-On

- Female Age: 29

- Male Age: 6
  (plus father and brother both injured)

- Highway 212 at Kelly Ave, Dahlgren Twp, Carver County
- On 11-15- 2014, during a snowy, icy and metro-wide crash prone Saturday, two members of a Lester Prairie, MN family died as passengers in a crash on Highway 212, according to the Minnesota State Patrol. Two passengers of one of the vehicles, a mother and her son, died in a head on crash on the narrow 2-lane section of highway near Kelly Ave on 11-15- 2014 at 1:51 pm, on a cloudy day with snow on the highway.
  A Pontiac Aztek driven by ||||||||||||, of Lester Prairie, and carrying his wife and two sons, was eastbound on an icy Highway 212 in Carver County when it spun out, lost control and went sideways, according to the State Patrol report. A westbound Ford Ranger, pulling a trailer, and driven by ||||||||||||, 33, of Excelsior, broadsided the Pontiac Aztek.

||||||||||||, 29, and ||||||||||||, 6, were killed in the crash. The driver and his 4-year-old son, ||||||||||||, were seriously injured and transported to the Hennepin County Medical Center. |||||||||||| was treated at Ridgeview Medical Center in Waconia for non-life-threatening injuries.

2018 Fatal Crash (1 death), TH 212 at CSAH 43, Right-Angle (WB → SB)

- Female Age: 65

- Highway 212 at County Road 43, Dahlgren Twp, Carver County

- In 2018, on Saturday January 13th at 4:11 p.m., |||||||||||| (DOB 04/04/52), age 65, of Carver, MN, was driving with her seatbelt on in her red 2006 Toyota Scion passenger car traveling southbound on County Road 43 trying to cross US Highway 212. She proceeded from the side street stop sign and was struck by a Chevy Suburban hauling a U-Haul trailer traveling westbound on US 212 driven by ||||||||||||, age 53, of Richmond, MN. ||||||||||||was driving by herself. The Suburban was driven by S||||||||||||, 53, of Richmond, whose injuries were non-life threatening. Two passengers, ||||||||||||, 24, of Elk River, and ||||||||||||, 17, of Richmond, also sustained non-life-threatening injuries. According to the State Patrol, road conditions at the time of the crash were dry, airbags deployed in both vehicles and all the travelers were wearing seatbelts. The road was dry and alcohol wasn't involved. First responders from the Carver County Sherriff's Office, Chaska Fire Department, and State Patrol transported ||||||||||||to 212 Medical Circle, where she was later taken to Hennepin County Medical Center (HCMC) in Minneapolis with her daughter |||||||||||| by her side (DOB 02/21/90). At about 7:30 p.m. that same day |||||||||||| had succumbed to her injuries and was declared deceased. (MSP Case # 18500803; District 2500)

2018 Fatal Crash (1 death), TH 212 at CSAH 51, Right-Angle (WB → NB)

- Female Age: 20

- Highway 212 at County Road 51, Benton Twp, Carver County

- In 2018, on Tuesday 8-28-18, at 7:44 a.m., ||||||||||||, 20 years old, of Shakopee, MN was driving her 2006 Chevy HHR station wagon northbound on County Road 51 trying to cross US Highway 212. She stopped at the side street stop sign near Bongards Creameries and St. John's United Church of Christ in Benton Township and was struck as she crossed the intersection by a Mack semi-tractor driven by |||||||||||| traveling westbound on US 212. The Minnesota State Patrol reported that |||||||||||| was not wearing a seat belt, her airbag deployed, and she was pronounced dead at the scene. Reports indicated that the collision left the semi jackknifed and, in a ditch, while ||||||||||||vehicle came to rest on its side. As noted in the newspaper BringMeTheNews, a GoFundMe account was started in |||||||||||| name with a goal of raising $7,000 to help pay for funeral expenses. The GoFundMe page was created by her stepfather, who says he only married ||||||||||||mother 9 days prior to her death. He noted that her mother was delayed in seeing |||||||||||| body because she was registered as an organ donor.

  Said ||||||||||||stepfather, "My heart breaks for my wife and ask any willing to listen..... Please help me so that she can see her daughter one more time."

  The driver of the semi, 52-year-old ||||||||||||, of Silver Lake, MN sustained minor injuries in the crash and was treated at the scene.

2018 Fatal Crash (1 death), TH 212 at CSAH 51, ROR (EB), Ditch

- Female Age: 64

- Highway 212 at County Road 51, Benton Twp, Carver County

- In 2018, on Sunday 4-15-18, at 10:51 p.m., ||||||||||||, 64 years old, of Lester Prairie, MN was a passenger in the back seat of a SUV with two other people traveling eastbound on US 212, when during a snowstorm and poor road conditions the SUV lost control and spun out into the ditch on the north side, just west of CR 51, in a single vehicle run off the road crash. The Carver County Sheriff's Office reported that |||||||||||| was bleeding from her head and complained of back pain. Ridgeview Ambulance transported |||||||||||| and another passenger to the Ridgeview Medical Center in Waconia. The third person in the vehicle was uninjured.

- On 5/5/2018, the Hennepin County Medical Examiner's Office advised that |||||||||||| had died because of the injuries sustained during the crash. During the crash |||||||||||| sustained a C1 and C4 fracture in her neck, which caused additional other complications leading to her death. Roads were icy with blowing snow. A witness 100 yards behind the vehicle said the SUV was traveling below the speed limit at about 50 mph and lost control and spun out into the ditch and taking out a Hwy 212 West road sign. No drugs or alcohol were involved. Carver County Sheriff's Office Incident Report: 201800011098.

2019 Fatal Crash (1 death), TH 212 east of CSAH 43 – Right-Angle (WB →WB U-turn)

- Female Age: 75

- Highway 212 east of County Road 43 (@5730 Hwy 212), Dahlgren Twp, Carver County
  In 2019, on 1-16-2019, at 10:02 a.m., a semitrailer truck collided with a pickup truck making a U-turn on Hwy 212 Wednesday morning west of Carver, and the driver of the pickup was killed, authorities said. The crash occurred in Dahlgren Township on Hwy. 212 between Carver County Road 43 and Jonathan Carver Parkway, according to the State Patrol. The pickup driver was identified as ||||||||||||, 75, of Norwood Young America. ||||||||||||| died at the scene, and next of kin in the area were notified. The semi driver, T||||||||||||, 43, of South St. Paul, survived his injuries. ||||||||||||| was making a U-turn after stopping on the right shoulder along westbound Hwy. 212 attempting to head in the opposite direction, and the big rig struck the pickup, the Minnesota State Patrol said.
  According to the state patrol, the 75-year-old woman was driving a 2004 Chevrolet Silverado and was sitting stationary alongside the highway, just east of CSAH 43 at or around the driveway at 5730 Hwy 212. ||||||||||||| attempted to make a U-turn onto Hwy. 212 to go back east on the highway and was unaware of the semi-truck approaching. The semi-truck t-boned the Chevrolet pickup, killing ||||||||||||. The driver of the 2000 Peterbilt semi, driven by 43-year-old ||||||||||||| of South St. Paul, suffered non-llife-threateninginjuries, according to the state patrol, and was not transported to a health care facility. Alcohol was not thought to be a factor in the crash, according to the incident report. MSP (Minnesota State Patrol) Incident Report: 19500557

2009 Fatal Crash (2 deaths) – TH 212 at CSAH 51 (Bongards) – Rear End/Head On (on US 212)

- Female Age: 45

- Male Age 35
  (plus 4 family members injured)

- Highway 212 at County Road 51, Benton Twp, Carver County

- On 8-29-2009, a three-vehicle fatal accident took the lives of two people and injured several others on Highway 212 in Carver County. Two of three drivers are dead, ||||||||||||, 45, of

Norwood and ||||||||||||, 35, of Sullivan, Texas, following a chain reaction involving a left turn off the highway.

In the double fatality crash on US 212 at Bongards at County Road 51, a car was stopped on dry roads during daylight, cloudy conditions on Hwy 212, in Carver County, waiting to turn left onto CR 51, when it was rear-ended by a semi-truck. The impact threw the car into the oncoming traffic, broadsiding a pick-up truck.

The accident took place as follows: Semi-truck driver ||||||||||||, 52, of Hutchinson was going eastbound on Highway 212 in a 2007 Kenworth semi-truck. A second driver, ||||||||||||, was also going eastbound, driving a 2003 Pontiac Vibe. |||||||||||| stopped in the eastbound lane to make a left handed turn off the highway, onto County Road 51 going north.

||||||||||||rear-ended ||||||||||||, pushing her into the westbound lane, where she was struck broadside by driver Olvera driving a 1999 Chevrolet K15 pickup. |||||||||||| was killed, but also had numerous passengers in his vehicle.

The driver of the car, ||||||||||||, 45, of Norwood Young America, was pronounced dead at the scene. The driver of the pick-up truck, ||||||||||||, 35, of Sullivan, Texas, died as he was being transported to Ridgeview Medical Center. There were 4 other occupants in the truck. All four were critically injured and taken to Ridgeview Medical Center, Waconia. They are: ||||||||||||, 29, ||||||||||||, 9, ||||||||||||, 8, and ||||||||||||, 7, all of Bird Island, MN. The driver of the semi was not injured.
[Note: In 2011, MnDOT added exclusive turn lanes and rural lighting on US 212.]

2009 Fatal Crash (1 death) – West of Jonathan Carver Parkway – ROR, Rollover

- Male Age: 55

- Highway 212 west of County Road 11/147, Dahlgren Twp, Carver County

- Details of the 4-22-2009 fatal crash west of Jonathan Carver Parkway – Run off the Road (ROR), Rollover, indicate that around 4:47 p.m., ||||||||||||, 55, of Minneapolis, was going east on Minnesota 212 in Dahlgren Township about a quarter mile west of County Road 11, the Minnesota State Patrol said. After his Volkswagen Cabrio hit the shoulder, |||||||||||| over-corrected and the car rolled over.
  |||||||||||| died of multiple blunt force injuries, according to the Hennepin County medical examiner's office. |||||||||||| was not wearing a seat belt, and roads were dry on a clear day at the time of the crash, the state patrol said.

Additional Details and Statistics of Crash / Safety Data (based on available data)

[**Note:** This does not include data at the Cologne CSAH 53 / TH 284 intersection. Until major improvements there were built in 2012, there were four (4) traffic fatalities at this intersection in the reporting period from 2009-2011.]

US 212 – Carver to Cologne
o Length: 4.17 miles; AADT: 13,400 vpd

5-Year Analysis (2011 – 2015)
 Corridor Analysis
 Total Crashes = 78 crashes
 Crash Rate = 0.76 crashes per MVMT
 Statewide Average Crash Rate = 0.76 crashes per MVMT
 Critical Crash Rate = 0.99 crashes per MVMT
 Critical Index = 0.78

 Key Intersections
 US 212 at CSAH 43
o Thru-Stop Control
o Total Crashes = 19 crashes
o Critical Index = 1.37 (> 1.0 therefore outside normal range)
o 8 right-angle crashes during 5-year period at CSAH 43 intersection

2-Year Analysis (2016 – 2017)
Corridor Analysis
 Total Crashes = 30 crashes
Crash Rate = 0.74 crashes per million vehicle miles traveled (MVMT)
 Statewide Average Crash Rate = 0.77 crashes per MVMT
 Critical Crash Rate = 1.14 crashes per MVMT
 Critical Index = 0.65

Key Intersections
 US 212 at CSAH 43
o Thru-Stop Control
o Total Crashes = 6 crashes
o Critical Index = 0.80

Fatal and Severe Incapacitating Crash Notes (2006 – 2015 + 2016 – March 2018 + Extra):
 2009 Fatal Crash (1 death) – West of Johnathan Carver Parkway – ROR, Rollover
 2014 Fatal Crash (2 deaths) – Near Kelly Ave. – Head-On
 2018 Fatal Crash (1 death), TH 212 at CSAH 43, Right-Angle (WB → SB)

2017 Severe Incapacitating Crash (Type A) –West of Kelly Avenue – EB Rear End
2016 Severe Incapacitating Crash (Type A) – TH 212 at CSAH 43 – Right-Angle (EB → NB)

US 212 – Cologne to Norwood Young America
o Length: 5.33 miles; AADT: 12,700 vpd

5-Year Analysis (2011 – 2015)
 Corridor Analysis
 Total Crashes = 76 crashes
 Crash Rate = 0.62 crashes per MVMT
 Statewide Average Crash Rate = 0.76 crashes per MVMT
 Critical Crash Rate = 0.97 crashes per MVMT Critical Index = 0.64

 Key Intersections
 US 212 at CSAH 34
o Thru-Stop Control
o Total Crashes = 14 crashes o Critical Index = 1.08 (> 1.0 therefore outside normal range)
o 3 right-angle, 4 head-on, 2 left turn crashes observed at CSAH 34

2-Year Analysis (2016 – 2017)
Corridor Analysis
- **Total Crashes = 37 crashes**
- Crash Rate = 0.75 crashes per million vehicle miles traveled (MVMT)
- Statewide Average Crash Rate = 0.77 crashes per MVMT
- Critical Crash Rate = 1.1 crashes per MVMT
- Critical Index = 0.68

Key Intersections
- US 212 at CSAH 34

o Thru-Stop Control
o Total Crashes = 6 crashes
o Critical Index = 0.85

Fatal and Severe Incapacitating Crash Notes (2006 – 2015 + 2016 – March 2018 + Extra):
 2009 <u>Fatal</u> Crash (2 deaths) – TH 212 at CSAH 51 (Bongards) – Rear End/Head On (on US 212)
 2018 <u>Fatal</u> Crash (1 death), TH 212 at CSAH 51, Right-Angle (WB → NB)

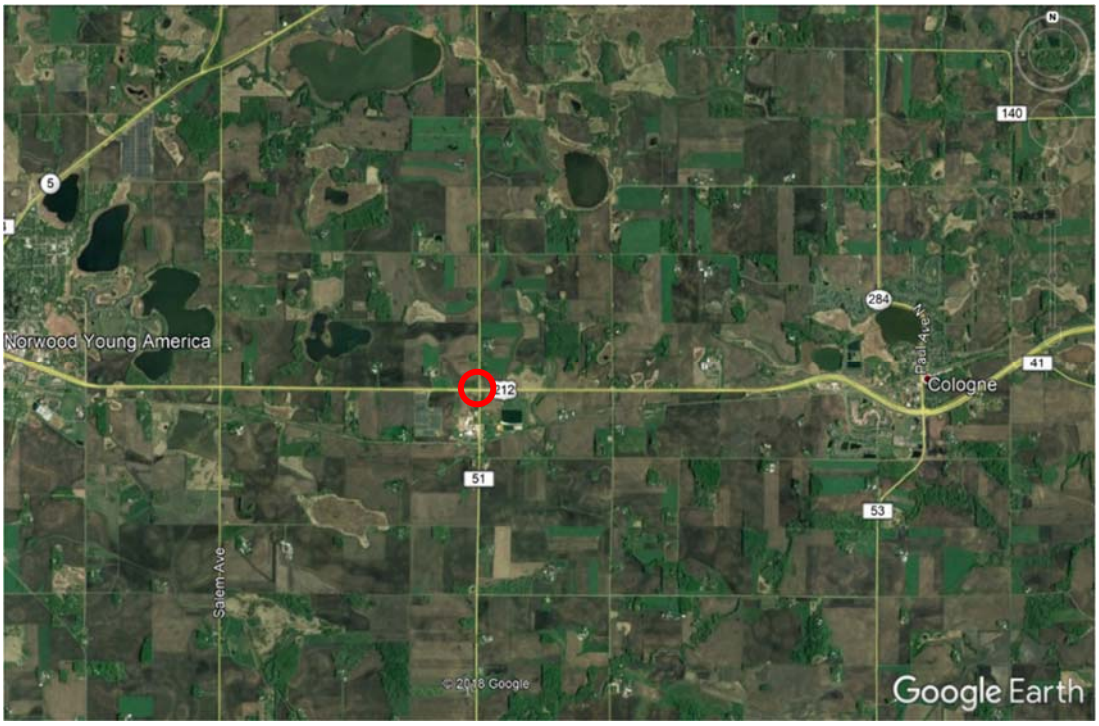
 2010 Severe Incapacitating Crash (Type A) – TH 212 at CSAH 51 (Bongards) – Right-Angle (EB → SB)

Attachment F – Pages from County Road Safety Workshop

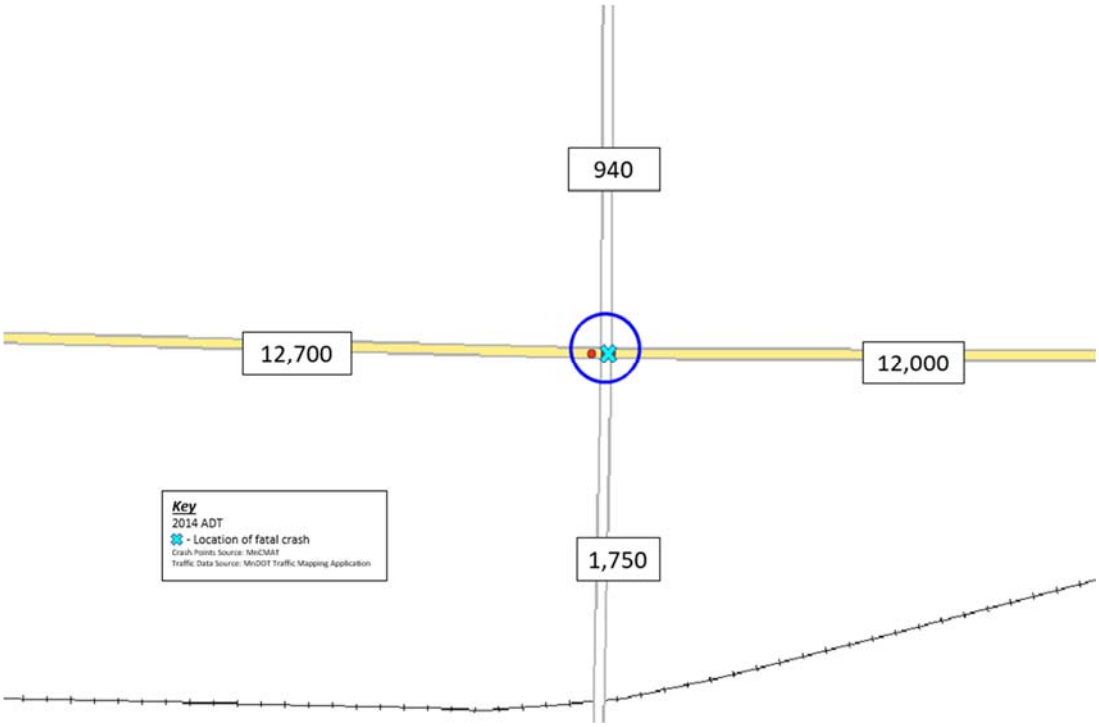
Location 1: CR 51 and Hwy 212

Type: Intersection

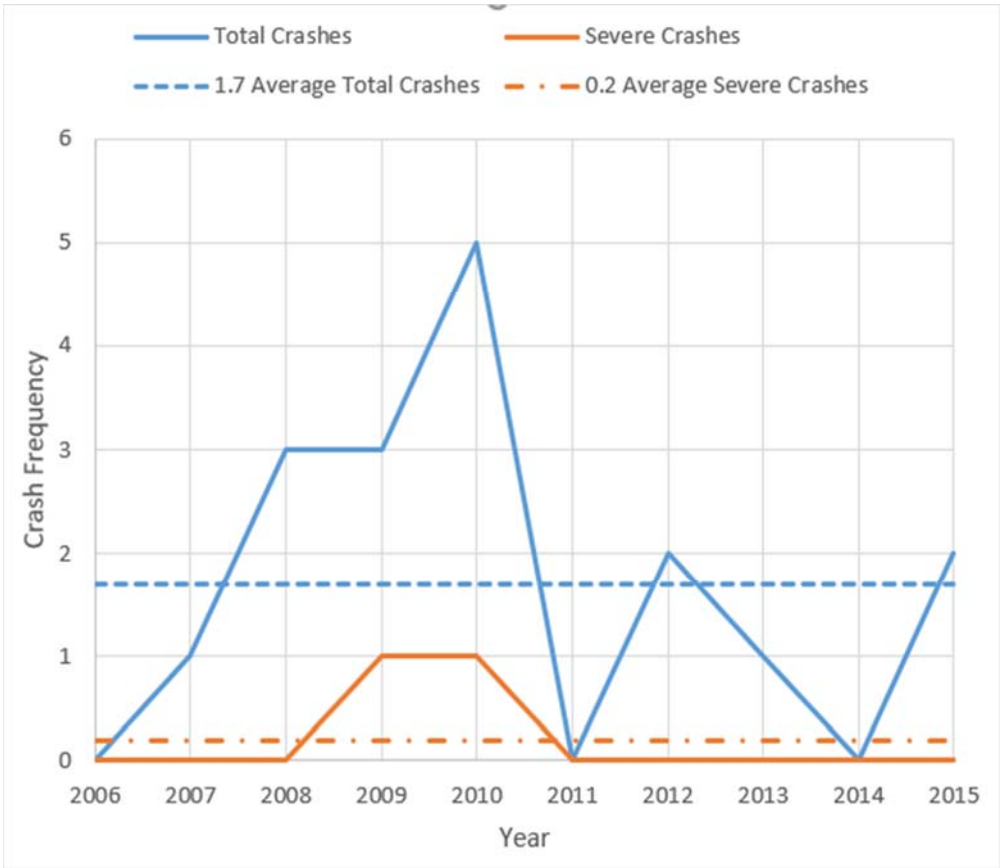
Intersection of CR 51 and Hwy 212



Aerial of Area



ADT Map & Crash Map



Crash Frequency Plot from 2006-2015

Intersection of CR 51 & Hwy 212

County:	Carver	*Crash Years:*	2006-2015	*Crash Cost [a] :*	$11,939,400
District:	0	*Environment:*	Small town	*Crash Rate [b] :*	0.68
Entering Volume:	6,848	*Cross Section:*	4-Lane	*Critical Crash Rate [b] :*	0.43
Speed Limit (Major/Minor) :	55/30	*Functional Classification:*	Principal Arterial	*Expected Crash Rate [c] :*	0.25
2016/17 Severe Crash Frequency:	Unknown	*Traffic Control Device:*	Thru-STOP		

BELOW DATA CAME FROM MNCMAT

Crash Severity	Frequency	Percentage	Expected %†	KA%
Fatal	1	6%	2%	50%
Injury - A	1	6%	4%	50%
Injury - B	4	24%	12%	
Injury - C	5	29%	23%	
Property Damage	6	35%	59%	
Total	17	100%	100%	100%

Year	Frequency	Percentage	Expected %†	KA%
2006	0	0%	N/A	0%
2007	1	6%	N/A	0%
2008	3	18%	N/A	0%
2009	3	18%	N/A	50%
2010	5	29%	N/A	50%
2011	0	0%	18%	0%
2012	2	12%	25%	0%
2013	1	6%	20%	0%
2014	0	0%	20%	0%
2015	2	12%	17%	0%
Total	17	29%	100%	0%

Day of Week	Frequency	Percentage	Expected %†	KA%
Sunday	3	18%	15%	0%
Monday	0	0%	11%	0%
Tuesday	2	12%	10%	0%
Wednesday	6	35%	12%	0%
Thursday	2	12%	14%	0%
Friday	1	6%	17%	0%
Saturday	3	18%	20%	100%
Total	17	100%	100%	100%

Light Condition	Frequency	Percentage	Expected %†	KA%
Daylight	13	76%	65%	50%
Sunrise	1	6%	3%	0%
Sunset	1	6%	3%	0%
Dark (Street Lights On)	1	6%	4%	0%
Dark	1	6%	23%	50%
Other/Unknown/Blank	0	0%	1%	0%
Total	17	100%	100%	100%

Collision Type	Frequency	Percentage	Expected %†	KA%
Motor Vehicle	17	100%	56%	100%
Pedestrian & Bicycle	0	0%	4%	0%
Animal	0	0%	1%	0%
Fixed Object	0	0%	8%	0%
Overturn Rollover	0	0%	15%	0%
Embankment/Ditch/Curb	0	0%	10%	0%
Other/Unknown	0	0%	5%	0%
Total	17	100%	100%	100%

Collision Diagram	Frequency	Percentage	Expected %†	KA%
Rear End	4	24%	5%	50%
Sideswipe Passing	0	0%	1%	0%
Sideswipe Opposing	3	18%	4%	0%
Left Turn Into Traffic	3	18%	5%	0%
Run-off-Road	0	0%	29%	0%
Right Angle	4	24%	27%	50%
Right Turn Into Traffic	0	0%	1%	0%
Head On	1	6%	8%	0%
Other/Unknown/Blank	2	12%	21%	0%
Total	17	100%	100%	100%

Vehicle Type	Frequency	Percentage	Expected %†	KA%
Passenger Car	16	42%	N/A	20%
Pickup	9	24%	N/A	20%
Van or Minivan	1	3%	N/A	0%
SUV	5	13%	N/A	40%
Motorcycle	0	0%	N/A	0%
Semi Truck	2	5%	N/A	0%
Other Heavy Vehicle	4	11%	N/A	20%
Bicycle	0	0%	N/A	0%
Pedestrian	0	0%	N/A	0%
Other/Unknown*	1	3%	N/A	0%
Total[§]	38	100%	N/A	100%

Contributing Factor	Frequency	Percentage	Expected %†	KA%
Illegal/Unsafe Speed	2	5%	N/A	0%
Driver Inattention/Distraction	4	11%	N/A	20%
No Contributing Factor	14	38%	N/A	60%
Failure to Yield Right of Way	4	11%	N/A	0%
Improper Maneuver	2	5%	N/A	0%
Car Phone/Two-Way Radio	0	0%	N/A	0%
Chemical Impairment	0	0%	N/A	0%
Weather	4	11%	N/A	0%
Other/Unknown	7	19%	N/A	20%
Total[§]	37	100%	N/A	100%

Road Surface Condition	Frequency	Percentage	Expected %†	KA%
Dry	12	71%	85%	100%
Wet	2	12%	5%	0%
Snow/Slush	2	12%	3%	0%
Ice/Packed Snow	1	6%	5%	0%
Sand/Mud/Dirt	0	0%	<1%	0%
Other/Unknown/Blank	0	0%	2%	0%
Total	17	100%	100%	100%

Weather Condition	Frequency	Percentage	Expected %†	KA%
Clear	12	48%	69%	100%
Cloudy	7	28%	17%	0%
Rain	1	4%	2%	0%
Snow/Sleet/Hail/Freezing Rain	2	8%	3%	0%
Fog/Smog/Smoke	0	0%	1%	0%
Other/Unknown*	3	12%	8%	0%
Total[§]	25	100%	100%	100%

Notes -

[a] Information obtained from 2015 Traffic Safety Fundamental Handbook Page C-55

[b] Information obtained from 2015 Traffic Safety Fundamental Handbook Page B-15

[c] Information obtained from 2015 Traffic Safety Fundamental Handbook Page A-18

* Values of "00" or "Left Blank" are excluded from summations

† Expected percentages estimated with 2011-2015 TIS, Severe Greater Minnesota crash records using "Rural" environment and "Non-Intersection Related" relation to junction

§ Total crash frequencies are greater than the number of crash records due to multiple vehicles, contributing factors and weather conditions present at the time of the crash

- Frequency counts are 2006-2015 MnCMAT crash records selected for the identified location.

- 2016-2018 crash records received from MNDOT and analyzed for identified location in Key Points.

Key Points

- A fatal crash happened in 2009 and a serious injury crash happened in 2010. Two people died in the fatal crash.
- The fatal crash was the result of a rear end collision, because of following too closely and driver distraction/inattention.
- The fatal accident happened on a clear dry day with three vehicles involved. One of them is a single unit truck w/trailer.
- The serious injury crash was the result of a right angle collision, because of river distraction/inattention and inexperience.
- The serious injury crash happened on a clear dry day, but the light is dark. There was no street light provided at the intersection.
- Total Crash Rate = .68 crashes per million entering vehicles
- Intersection averages 1.7 total crashes per year.
- The crash rate is higher than the expected and the critical crash rates.
- Two crashed happened at this location from 2016 to 2018. No injury involved.

Workspace: