County State Aid Highway (CSAH) 11 Traffic and Eagle View Elementary Site Circulation Study

Crow Wing County, MN
February 18, 2026

Real People. Real Solutions.

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Certification

Traffic Report

For

County State Aid Highway (CSAH) 11 Traffic and Eagle View Elementary Site Circulation Study

Crow Wing County, MN
25X.139457.000

February 18, 2026

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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ADOPTED BY:

Crow Wing County	Date
Pequot Lakes Public Schools	Date
City of Breezy Point	Date
City of Pequot Lakes	Date

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I. Executive Summary

Crow Wing County, in collaboration with ISD 186, the City of Pequot Lakes and the City of Breezy Point, conducted a study that analyzed traffic operations and safety along CSAH 11 near Eagle View Elementary in Breezy Point, Minnesota. This primarily focused on the two school access intersections as well as the internal school site circulation. Current conditions show that while overall crash rates are below the statewide average, the West School Access intersection has experienced angle crashes, and drivers exiting the school face limited sightlines and significant delays during peak arrival and dismissal times. Traffic observations and modeled conditions showed that school peak congestion affects queue lengths, driver gap acceptance, and overall safety on CSAH 11. These findings prompted an analysis of alternatives that aim to improve safety, increase efficiency of school traffic peaks, and maintain the collaborative system that balances the needs of the school peak hours as well as CSAH 11 during all times of the year.

Public engagement played a key role in shaping and evaluating alternatives. Two phases of outreach occurred; each included an in-person open house and an online platform for feedback and collaborative conversation. The outreach process was designed to share technical findings in an accessible way and to gather both qualitative and location-specific feedback from parents, residents, school staff, and daily roadway users. Community opinions were split between roundabouts and signals, with many respondents emphasizing the need for improvements during school peak hours without creating year-round delays. Public feedback was incorporated into the evaluation of alternatives and helped refine the recommended phased approach.

Alternatives included roundabouts, traffic signals, and on-site circulation changes. Each alternative was evaluated using consistent criteria that considered safety, mobility, public input, and cost. Roundabouts scored highest for safety benefits due to their ability to reduce severe crashes and vehicle conflict points, and they maintained acceptable traffic flow through 2045. A benefit-cost analysis showed that none of the alternatives have a construction cost outweighing the quantified benefits; however, a single-lane roundabout at the West School Access had the most favorable ratio, and the highest safety benefit among all options.

These results supported focusing near-term investments on lower-cost improvements while reserving higher-cost infrastructure changes for future consideration. Based on technical analysis and public input, the study recommends a phased approach: implement interim improvements first by reconstructing eastbound right-turn lanes and adjusting stop bar locations at both school access intersections to improve sightlines and increase driver comfort. These interim improvements are intended to address the most critical visibility and safety concerns while minimizing cost and disruption.

Annual reviews of safety and operational performance are recommended to monitor the study area. If issues persist, the long-term recommendation is to construct a single-lane roundabout at the West School Access intersection, which offers the greatest safety and operational benefits while aligning with public priorities. This phased strategy allows near-term improvements while preserving a long-term solution that can be implemented at the agency's discretion as conditions are warranted.

II. Introduction

This report summarizes the traffic and site circulation analysis completed to identify and evaluate future roadway improvements on CSAH 11 near Eagle View Elementary in Breezy Point, Minnesota. State Aid Highway 11 roadway will be referred to as CSAH 11 throughout this report. CSAH 11 is being analyzed between the eastern and western access points of Nickel Road to evaluate the current roadway and develop a plan for this corridor to better serve current and future generations of users. The project considerations include:

- Safety: The corridor averages 1 crash per year in the study area – 2 of which were angle crashes in the last five years at the intersection of the West School Access and Edgewater Farm Drive.
- Balance: Design must accommodate fluctuating traffic volumes, including school start and end times as well as peak seasons due to the presence of nearby summer homes.
- Roadway Conditions: Vertical curvature to the west, horizontal curvature to the east, and various access points were considered.

CSAH 11 is divided by the cities of Pequot Lakes and Breezy Point within the project area, the project corridor is located in Crow Wing County. See **Figure 1** for the project location.

Figure 1: Project Location

The current speed limit along CSAH 11 is 55 MPH with a 30 MPH School Zone near Eagle View Elementary School. Roadway functional classification by roadway in the project area is as follows:

- CSAH 11 is classified as a Major Collector
- All other side streets along the corridor are classified as local roads

All intersections along CSAH 11 within the study area are side street stop controlled.

The corridor serves a variety of adjacent land uses including several businesses, residential homes, a church, Eagle View Elementary School, and traffic destined to/from MN 371. CSAH 11 is a two-lane undivided roadway. The East and West School Access intersections to Eagle View Elementary have designated left and right turn lanes. There are also two bypass lanes along eastbound CSAH 11 within the study area.

The West School Access intersection for Eagle View Elementary functions as the primary parent drop-off and pick-up area, while the East School Access accommodates buses and early childhood drop-off and

pick-up. The west loop experiences the highest traffic volumes during arrival and dismissal times. Parents queue through the parking lot and circulate through the loop for pick-up. A notification system is in place that allows parents to alert staff upon arrival, prompting students inside the building to prepare for departure.

III. Data Collection

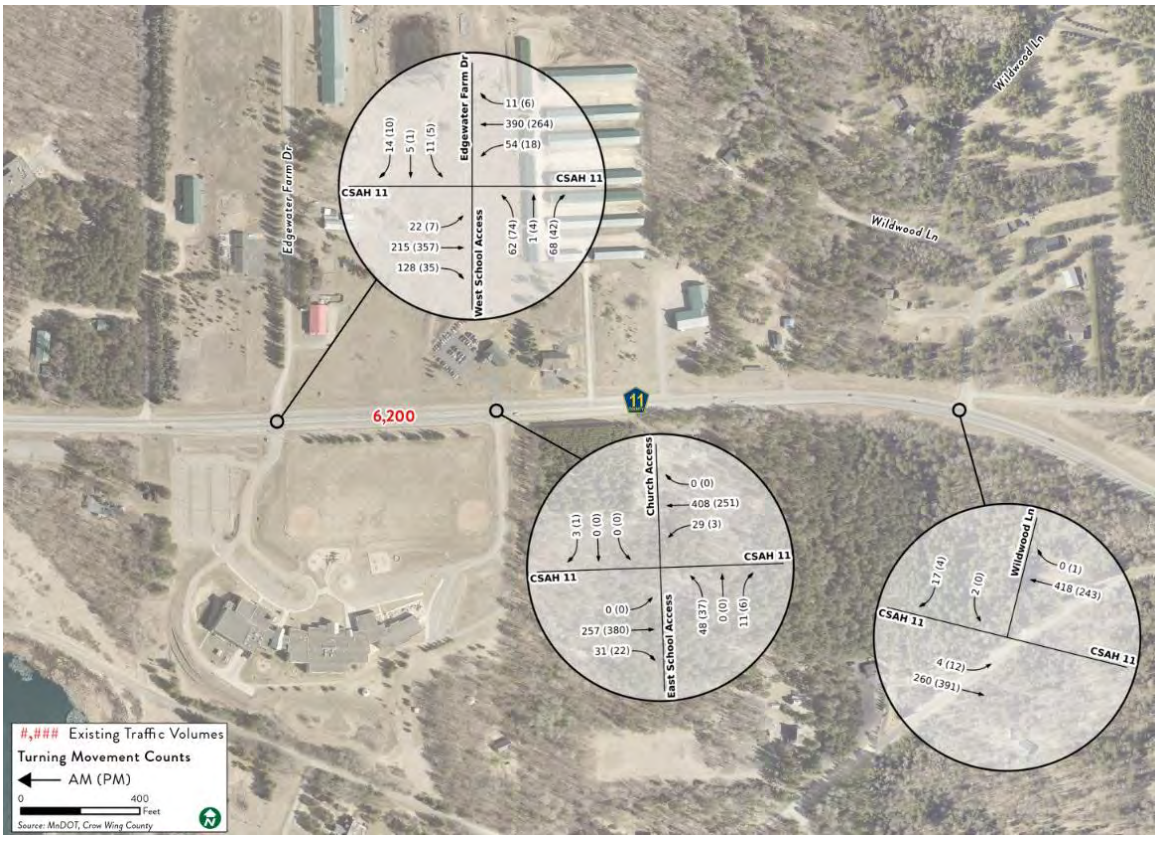
Traffic Counts

In September 2025, 13-hour typical weekday turning movement counts were collected at the following intersections while school was in session:

- CSAH 11 at West School Access/Edgewater Farm Dr
- CSAH 11 at East School Access/Church Access
- CSAH 11 at Wildwood Ln

The counts isolate auto, heavy commercial, bicycle, and pedestrian movements. The AM peak hour was found to be from 7:15- 8:15 AM, the school PM peak was found to be from 2:45-3:45 PM. The heavy vehicle percentage (HV%) on CSAH 11 was determined to be 2.9% for the entire day, but the peak hour HV% is higher, ranging from 4.1% (AM) to 6.6% (PM). The AM and PM peak turning movement counts are displayed in **Figure 2** and can be found in **Appendix A**.

Figure 2: 2025 Turning Movement Counts



Radar Counts

Radar counts were also collected at the same time as turning movement counts. The radar was located between the two school access points along CSAH 11. Radars collect the total number of vehicles as well as speeds for each vehicle passing that location on CSAH 11. 48 hours of radar data was collected from 9/10/2025-9/11/2025. The data found in **Table 1** below displays the data found from the radar data collection. The radar data summary can be found in **Appendix B**.

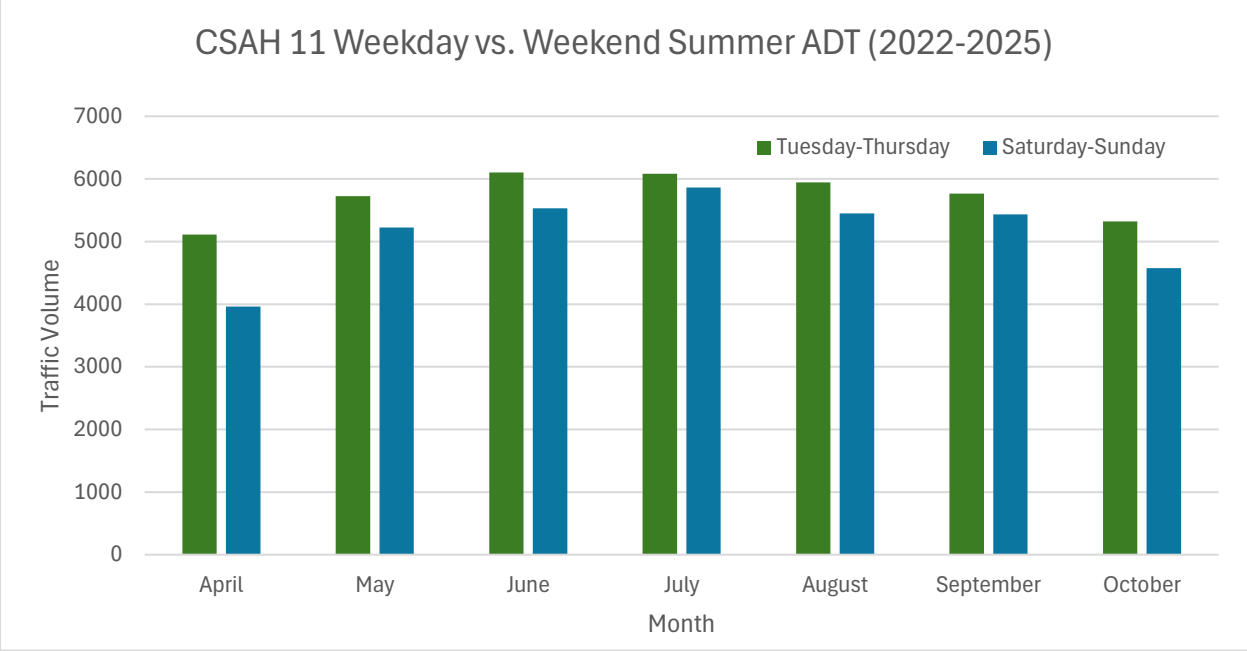
Table 1: Radar Data Summary

	EB	WB
Average Daily Weekday Speed (mph)	46.2	50.3
Average Daily 10 mph Pace (mph)	45-55	51-61
Average Daily 85th Percentile Speed (mph)	54	59
Average School Drop-Off Time Speed (mph)	38.5	40.9
Average School Pick-Up Time Speed (mph)	39.5	43.2

IV. StreetLight Analysis

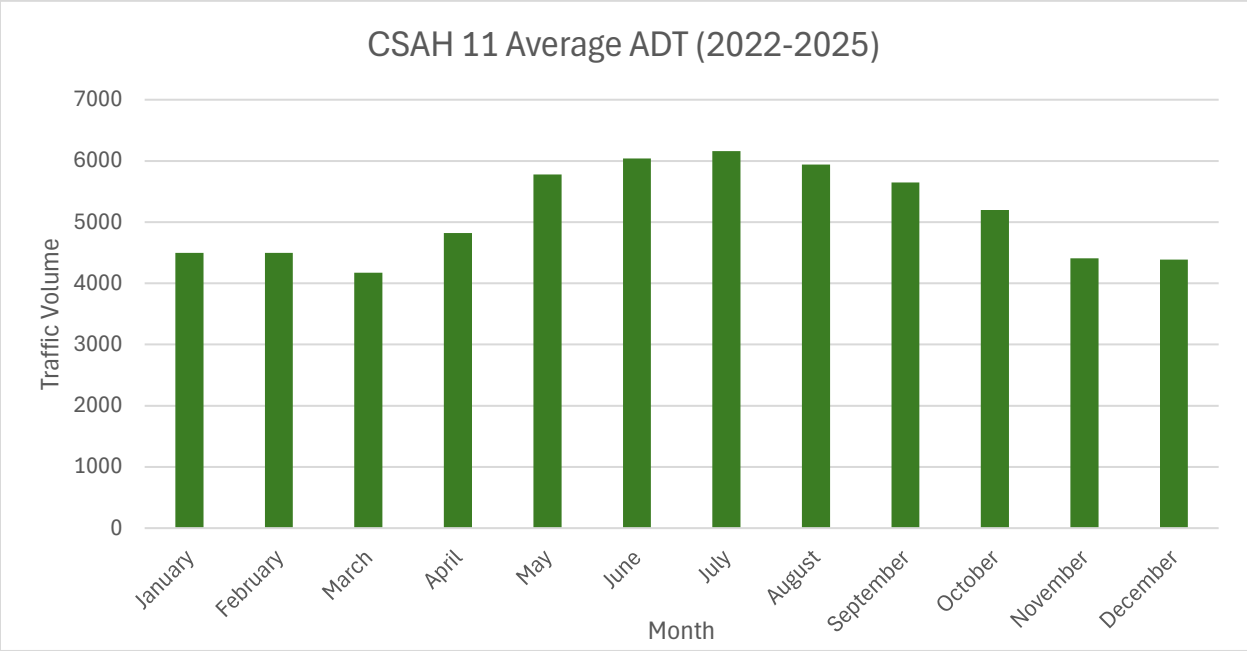
Summer traffic variation, historical average daily traffic, and speed data along the corridor were analyzed using StreetLight. The study compared weekday and weekend volumes from April through September, using a three-year average for consistency. Results indicate that weekend traffic nearly equals weekday traffic from May through October, indicating high recreational usage of the roadway in the summer months. **Figure 3** illustrates the trend in traffic volumes throughout the summer months.

Figure 3: Summer ADT Variability



Historical daily traffic data, averaged by month over the past three years, reveals seasonal trends in corridor usage. Notably, the Average Daily Traffic (ADT) increases during the summer months, likely due to the presence of cabins or lakeside destinations in the surrounding area. May-October shows higher than average volume. July has the highest ADT, at 20% above the yearly average. **Figure 4** illustrates the historical ADT patterns.

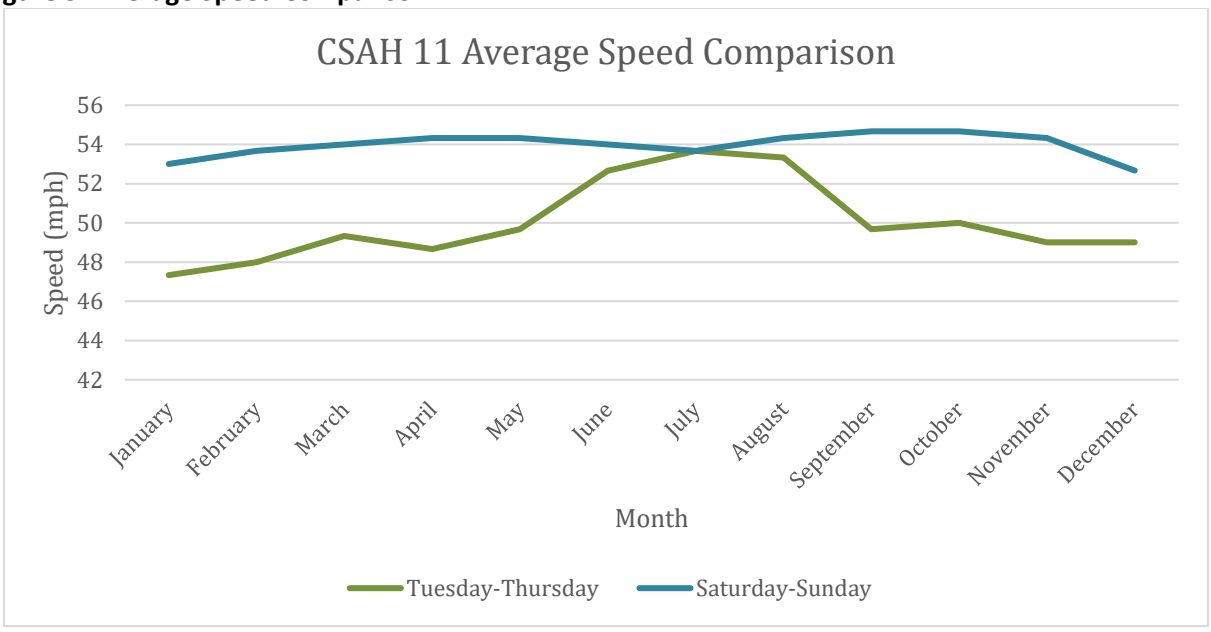
Figure 4: Historical ADT



Average speed data was analyzed to better understand driving patterns along the corridor throughout the year, including differences between weekdays and weekends. The analysis revealed that weekend speeds are consistently higher than weekday speeds. As expected, average speeds tend to decrease during the winter months. Weekend speeds remain in the 53-55 mph range year-round. Weekday speeds show a 4-mph reduction during the school year.

Figure 5 illustrates the variation in speeds between weekdays and weekends over the course of the year.

Figure 5: Average Speed Comparison



V. Crash Analysis

Intersection Crashes

A five-year crash analysis between January 2020 – December 2024 was completed for all study intersections along the project corridor.

At the CSAH 11 at West School Access/Edgewater Farm Dr intersection, there were two crashes in the last five years. Both were right angle crashes, the first one involving a southbound and westbound vehicle resulting in minor personal injury. The other angle crash consisted of a northbound and eastbound vehicle resulting in property damage only. Notably, the northbound and eastbound vehicle crash occurred during the school morning peak.

At Wildwood Ln (approximately 300 feet east of the East School Access intersection), a single vehicle run off road crash occurred with a vehicle traveling eastbound. This crash resulted in property damage only. No other crashes were reported in the five-year analysis period.

A comparison of the crash rate and the critical rate were completed to determine if there is a safety issue at any of the intersections in the project area. The total crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside of the expected normal range. The critical index reports the magnitude of this difference and a critical index of less than one indicates that the intersection is operating within the normal range. **Table 2** summarizes the total crash rate information by intersection.

Table 2: Total Crash Rate Summary

Intersection	Number of Crashes	Total Crash Rate		
		Observed	Statewide Average	Critical Index
CSAH 11 at West School Access/Edgewater Farm Dr	2	0.138	0.141	0.32
CSAH 11 at East School Access/Church Access	0	0	0.141	0
CSAH 11 at Wildwood Ln	1	0.079	0.141	0.18

Table 2 indicates that all intersections have a critical index under one**,** indicating all intersections are performing within the normal expected range compared to similar intersections statewide in the last five years.

The intersection crash worksheets can be found in **Appendix C.**

A 10-year analysis of fatal, serious injury, pedestrian and bicycle crashes was completed analyzing data from January 2015-December 2024 and found no fatal, serious injury, pedestrian or bicycle crashes have occurred in the study area.

VI. Existing Traffic Operations

A level of service (LOS) analysis of the peak hours was completed using the 2025 turning movement counts that were collected in September. The LOS results are based on average delay per vehicle as calculated by the Highway Capacity Manual (HCM) 7th Edition, which defines the level of service, based on control delay. Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection, and the time for the vehicle to speed up through the intersection and enter the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D is generally perceived to be acceptable to drivers. LOS E indicates that an intersection is operating at, or very near, its capacity and that drivers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity, and drivers experience substantial delays.

The existing traffic volumes were analyzed with the current geometry along CSAH 11. The school start/end times made up the two peak hours analyzed. The AM school peak hour was analyzed from 7:15-8:15 AM and the PM school peak hour was found to be 2:45-3:45 PM. The peak hour operational results are summarized in **Table 3**. The overall intersection delay, approach delay, and maximum queues are shown. The simulation settings within Synchro were calibrated based on the camera footage of the site to replicate real-life conditions as closely as possible.

Table 3: Existing Traffic Operations

	Approach	AM Peak			PM Peak		
		Approach (Delay - LOS)	Intersection (Delay - LOS)	Max. Approach Queue Length (ft)	Approach (Delay - LOS)	Intersection (Delay - LOS)	Max. Approach Queue Length (ft)
CSAH 11 at West School Access/Edgewater Farm Dr	EB	1 - A	14 - B	25	1 - A	10 - B	0
	WB	1 - A		25	1 - A		25
	NB	63 - F		175	40 - E		150
	SB	28 - D		25	16 - C		25
CSAH 11 at East School Access/Church Access	EB	0 - A	5 - A	0	0 - A	3 - A	0
	WB	1 - A		0	0 - A		0
	NB	41 - E		75	27 - D		50
	SB	12 - B		0	10 - B		0
CSAH 11 at Wildwood Ln	EB	0 - A	1 - A	0	0 - A	0 - A	0
	WB	0 - A		0	0 - A		0
	NB	-		-	-		-
	SB	14 - B		0	10 - B		0

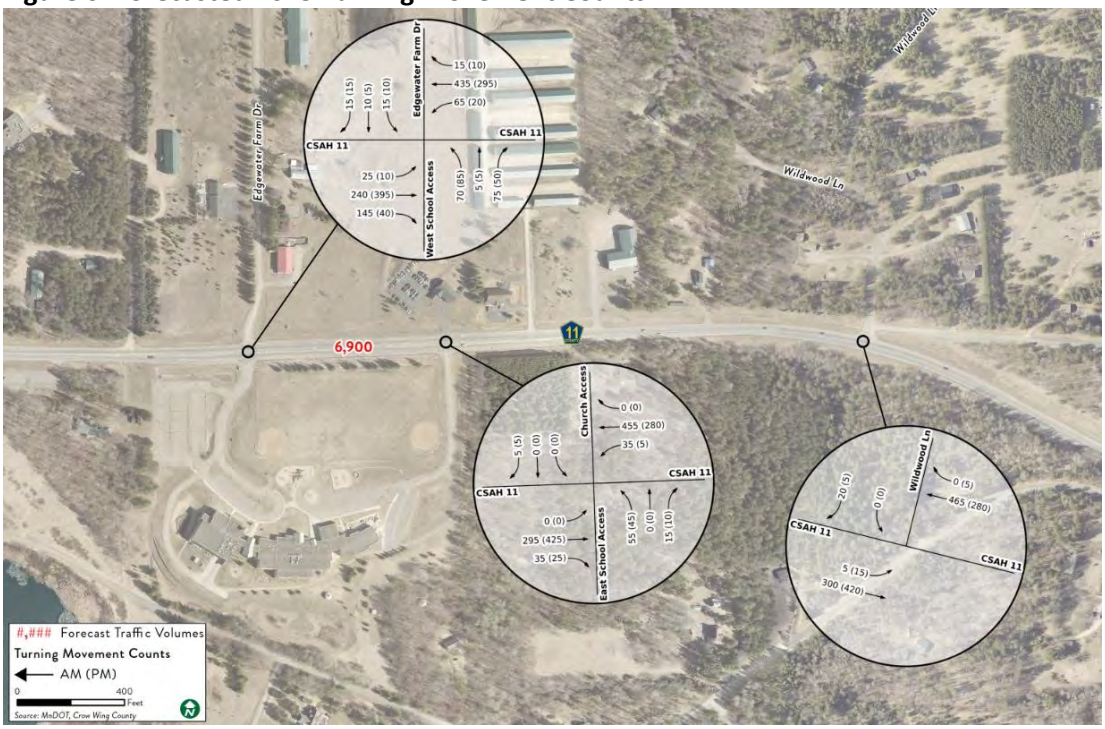
During the existing condition AM and PM peak hour, all intersections operate at LOS B or better overall. However, the northbound approaches at the West and East School Access intersections show delay during each peak hour. In the AM peak hour, the West School Access intersection (where the majority of parent pick-up and drop-off occurs) shows a failing level of service with over a minute of delay, while the East School Access northbound approach experiences 41 seconds of delay (LOS E). The PM peak hour shows slightly better operations, but elevated delays and queueing are still observed on the northbound approaches.

VII. Traffic Forecasting

2045 forecasts were determined based on data available from the 2040 Comprehensive Plan for Crow Wing County. The county is assuming a 0.5% growth for CSAH 11 in twenty years. Therefore, 2045 forecasted turning movements were calculated using the same growth rate.

Forecasted AM and PM peak turning movement counts are shown in **Figure 6** and **Appendix A.**

Figure 6: Forecasted 2045 Turning Movement Counts



VIII. Forecasted Traffic Operations

The forecasted 2045 peak hour turning movement counts were analyzed in Synchro. The operational results are shown in **Table 4**. The overall intersection delay, approach delay, maximum queues are shown.

Table 4: 2045 No Build Traffic Operations

	Approach	AM Peak			PM Peak		
		Approach (Delay - LOS)	Intersection (Delay - LOS)	Max. Approach Queue Length (ft)	Approach (Delay - LOS)	Intersection (Delay - LOS)	Max. Approach Queue Length (ft)
CSAH 11 at West School Access/Edgewater Farm Dr	EB	1 - A	29 - D	25	1 - A	18 - C	0
	WB	1 - A		25	1 - A		25
	NB	137 - F		275	75 - F		225
	SB	38 - E		50	18 - C		25
CSAH 11 at East School Access/Church Access	EB	0 - A	7 - A	0	0 - A	4 - A	0
	WB	1 - A		0	0 - A		0
	NB	66 - F		125	36 - E		75
	SB	12 - B		0	10 - B		0
CSAH 11 at Wildwood Ln	EB	0 - A	1 - A	0	0 - A	0 - A	0
	WB	0 - A		0	0 - A		0
	NB	-		-	-		-
	SB	14 - B		0	10 - B		0

During the 2045 No Build AM peak hour, the intersection delay increases compared to the existing conditions at the two school accesses. Most of the delay increase is observed at the northbound approach at both intersections. At the West School Access intersection, the approach delay increases from 63 seconds (LOS F) in 2025 to 137 seconds (LOS F) in 2045. While this approach is LOS F currently, in 2045 the approach delay is expected to increase by more than double.

During the 2045 No Build PM peak hour analysis, the maximum approach delay at the West School Access intersection increases from 40 seconds of delay per vehicle (LOS E) in 2025 to 75 seconds of delay per vehicle (LOS F) in 2045. Similar increases in delay are anticipated for the East School Access intersection.

IX. Warrant Analysis

A warrant analysis was completed for the intersection analyzing the existing (2025) traffic volumes. The MnMUTCD (Chapter 4C) states that the investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants:

- Warrant 1: Eight-Hour Vehicular Volume
- Warrant 2: Four-Hour Vehicular Volume
- Warrant 3: Peak Hour
- Warrant 4: Pedestrian Volume
- Warrant 5: School Crossing
- Warrant 6: Coordinated Signal System
- Warrant 7: Crash Experience
- Warrant 8: Roadway Network
- Warrant 9: Intersection Near a Grade Crossing

A warranted analysis was completed for the three intersections that had count data collected along the corridor. The results by location are summarized below. Documentation supporting the warrant analysis is included in **Appendix D.**

West School Access/Edgewater Farm Drive

- No signal warrants are met with existing volumes.
- All-way stop criteria are not met with existing volumes.

East School Access/Church Access

- No signal warrants are met with existing volumes.
- All-way stop criteria are not met with existing volumes.

Wildwood Lane

- No signal warrants are met with existing volumes.
- All-way stop criteria are not met with existing volumes.

X. Alternative Analysis

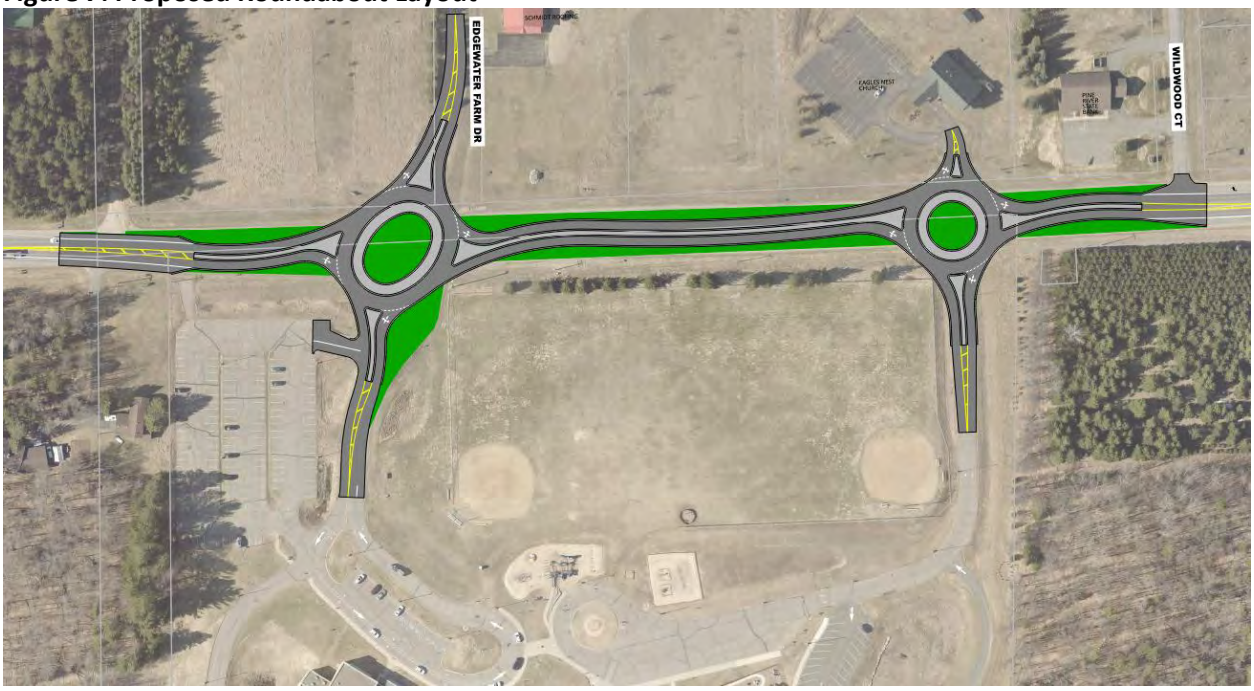
Traffic control changes were considered at the two school access intersections within the study area in order to improve safety and reduce delay for all users. The alternatives are discussed in categories for CSAH 11 alternatives, on-site alternatives, opportunities and dismissals, and interim alternatives.

CSAH 11 Alternatives

Single Lane Roundabout

This alternative reduces side street approach delay and queuing compared to the current side street stop control. It also improves safety for all modes of transportation, as roundabouts are found to reduce the severity of crashes and reduce the number of right angle crashes at intersections. The proposed roundabout layout is shown below in **Figure 7**.

Figure 7: Proposed Roundabout Layout



The single lane roundabout alternative was analyzed in Arcady Junctions 10, which is based on geometric simulation. The operational analysis of the roundabout alternative is found in **Table 5** below.

Table 5: Roundabout Traffic Operations (2025 & 2045)

		Approach	AM Peak						PM Peak					
			Approach		Intersection		Queue Length (ft)		Approach		Intersection		Queue Length (ft)	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Avg	Max	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Avg	Max
2025	CSAH 11 at West School Access/Edgewater Farm Dr	EB	6	A	6	A	25	75	6	A	6	A	25	100
		WB	7	A			50	100	6	A			25	75
		NB	5	A			25	50	5	A			25	50
		SB	5	A			25	25	5	A			0	25
	CSAH 11 at East School Access/Church Access	EB	6	A	6	A	25	100	6	A	6	A	25	100
		WB	7	A			50	100	4	A			25	50
		NB	5	A			25	50	6	A			25	50
		SB	4	A			0	25	0	A			0	25
2045	CSAH 11 at West School Access/Edgewater Farm Dr	EB	7	A	7	A	50	100	7	A	6	A	50	100
		WB	8	A			50	125	6	A			25	75
		NB	5	A			25	50	5	A			25	50
		SB	5	A			0	25	5	A			0	25
	CSAH 11 at East School Access/Church Access	EB	6	A	7	A	25	75	7	A	6	A	50	100
		WB	8	A			50	125	5	A			25	50
		NB	6	A			25	50	7	A			25	50
		SB	5	A			0	25	0	A			0	25

The roundabouts are expected to operate at LOS A through 2045. The maximum queue found is 125ft heading westbound into the western roundabout. Because there is approximately 500 feet of space between the two roundabouts, this maximum queue is not anticipated to cause any congestion.

A single lane roundabout would reduce the number of conflict points at a standard four-legged intersection from 32 to 8. Data published by MnDOT's Office of Traffic Engineering "A Study of the Traffic Safety at Roundabouts in Minnesota" indicates that single-lane roundabouts are anticipated to have less fatal and serious injury crashes than thru-stop intersections.

Signalized Traffic Control

Signals are customizable to timing needs of the school while prioritizing mainline CSAH 11 at other times. They also allow for each approach and/or movement to have designated time to safely maneuver, alleviating congestion coming into or out of the school property. The proposed layout would not require any geometric changes to the existing roadway. **Table 6** shows the operational results of this alternative.

Table 6: Signalized Traffic Operations (2025 & 2045)

		Approach	AM Peak			PM Peak		
			Approach (Delay - LOS)	Intersection (Delay - LOS)	Max. Approach Queue Length (ft)	Approach (Delay - LOS)	Intersection (Delay - LOS)	Max. Approach Queue Length (ft)
2025	CSAH 11 at West School Access/Edgewater Farm Dr	EB	10 - B	11 - B	100	8 - A	13 - B	175
		WB	11 - B		100	8 - A		75
		NB	13 - B		25	15 - B		50
		SB	11 - B		25	9 - A		25
	CSAH 11 at East School Access/Church Access	EB	13 - B	11 - B	125	16 - B	12 - B	200
		WB	10 - B		150	8 - A		100
		NB	7 - A		50	7 - A		50
		SB	0 - A		0	0 - A		0
2045	CSAH 11 at West School Access/Edgewater Farm Dr	EB	10 - B	12 - B	125	8 - A	13 - B	200
		WB	13 - B		125	8 - A		100
		NB	14 - B		50	15 - B		75
		SB	11 - B		25	9 - A		25
	CSAH 11 at East School Access/Church Access	EB	14 - B	12 - B	150	17 - B	13 - B	225
		WB	11 - B		175	8 - A		100
		NB	8 - A		50	8 - A		50
		SB	0 - A		0	0 - A		0

All intersections operate at LOS B or better through 2045. The highest approach delay is 17 seconds (LOS B) with a maximum queue of 225 feet at the eastbound approach at the East School Access intersection in the 2045 PM peak hour.

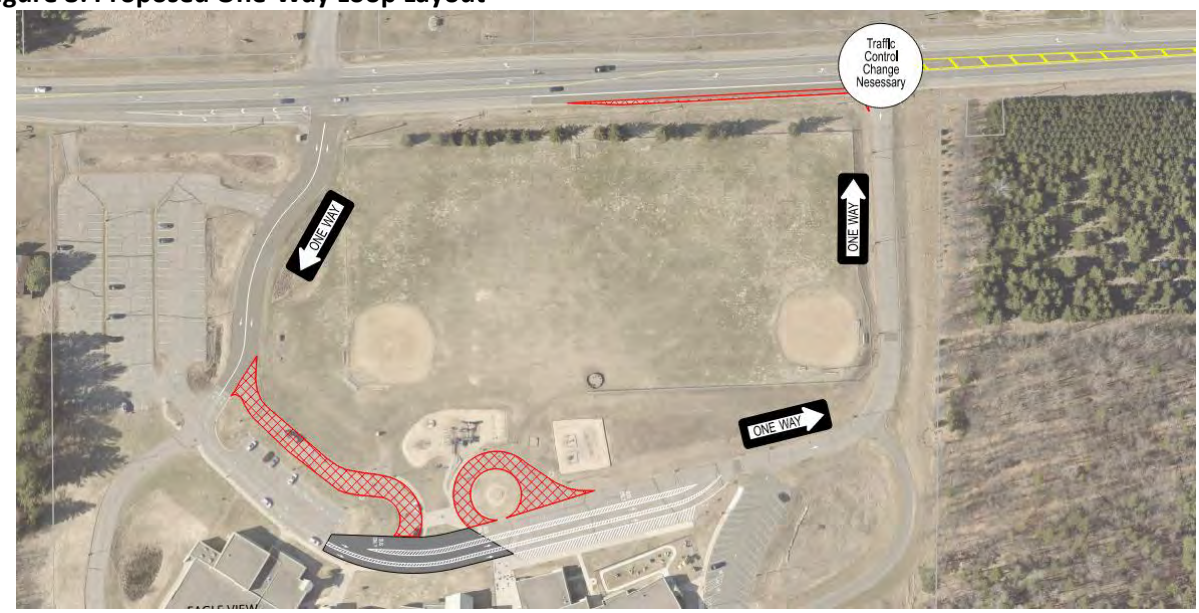
On-Site Alternatives

Several alternatives were considered to alleviate on-site congestion within the school property only. Each one attempts to either reduce the amount of accesses to CSAH 11, or change the traffic pattern on CSAH 11 to reduce conflicting vehicular movements. The One Way Loop alternative is discussed below, while the two Single Access alternatives are discussed in the dismissals section of this study report.

One-Way Loop

With this alternative, vehicles and buses enter via West School Access intersection and exit via East School Access intersection This allows more space for parent pick-up line, and maintains access to all existing parking lots. **Figure 8** shows the proposed alternative layout.

Figure 8: Proposed One-Way Loop Layout



The East School Access intersection would require a traffic control change because the increase in volume would lead to higher delay than is seen today with the existing stop control. Therefore, this alternative was analyzed with both a roundabout and a signal at the East School Access intersection. The alternative assumed no traffic control change to the West School Access intersection. **Table 7** shows the operational results for this alternative if there were a signal or a roundabout at the East School Access intersection.

Table 7: One-Way Loop Traffic Operations (2025 & 2045)

		Approach	AM Peak			PM Peak		
			Approach (Delay - LOS)	Intersection (Delay - LOS)	Max. Approach Queue Length (ft)	Approach (Delay - LOS)	Intersection (Delay - LOS)	Max. Approach Queue Length (ft)
2025	CSAH 11 at West School Access/Edgewater Farm Dr	EB	1 - A	2 - A	25	1 - A	1 - A	0
		WB	2 - A		25	1 - A		25
		NB	-		-	-		-
		SB	23 - C		25	14 - B		25
	CSAH 11 at East School Access/Church Access *Signal*	EB	9 - A	14 - B	75	17 - B	17 - B	125
		WB	15 - B		175	12 - B		100
		NB	14 - B		75	22 - C		50
		SB	0 - A		0	0 - A		0
	CSAH 11 at East School Access/Church Access *Roundabout*	EB	3 - A	6 - A	25	5 - A	7 - A	75
		WB	7 - A		100	6 - A		50
		NB	5 - A		50	11 - B		175
		SB	4 - A		25	0 - A		25
2045	CSAH 11 at West School Access/Edgewater Farm Dr	EB	1 - A	3 - A	25	1 - A	1 - A	25
		WB	2 - A		25	1 - A		25
		NB	-		-	-		-
		SB	29 - C		50	16 - B		25
	CSAH 11 at East School Access/Church Access *Signal*	EB	10 - B	15 - B	100	19 - B	20 - C	150
		WB	17 - B		225	13 - B		125
		NB	15 - B		75	27 - C		75
		SB	0 - A		0	0 - A		0
	CSAH 11 at East School Access/Church Access *Roundabout*	EB	4 - A	24 - C	50	5 - A	7 - A	50
		WB	34 - D		950	7 - A		75
		NB	7 - A		75	13 - B		200
		SB	6 - A		25	0 - A		25

The roundabout alternative operates with a lower intersection delay at the East School Access intersection. Both options operate at LOS C or better for the overall intersection through 2045. In the 2045 AM peak hour, the westbound approach of the roundabout option operates with 34 seconds of delay per vehicle (LOS D). While the average queue for the WB approach at the roundabout in the 2045 AM peak hour is 350 feet, the maximum queue (950 feet) is anticipated to extend through multiple intersections along CSAH 11, which could temporarily block access to those driveways or roadways.

Opportunities and Dismissals

Through public engagement and engineering analysis, various options and alternatives were discussed but were either determined to be a future opportunity-driven improvement, or dismissed altogether. Opportunities were identified as long-term solutions that could be added to any alternative but is not a standalone alternative in itself. Dismissals were identified as concepts that had a fatal flaw due to constructability, safety, or inability to meet engineering standards. A visual map with these items is included in the **Appendix E**.

Opportunities

- Shift eastbound right turn lane at the West School Access intersection to the western access of the parking lot. This removes traffic from the West School Access intersection, creating more gaps for northbound vehicles exiting the property
- Add additional parking to the west of the current school property through school district's potential pursuit/acquisition of land
- Add second row of parking and lane line up to the eastern portion of the parking lot outside the Early Childhood Center

Dismissals

- Restrict access to right-in right-out or ¾ access at both school accesses along CSAH 11
    - Affects access of Edgewater Farm Dr and/or church, there is no nearby viable turnaround.
- Create a single entrance point in the middle of the school property and close other access points
    - Design is not per County access spacing guidelines, and new roadway would impact too much green space.
- Connect buses through back of school property
    - Dismissed due to constructability concerns due to steep grade, and disruption to current uses of land in the back of the school.
- Connect current on-site network to Nickel Rd instead of / in addition to CSAH 11
    - This pushes traffic to other connection points on CSAH 11, where operational and safety problems would persist. Nickel Rd is designed to handle residential traffic. Higher construction cost due to steep grade.
- Single Access A
    - In this alternative, all traffic enters and exits via West School Access intersection, and the East School Access intersection is closed. Buses and early childhood pick-up would circulate the same as the existing parent pick-up/drop-off, but continue on straight toward the eastern lots, turning back around and merging with parent pick-up/drop-off again before exiting the property. **Figure 9** shows the proposed layout of this alternative.
    - Through evaluation with the project management team and based on public feedback, it was determined that this alternative would not be carried through further analysis.

Figure 9: Proposed Single Access A Layout

- Single Access B
    - This alternative is similar to Single Access A, but uses a new roadway that goes between the field and the playground in order to separate the parent pick-up/drop-off and the buses and early childhood traffic. **Figure 10** shows the proposed layout of this alternative.
    - Through evaluation with the project management team and based on public feedback, it was determined that this alternative would not be carried through further analysis.

Figure 10: Proposed Single Access B Layout

Interim Alternatives

In order to immediately address the safety concerns and difficult sight lines at the school access intersections, an interim alternative is proposed. Vehicles that are northbound (exiting the school property) at either intersection need proper visibility to know the road is clear and safely make their turn. The proposed interim alternative at the West School Access intersection is to convert the currently striped gore area at the eastbound right turn lane to a concrete median, reconstruct the southeast corner of the intersection to improve curb lines and move the stop sign and stop bar forward. At the East School Access intersection, a median gore area would be constructed as there is currently no separation from the eastbound through lane and eastbound right turn lane. This allows for the southeast corner to be reconstructed and the northbound approach stop bar to move forward and create a better angle and visibility with the eastbound through lane. Additionally, a 250-foot northbound right turn lane was added for extra capacity. All of these proposed changes allow for northbound vehicles to safely move forward further, giving them more visibility as they assess CSAH 11 for gaps in traffic on both sides of the roadway. **Figure 11** and **Figure 12** show the proposed concepts at the west and east access intersections, respectively.

Figure 11: West School Access Interim Concept

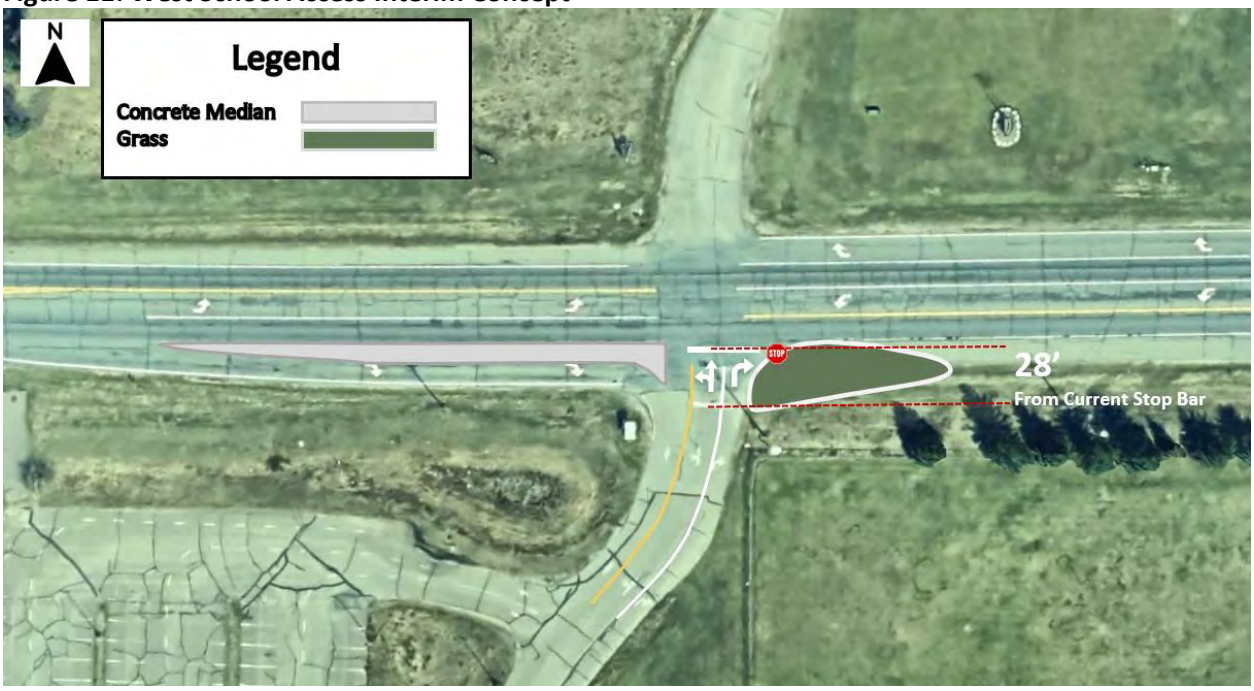
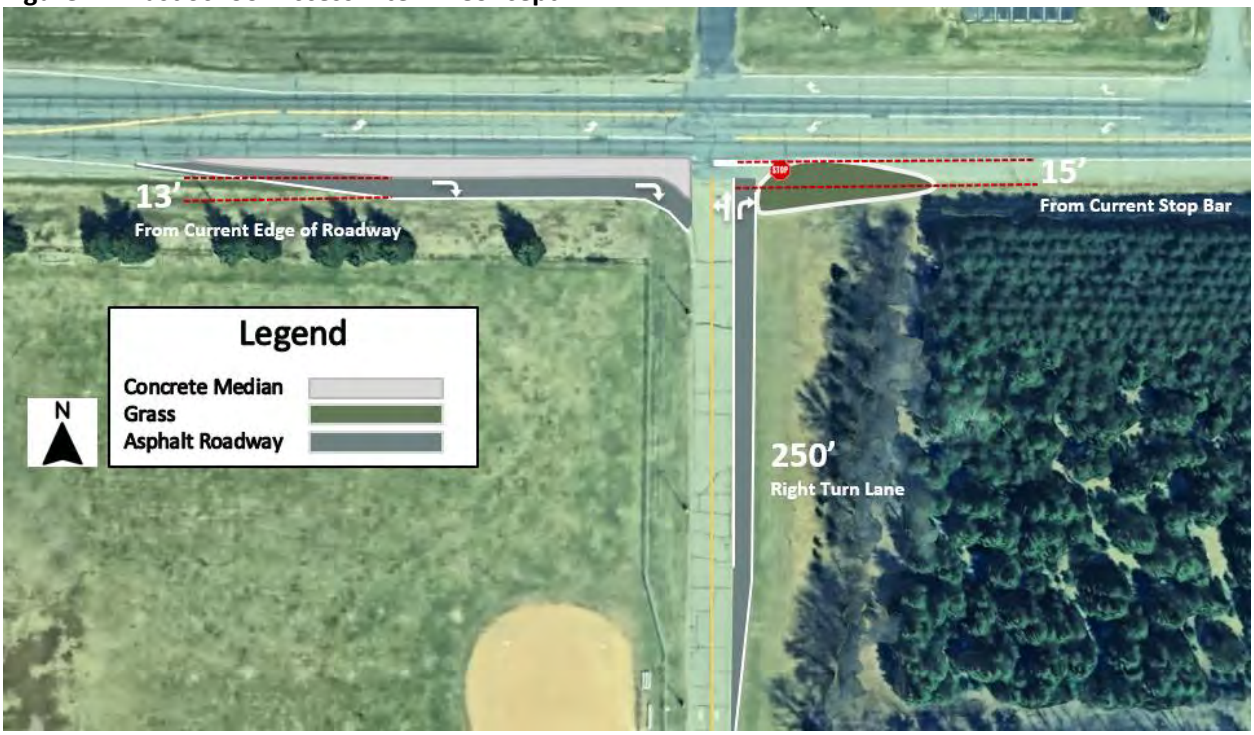


Figure 12: East School Access Interim Concept



Each intersection was assessed for proper sightlines in the current configuration and the proposed stop bar location. According to AASHTO's *Policy on Geometric Design of Highways and Streets*, the required sight distance for the use case "left-turn-from-stop" for a roadway speed of 55 mph, is 610 feet. This use case is the largest distance and longest gap a driver needs to safely complete their maneuver from a side

street. During the peak school start and release periods, the school speed zone speed limit is 30 mph. At 30 mph the required sight distance is 335 feet, which still leaves the majority of the turn lane within the sight triangle.

Figure 13 and **Figure 14** illustrate the existing sight distance triangles compared to the proposed triangles after shifting the stop bar north for the West and East School Access Intersections, respectively. This adjustment improves the sightline for northbound drivers, thereby enhancing overall safety.

Figure 13: Existing and Proposed Sight Triangles- West School Access

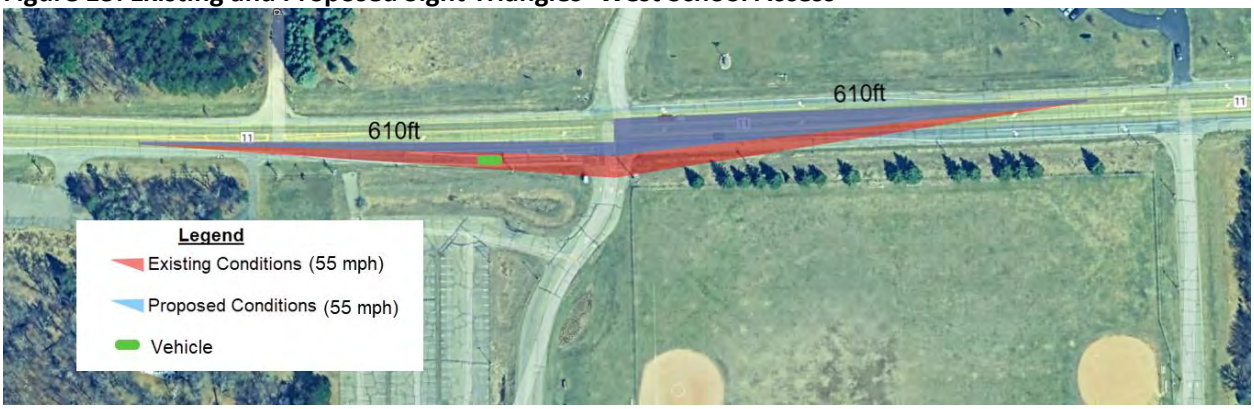


Figure 14: Existing and Proposed Sight Triangles- East School Access

Figure 13 and **Figure 14** also show an example vehicle in the eastbound right turn lane. This vehicle, when entering the school property using the turn lane, is within the red shaded sight triangle for the existing condition, but removed from the line of sight in the proposed (blue) condition. **Figure 14** also shows the proposed eastbound right turn lane moving further south, and the gore area that would be created in doing so.

The preliminary estimated cost of these treatments are $154,000 at the West School Access intersection and $234,000 at the East School Access intersection. Though studied for roadways with higher volume than CSAH 11, CMF 8499 shows that treatment of right turn geometry can decrease angle crashes at an intersection by nearly 60%.

XI. Public Engagement

Public engagement was a valuable piece of the study and alternatives analysis. In addition to an online engagement platform, an open house was held on September 29th, 2025 at Eagle View Elementary during phase one of public engagement. The first phase consisted of sharing existing speed data, operations, and safety analysis with the public. In turn, the public was asked to share their concerns, ideas, and thoughts as to how the safety and efficiency could be improved on CSAH 11 or within the Eagle View School site internally (or both). Many expressed opinions over the two access points to Eagle View Elementary on CSAH 11, and the delay experienced trying to exit the site. Suggestions included signalized intersections, roundabouts, and new connections on the south side of the school property.

A second round of public engagement occurred in November 2025. A bus driver meeting and an open house was held on November 5th, 2025 at Eagle View Elementary. This phase of engagement included informing the public of the various alternatives and soliciting opinions on which they feel is the best treatment for CSAH 11 and/or the school property to alleviate congestion, improve safety, and maintain efficiency.

A comprehensive list of the comments, the reactions and responses from both phases of public engagement are found in **Appendix F.**

XII. Evaluation Matrix

An evaluation matrix was developed to determine the various components of each alternative and how they contribute to the overall value of a recommended solution. As previously mentioned, the signals, roundabouts, and one way loop alternatives were evaluated at this level of detail for the study. Additionally, it was determined and desired through public feedback that the study look into the alternatives further to see if a treatment could occur at just one of the school access intersections, rather than both. Therefore, nine different alternatives were analyzed:

- Dual roundabout
- Roundabout at West School Access intersection only
- Roundabout at East School Access intersection only
- Dual signal
- Signal at West School Access intersection only
- Signal at East School Access intersection only
- One way loop – signalized at East School Access intersection
- One way loop – roundabout at East School Access intersection
  Interim- Stop Bar and Raised Gore

Each alternative was evaluated with both intersections included, so that the safety and operational benefits were quantified based on whether one or both of the intersections were being reconstructed, and all comparisons would be equal. The interim improvement assumes the same operational performances as the no build.

The evaluation matrix criteria, including the weight, tools used to evaluate, and scoring notes are listed below. The various measures evaluate safety, efficiency/mobility, public input, and cost. The weights of the measures are based on project goals, with 45% weighted for safety, 20% to mobility (delay and reliability), and the remaining 25% to public input and cost/benefit.

Table 8: Evaluation Matrix Criteria

Weight	Metric	Measure	Tool(s)	Scoring Notes
30%	Vehicle Safety	Treatments to improve safety	CMFs / anticipated crash reduction	Crash Rate Reduction: 0 = no reduction, 1 = mimimal reduction (<25%), 2 = some reduction ~25%, 3 = moderate reduction ~50%, 4 significant reduction ~75+%
15%		Vehicle to vehicle conflict points	Intersection design and typical section	0 = neutral; 1= reduction of >10% conflict points; 2 = reduction of >25% conflict points; 3 = reduction of >50% conflict points; 4 = reduction of ≥75% conflict points
10%	Vehicle Mobility	Mainline LOS	Peak Hour 2045 traffic model operations	Weighted Average EB/WB delay. 1 = LOS F; 2 = LOS E; 3 = LOS D; 4 = LOS A,B, C
10%		Side Street LOS	Peak Hour 2045 traffic model operations	Weighted Average NB/SB delay. 1 = LOS F; 2 = LOS E; 3 = LOS D; 4 = LOS A,B, C
5%		System reliability (Off Peak)	CSAH 11 Travel Time Consistency (off peak)	Added travel time compared to No Build; 1 = ≥15 sec; 2 = ≥10 sec; 3 = ≥5 sec; 4 = <5 sec
5%		System reliability (Peak)	CSAH 11 Travel Time Consistency (peak)	Added travel time compared to No Build; 1 = ≥15 sec; 2 = ≥10 sec; 3 = ≥5 sec; 4 = <5 sec
15%	Public Feedback		Input ID and Open House Feedback	0 = majority negative; 2 = some negative, 3 = neutral or 50/50; 4; some positive; 5 = majority positive
10%	Benefit / Cost		Benefit Cost Ratio	Raw Value

Table 9: Evaluation Matrix Scoring

Metric	Measure	No Build	2 Roundabouts	West Roundabout	East Roundabout	2 Signals	West Signal	East Signal	One way loop-signalized	One way loop-roundabout	Interim Improvement
Vehicle Safety	Treatments to improve safety	0	4	3	3	2	1	1	1	3	3
	Vehicle to vehicle conflict points	0	4	2	2	0	0	0	1	3	0
Vehicle Mobility	Mainline LOS	4	4	4	4	4	4	4	4	4	4
	Side Street LOS	1	4	4	1	4	3	1	4	4	1
	System reliability (Off Peak)	4	1	1	1	2	3	3	4	1	4
	System reliability (Peak)	4	3	3	4	1	2	2	2	1	4
Public Feedback		0	3	4	4	3	4	4	0	0	3
Property Impacts		3	1	2	2	3	3	3	3	2	3
Benefit / Cost		-	0.1	0.6	-0.3	-1.4	-1.1	-1.8	-0.7	0.3	0.1
Total Score		**0.9**	**3.3**	**2.9**	**2.5**	**1.9**	**1.7**	**1.5**	**1.5**	**2.3**	**2.3**

As seen in **Table 9,** the alternatives including a signalized intersection treatment score in the lower half of the alternatives. Evaluated for both the crash modification factors and conflict point reductions, roundabouts provide larger safety benefits than signals do. In terms of mobility, all alternatives maintain reasonable mainline level of service. Side street level of service is much lower on a system wide level when treatment would only occur at the East School Access intersection. This is due to the larger amount of vehicles at the West School Access intersection. In an off-peak hour, the signals add less travel time to vehicles traveling along CSAH 11. However, during a peak hour the roundabouts allow for better balance and mainline efficiency and therefore are scored higher than the signals. Public feedback was scored based on the online feedback as well as in-person. While roundabouts and signals were nearly split alternatives, most agreed they'd rather see a change to just one intersection than both. Another level of evaluation was done with the benefit/cost analysis, below.

XIII. Benefit Cost Analysis

A benefit cost analysis was completed for the same nine alternatives at both school access intersections on CSAH 11.

Safety Benefit

Crash reduction factors were taken from the Crash Modification Factor (CMF) Clearinghouse. The reduction factors were used in combination with the standard HSIP Benefit-Cost Calculation worksheets to generate benefits associated with crash reductions. The worksheet asks for an overall percent traffic growth at the intersections. Additionally, a discount rate of 3.1% and a project lifespan of 20 years was assumed based on MnDOT Benefit-Cost Analysis and HSIP guidance. For analysis, it was assumed that opening day would be in 2026. Benefits between 2026 and 2045 were analyzed. Five years of crash data (2020-2024) were analyzed.

CMFs for converting a stop-controlled intersection to a roundabout or signal were applied to the intersection(s). For a roundabout, CMF ID 211 was applied to all injury crashes (82% reduction) and CMF ID 229 was applied to all property damage only crashes (71% reduction). For a signal, CMF 7983 was applied to all crash types (36% reduction). For the interim improvement, CMF 8499 (60% reduction) was applied only to crashes that occurred involving NB and EB vehicles (where the treatment is proposed). The CMF worksheets are included in **Appendix G**.

The HSIP Benefit-Cost Calculation worksheets that were used to determine the present value cost of crashes for each alternative is included in the **Appendix G**.

Delay Benefit

The delay benefit was determined by modeling the existing and forecasted turning movement counts in Synchro and Arcady with the no build and build concepts. To estimate daily delay, delay was considered for four time periods; the AM peak hour, the PM peak hour, the average AM off peak hour, and the average PM off peak hour. The off peak hours were determined by analyzing the 6 am – 7 pm count and determining the average side street and mainline volumes. Five AM off peak hours and six PM off peak hours were used in analysis. New Synchro and Arcady models were created to determine delay for the two off peak hours.

It was assumed that 85% of the daily traffic occurred between 6:00 AM and 7:00 PM. Therefore, the following equation was used to calculate the total daily delay accounting for the remaining 15% of daily traffic. This equation references the number of hours that are associated with the peak and off-peak hours.

$$\boldsymbol{Total\ Daily\ Delay} = \frac{\mathbf{5}*(\boldsymbol{AM\ off-peak\ Delay})+\mathbf{1}*(\boldsymbol{AM\ Peak\ Delay})+\mathbf{1}*(\boldsymbol{PM\ Peak\ Delay})+\mathbf{6}*(\boldsymbol{PM\ off-peak\ Delay})}{\mathbf{0.85}}$$

Text within parenthesis represents the total network delay in hours as determined for each concept in Synchro and Arcady. Auto delay and truck delay values were computed using the truck percentage (2.9%) collected from the turning movement counts. The following values of travel time savings per person-hour were taken from Table A.1 of MnDOT's recommended standard values for use in cost effectiveness and benefit-cost analysis:

- $25.40 for autos
- $40.00 for trucks

Benefits from the reduction of delay were computed by comparing the total delay values for the build alternative to the no build alternative. The total benefit over the 20-year analysis period was determined using the existing and future benefits and interpolation to calculate the delay benefit for each year. The discount rate of 3.1% was used to convert the yearly benefit to a present value.

Project Cost

The preliminary construction cost was calculated and used for the benefit cost analysis. The cost estimate uses 2026 or 2027 dollars, depending on the alternative. The cost excludes engineering and Right of Way estimated costs. Preliminary cost estimates are included in **Appendix G**.

Benefit-Cost Ratio

The 20-year safety and delay benefits were combined and compared to the total cost to construct the build alternative to determine the benefit cost ratio. A ratio greater than one indicates the project cost is less than the anticipated benefit from the investment. A ratio lower than one, or a negative ratio, indicates the anticipated benefit does not offset the cost. The results are shown in **Table 10** below.

Table 10: Benefit-Cost Analysis Summary

Alternative	Safety Benefit	Delay Benefit	Construction Cost	B/C Ratio
2 Roundabouts	$1,028,482	-$502,228	$4,300,000.00	0.1
Roundabout - West School Access intersection	$1,028,482	$419,152	$2,480,000.00	0.6
Roundabout - East School Access intersection	$0	-$514,749	$2,020,000.00	-0.3
2 Signals	$845,474	-$3,743,151	$2,100,000.00	-1.4
Signal - West School Access intersection	$845,474	-$2,005,915	$1,050,000.00	-1.1
Signal - East School Access intersection	$0	-$1,899,247	$1,050,000.00	-1.8
One Way Loop- Signal	$38,238	-$887,882	$1,290,000.00	-0.7
One Way Loop- Roundabout	$40,521	$545,377	$2,260,000.00	0.3
Interim- Stop Bar and Raised Gore	$34,015	$0	$388,000.00	0.1

Table 10 shows that none of the alternatives have a benefit/cost ratio above 1. While this doesn't exclude the alternative from being an option, it demonstrates that based on current safety and operational conditions, the cost of implementing the alternative does not equal or outweigh the benefit that would be anticipated. The only alternatives that have a positive B/C ratio are the dual roundabouts, West School Access intersection roundabout, and one way loop with roundabout, and the interim alternative. The highest B/C ratio is for the West School Access intersection roundabout, due to the most safety benefit being seen at the West School Access intersection (due to crash history), and the lower cost of constructing a roundabout at just one intersection.

XIV. Recommendation

The evaluation matrix and benefit cost analysis show that the roundabout alternatives score higher than the signalized alternatives in terms of delay and safety. At present, the roundabout alternatives do not have a benefit/cost ratio above one and therefore do not show an immediate benefit for the estimated cost to construct.

The recommended solution in the immediate time frame is to implement the interim alternative of reconstructing the eastbound right turn lanes and northbound approaches at each school access intersection. The added visibility, due to increased sight distance, and comfort for northbound drivers and traffic calming effect that the concrete gore area would add for mainline drivers is anticipated to improve safety and reduce northbound delays exiting the school site, while maintaining mainline operations.

It is recommended that safety and operational performance of the study area are reviewed on an annual basis and discussed between the applicable agencies. In the event that safety or operational issues persist following the implementation of the interim improvements, the long-term recommendation for this area based upon the findings of the evaluation matrix and benefit-cost analysis is to implement a roundabout at the West School Access intersection. The evaluation matrix which weighs the project goals of safety, congestion, mainline efficiency, and public opinion shows that the dual roundabout alternative achieves these outcomes. The benefit cost analysis shows that implementing a roundabout at just the West School Access intersection has the most benefit in terms of system delay and expected safety benefits. If this solution becomes necessary, the agencies involved should seek outside funding sources and proceed with construction.

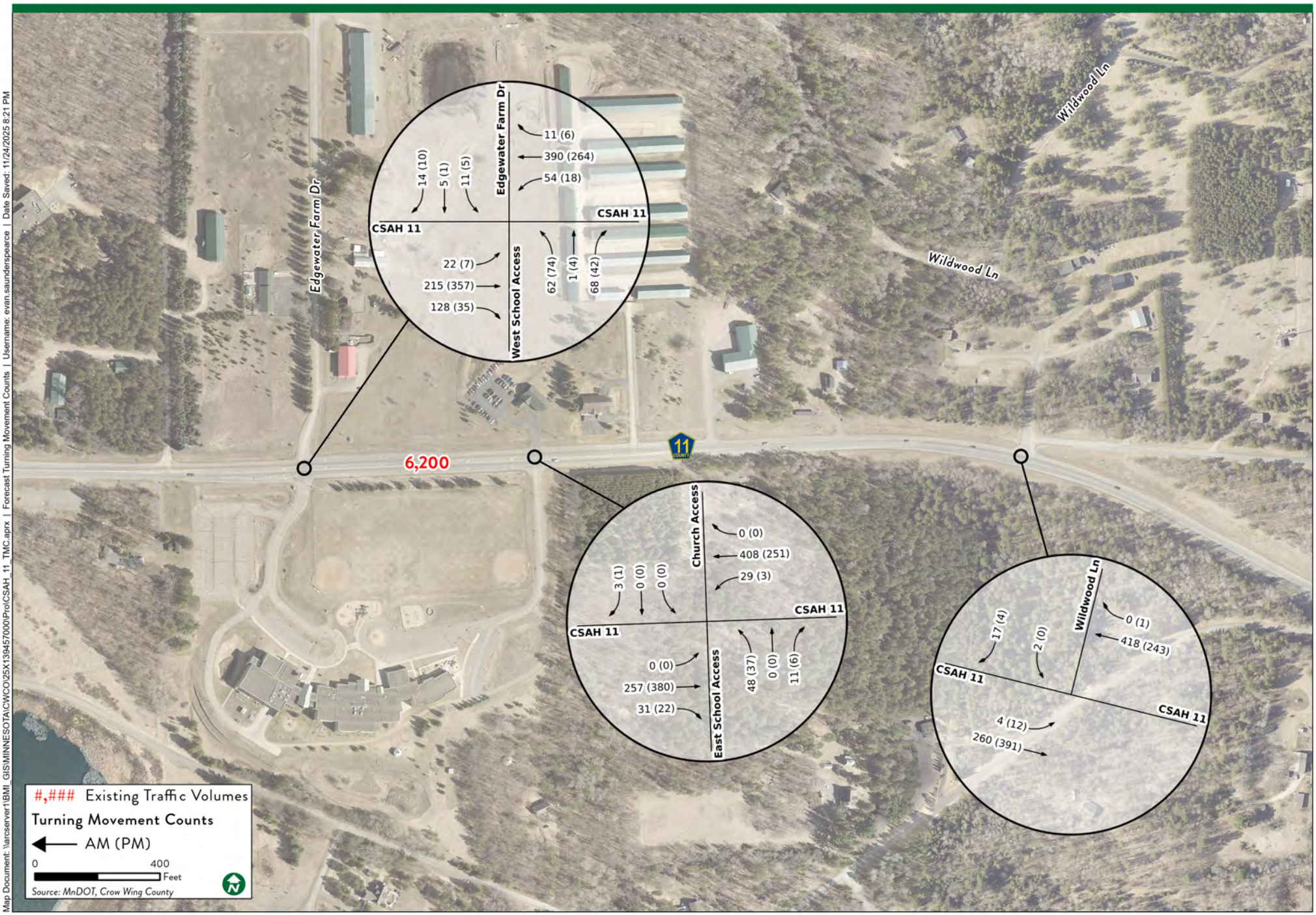
Appendix A: Turning Movement Figures

CSAH 11 Traffic Study

Crow Wing County, MN

Existing Turning Movement Counts

November 2025

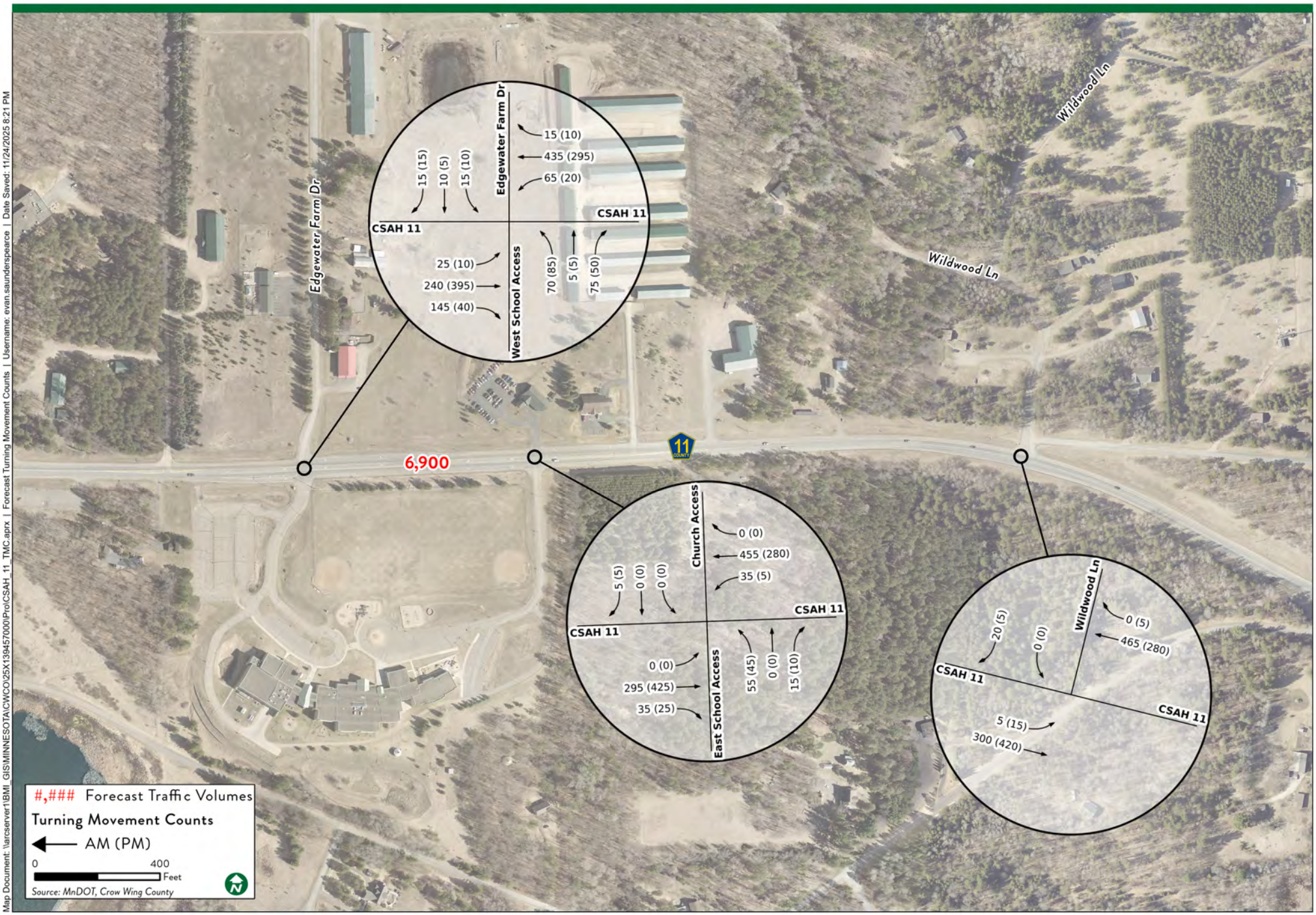


CSAH 11 Traffic Study

Crow Wing County, MN

Forecast Turning Movement Counts

November 2025



Appendix B: Radar Data

For Project:	Eagle View Elementary CWCO				
Project Notes:					
Location/Name:	Incoming = Eastbound				
Report Generated:	12/16/2025	9:39:50 AM			
Speed Intervals	1 MPH				
Time Intervals	Instant				
Traffic Report From	9/10/2025	12:00:00 AM	through	9/11/2025	11:59:59 PM
85th Percentile Speed	54 MPH				
85th Percentile Vehicles	4815				
Total Vehicles	5665				
AADT:	2832				

Volumes - weekly counts

	Time	5 Day	7 Day
Average Daily		2832	2832
AM Peak	11:00 AM	151	151
PM Peak	8:00 PM	340	340

Speed

Speed Limit:	55						
85th Percentile Speed:	54						
50th Percentile Speed:	48						
10 MPH Pace Interval:	45.0 MPH	to	55.0 MPH				
Average Speed:	46.43						
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**
Count over limit	N/A	N/A	177	238	N/A	N/A	N/A
% over limit	N/A	N/A	7.7	7.1	N/A	N/A	N/A
Avg Speeder	N/A	N/A	57.4	57.3	N/A	N/A	N/A
Avg Speed	N/A	N/A	45.7	46.9	N/A	N/A	N/A

Class Counts

	Number	%
VEH_SM	2	0
VEH_MED	5396	95.3
VEH_LG	267	4.7

[VEH_SM=motorcycle, VEH_MED = sedan, VEH_LG = truck]

For Project:	Eagle View Elementary CWCO				
Project Notes:					
Location/Name:	Outgoing = Westbound				
Report Generated:	12/16/2025	9:39:50 AM			
Speed Intervals	1 MPH				
Time Intervals	Instant				
Traffic Report From	9/10/2025	12:00:00 AM	through	9/11/2025	11:59:59 PM
85th Percentile Speed	59 MPH				
85th Percentile Vehicles	6514				
Total Vehicles	7663				
AADT:	3831				

Volumes - weekly counts

	Time	5 Day	7 Day
Average Daily		3831	3831
AM Peak	7:00 AM	385	385
PM Peak	3:00 PM	310	310

Speed

Speed Limit:	55		
85th Percentile Speed:	59		
50th Percentile Speed:	54		
10 MPH Pace Interval:	51.0 MPH	to	61.0 MPH
Average Speed:	50.53		

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	N/A	N/A	1316	1802	N/A	N/A	N/A
% over limit	N/A	N/A	37.6	43.3	N/A	N/A	N/A
Avg Speeder	N/A	N/A	58.6	58.6	N/A	N/A	N/A
Avg Speed	N/A	N/A	49.8	51.1	N/A	N/A	N/A

Class Counts

	Number	%
VEH_SM	178	2.3
VEH_MED	7106	92.7
VEH_LG	379	4.9

[VEH_SM=motorcycle, VEH_MED = sedan, VEH_LG = truck]

Appendix C: Crash Analysis

Intersection Safety Screening

Intersection: CSAH 11 & Wildwood Ln (2020-2024)

Statewide Averages based on 2019-2023 crashes

Crashes by Crash Severity	
Fatal (K)	0
Incapacitating Injury (A)	0
Minor Injury (B)	0
Possible Injury (C)	0
Property Damage (PDO)	1
Total Crashes	1

Intersection Characteristics	
Entering Volume	6,976
Environment	Rural
Lighting	Unlit
Traffic Control	Thru-Stop

Annual crash cost = $3,600

Statewide comparison = Thru/STOP, Rural

Total Crash Rate	
Observed	0.079
Statewide Average	0.141
Critical Rate	0.450
Critical Index	**0.18**

Fatal & Serious Injury Crash Rate	
Observed	0.000
Statewide Average	0.926
Critical Rate	8.310
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference (i.e. observed crash rate ÷ critical crash rate).

The observed total crash rate for this period is 0.08 per MEV; this is 82% below the critical rate. Based on similar statewide intersections, an additional 5 crashes over the five years would indicate this intersection operates outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: CSAH 11 & West School Access/Edgewater Farm Dr (2020-2024)

Statewide Averages based on 2019-2023 crashes

Crashes by Crash Severity	
Fatal (K)	0
Incapacitating Injury (A)	0
Minor Injury (B)	1
Possible Injury (C)	0
Property Damage (PDO)	1
Total Crashes	2

Intersection Characteristics	
Entering Volume	7,924
Environment	Rural
Lighting	Unlit
Traffic Control	Thru-Stop

Annual crash cost = $79,600

Statewide comparison = Thru/STOP, Rural

Total Crash Rate	
Observed	0.138
Statewide Average	0.141
Critical Rate	0.430
Critical Index	**0.32**

Fatal & Serious Injury Crash Rate	
Observed	0.000
Statewide Average	0.926
Critical Rate	7.620
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference (i.e. observed crash rate ÷ critical crash rate).

The observed total crash rate for this period is 0.14 per MEV; this is 68% below the critical rate. Based on similar statewide intersections, an additional 5 crashes over the five years would indicate this intersection operates outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Appendix D: Warrant Analysis

Traffic Signal Warrant Analysis

Warrants 1 - 3 (Volume Warrants)

Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	West Access/Edgewood Farm Dr
Analyzed with	1 approach lane	Analyzed with	2 or more approach lanes
Total Approach Volume	6141 vehicles	Total Approach Volume	594 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	3 crossings
Right turn reduction of	100 percent applied	Right turn reduction of	0 percent applied

Reduction applied to Volume Warrant thresholds due to isolated community.

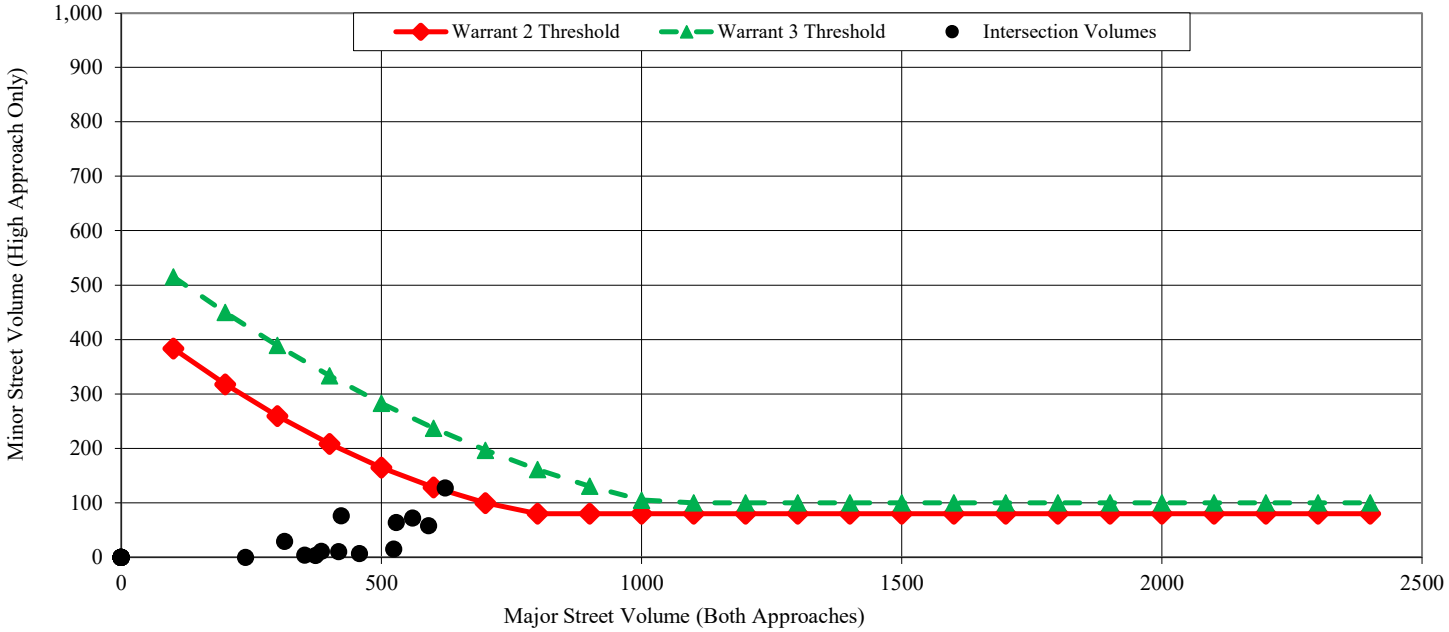
Warrant 1, Eight Hour Vehicular Volume			
	Condition A	**Condition B**	**Condition A+B***
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**	**Not Satisfied**
Required values reached for	0 hours	2 hours	1 (Cond. A) & 5 (Cond. B)
Criteria - Major Street (veh/hr)	350	525	280 (Cond. A) & 420 (Cond. B)
Criteria - Minor Street (veh/hr)	140	70	112 (Cond. A) & 56 (Cond. B)

* Should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Warrant 2, Four Hour Vehicular Volume	
Condition Satisfied?	**Not Satisfied**
Required values reached for	1 hour
Criteria	See Figure Below

Warrant 3, Peak Hour Vehicular Volume		
	Condition A	**Condition B**
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**
Required values reached for	0 total, minor, 0 delay	0 hours
Criteria - Total Approach Volume (veh in one hour)	800	See Figure Below
Criteria - Minor Street High Side Volume (veh in one hour)	150	
Criteria - Minor Street High Side Delay (veh-hrs)	5	

Figure 4C-2 (Warrant 2 - 70% Factor) & Figure 4C-4 (Warrant 3 - 70% Factor)



Traffic Signal Warrant Analysis

Warrants 4 to 6 (Pedestrian, School, Coordinated Systems)

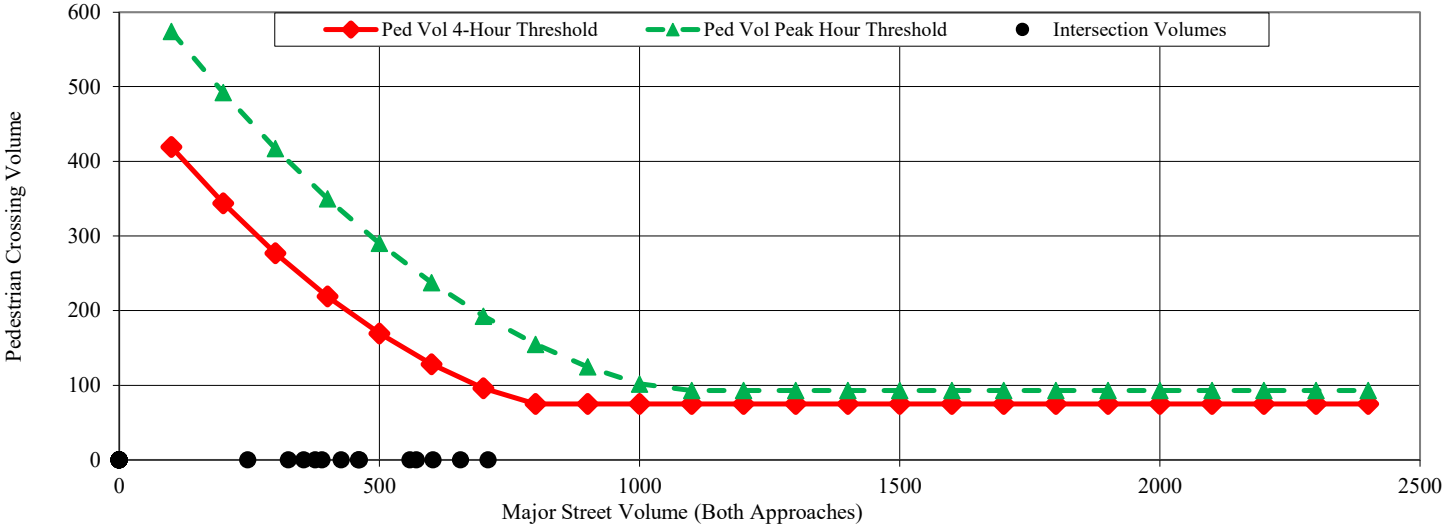
Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	West Access/Edgewood Farm Dr
Analyzed with	1 approach lane	Analyzed with	2 or more approach lanes
Total Approach Volume	6141 vehicles	Total Approach Volume	594 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	3 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	0 percent applied

Reduction applied to Pedestrian Warrant thresholds due to high speeds on CSAH 11 and isolated community.

Warrant 4, Pedestrian Volume		
	Condition A - Four Hour Vol.	**Condition B - Peak Hour Vol.**
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**
Required values reached for	0 hours	0 hours
Criteria - Min. Distance to Nearest Controlled Crossing	300 feet, unless progressive movement not impacted	
Criteria - Major Street Volume and Crossing Volume	See Figure Below	

Figure 4C-6 & Figure 4C-8 (Warrant 4 Four Hour & Peak Hour - 70% Factor)



Warrant 5, School Crossing	
Condition Satisfied?	**Not Satisfied**
Criteria - School Crossing Data	- 20 or more schoolchildren crossing during the highest hour. - Consideration given to other remedial measures. - 300 feet or more to nearest controlled crossing, or proposed signal will not restrict progression. - Engineering study showing inadequate gaps in traffic.

Warrant 6, Coordinated Signal System	
Condition Satisfied?	**Not Satisfied**
Criteria - Coordinated Signal System	- If one-way, the adjacent traffic control signals are too far apart to provide the necessary degree of vehicular platooning. - If two-way, the adjacent traffic control signals do not provide the necessary degree of platooning, but will collectively provide a progressive operation with the proposed traffic control signal. - Resultant spacing of traffic control signal is 1,000 feet or greater.

Traffic Signal Warrant Analysis

Warrants 7-9 (Crash, Network, Rail Crossing)

Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	West Access/Edgewood Farm Dr
Analyzed with	1 approach lane	Analyzed with	2 or more approach lanes
Total Approach Volume	6141 vehicles	Total Approach Volume	594 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	3 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	0 percent applied

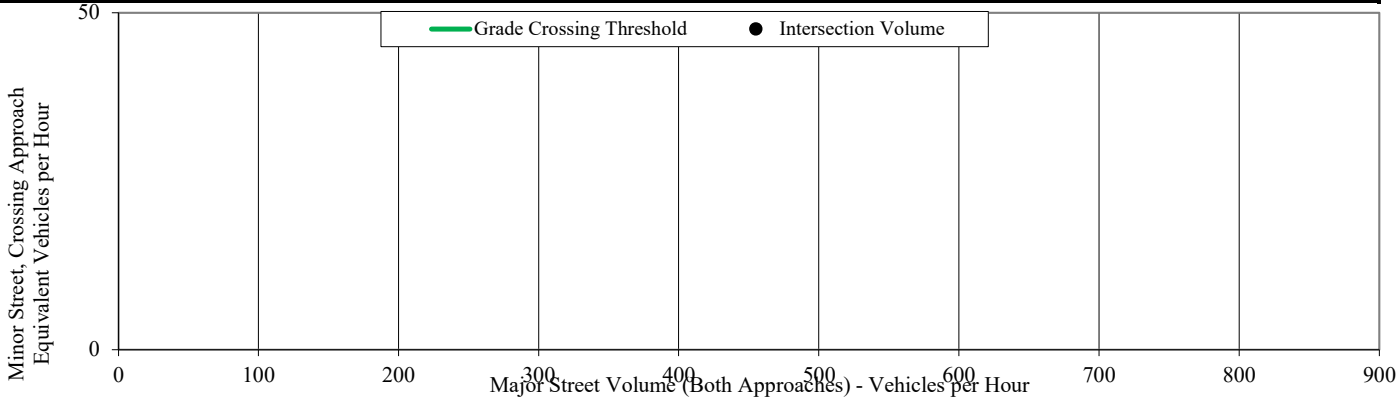
Reduction applied to the Crash and Roadway Network Warrant thresholds due to isolated community.

Warrant 7, Crash Experience	
Condition Satisfied?	**Not Satisfied**
Required values reached for	Alternatives not tried, 4 or less correctable crashes, 5 hours (Veh. Vol.), 0 hours (Ped 4-Hour), and 0 hours (Ped Peak Hour)
Criteria - Alternatives	Adequate trial has failed to reduce the crash frequency
Criteria - Reported Crashes (within 12-month period)	5 or more crashes susceptible to correction by a traffic control signal
Criteria - Major Street (veh/hr) - Minor Street (veh/hr)	From Warrant 1: 280 (Cond. A), 420 (Cond. B) From Warrant 1: 112 (Cond. A), 56 (Cond. B)
(Alternative Volume Requirement) Criteria - Pedestrian Volume	80 percent of the Pedestrian Volume Warrant requirements

Warrant 8, Roadway Network	
Condition Satisfied?	**Not Satisfied**
Required values reached for	Not an intersection of 2 major routes, but does not satisfy volume/warrant or alternative volume requirements
Criteria - Common Intersection of Two Major Routes	- Part of the street or highway system, or - Includes rural or suburban highways outside, entering, or traversing a city, or - Appears as or major route on an official plan.
Criteria - Existing or Immediately Projected Entering Volume	1,000 or more vehicles per typical peak hour
Criteria - Warrants	Satisfies Warrants 1, 2, or 3 with 5-year projected volumes
(Alternative Requirement) Criteria - Non-normal Business Day	1,000 or more vehicles per hour for any 5 hours

Warrant 9, Intersection Near a Grade Crossing	
Condition Satisfied?	**#N/A**
Required values reached for	#N/A
Criteria - Alternatives	Consideration or trial failed to alleviate the safety concerns
Criteria - Max. Distance to Nearest Controlled Crossing	140 feet from the center of the track to the stop or yield line
Criteria - Major Street Volume and Crossing Volume	See Chart Below

Figure 4C-10 (Two or More Approach Lanes): Distance D =



Traffic Signal Warrant Analysis

Multi-Way Stop Warrants

Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	West Access/Edgewood Farm Dr
Analyzed with	1 approach lane	Analyzed with	2 or more approach lanes
Total Approach Volume	6141 vehicles	Total Approach Volume	594 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	3 crossings
Right turn reduction of	100 percent applied	Right turn reduction of	0 percent applied

Reduction applied to Multi-Way Stop Warrant thresholds due to high speeds on CSAH 11 and isolated community.

Condition A - Traffic Signal Warrant	
Condition Satisfied?	**Not Satisfied**
Criteria*	Traffic Signal Warranted & Justified

* Multi-way stop control may be used as an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

Condition B - Crash Experience	
Condition Satisfied?	**Not satisfied**
Required values reached for	less than 4 correctable crashes
Criteria - Crash Experience	5 or more correctable crashes in 12-month period

Condition C - Intersection Volume & Delay	
Condition Satisfied?	**Not Satisfied**
Required values reached for	1 hour & 1.3 sec. average delay/veh
Criteria - Major Street (veh/hr)	210 for any 8 hours of an average day
Criteria - Minor Street (total vol-veh, ped, & bikes/hr)	140 for the same 8 hours of an average day
Criteria - Delay (average sec/veh)	30 during the highest hour

Condition D - Combination Volume, Crash Experience, & Delay	
Condition Satisfied?	**Not Satisfied**
Required values reached for	0 hours, less than 4 crashes, & 1.3 sec. average delay/veh
Criteria - Major Street (veh/hr)	240 for any 8 hours of an average day
Criteria - Minor Street (total vol-veh, ped, & bikes/hr)	160 for the same 8 hours of an average day
Criteria - Crash Experience	4 or more correctable crashes in 12-month period
Criteria - Delay (average sec/veh)	24 during the highest hour

Traffic Signal Warrant Analysis

Warrants 1 - 3 (Volume Warrants)

Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	East Access/Church Access
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	5928 vehicles	Total Approach Volume	152 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	3 crossings
Right turn reduction of	100 percent applied	Right turn reduction of	0 percent applied

Reduction applied to Volume Warrant thresholds due to isolated community.

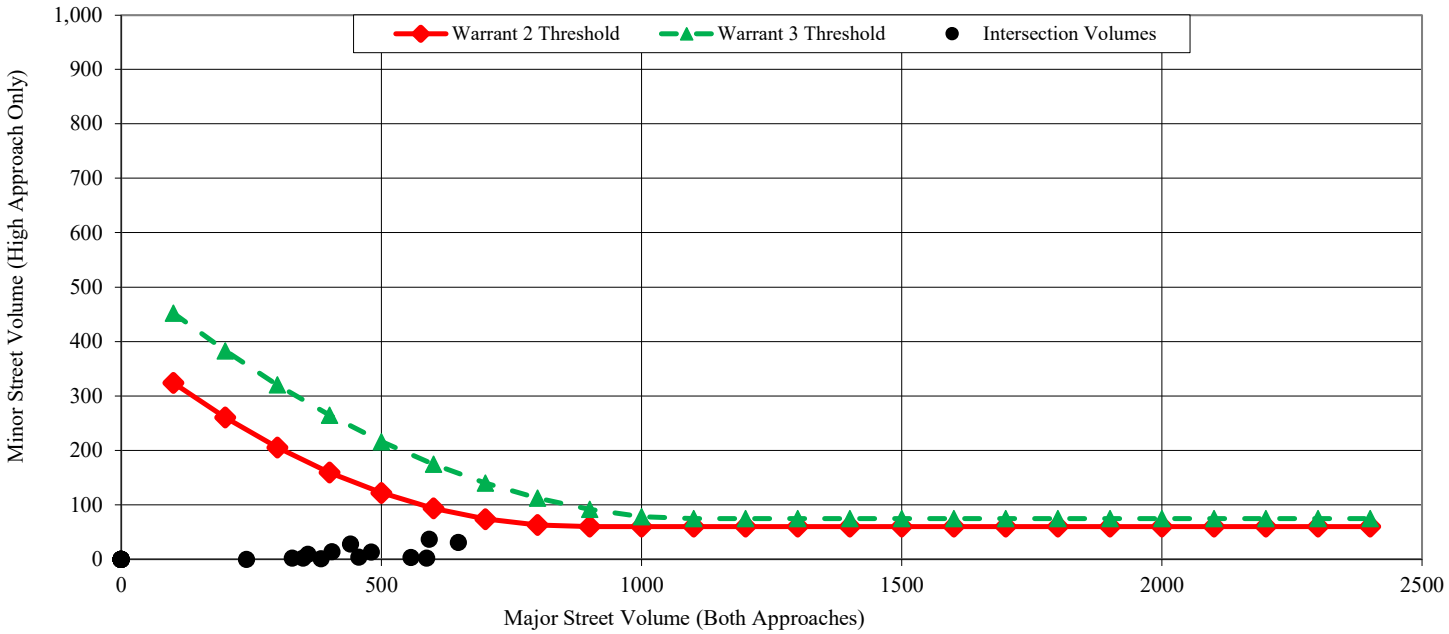
Warrant 1, Eight Hour Vehicular Volume			
	Condition A	**Condition B**	**Condition A+B***
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**	**Not Satisfied**
Required values reached for	0 hours	0 hours	0 (Cond. A) & 0 (Cond. B)
Criteria - Major Street (veh/hr)	350	525	280 (Cond. A) & 420 (Cond. B)
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)

* Should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Warrant 2, Four Hour Vehicular Volume	
Condition Satisfied?	**Not Satisfied**
Required values reached for	0 hours
Criteria	See Figure Below

Warrant 3, Peak Hour Vehicular Volume		
	Condition A	**Condition B**
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**
Required values reached for	0 total, minor, 0 delay	0 hours
Criteria - Total Approach Volume (veh in one hour)	800	See Figure Below
Criteria - Minor Street High Side Volume (veh in one hour)	150	
Criteria - Minor Street High Side Delay (veh-hrs)	5	

Figure 4C-2 (Warrant 2 - 70% Factor) & Figure 4C-4 (Warrant 3 - 70% Factor)



Traffic Signal Warrant Analysis

Warrants 4 to 6 (Pedestrian, School, Coordinated Systems)

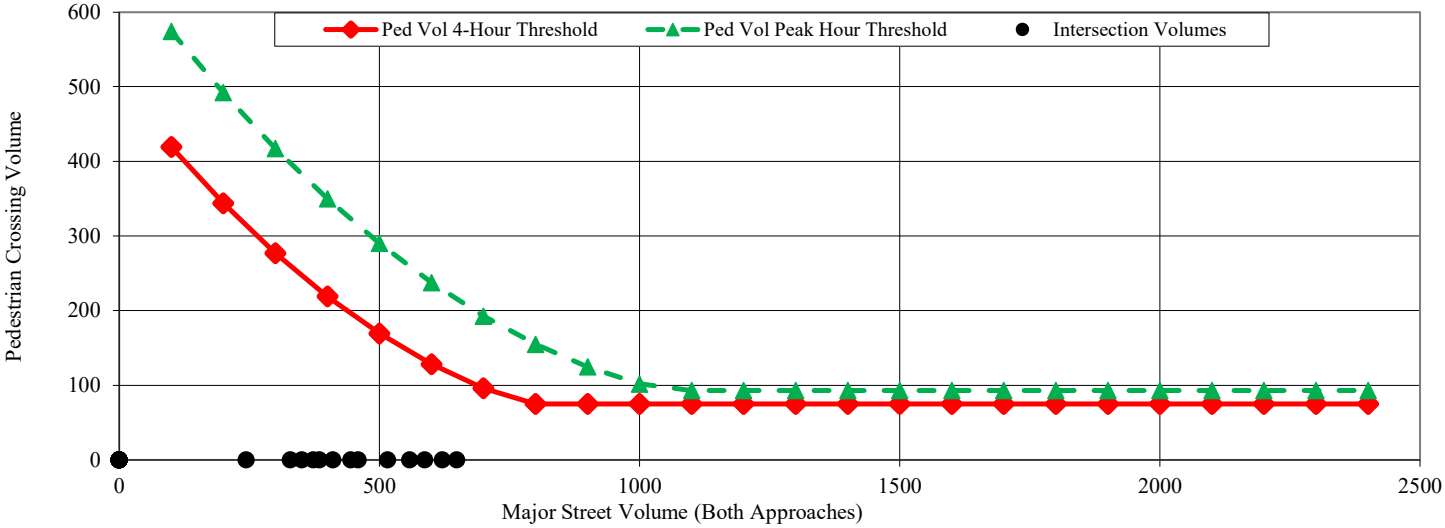
Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	East Access/Church Access
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	5928 vehicles	Total Approach Volume	152 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	3 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	0 percent applied

Reduction applied to Pedestrian Warrant thresholds due to high speeds on CSAH 11 and isolated community.

Warrant 4, Pedestrian Volume		
	Condition A - Four Hour Vol.	**Condition B - Peak Hour Vol.**
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**
Required values reached for	0 hours	0 hours
Criteria - Min. Distance to Nearest Controlled Crossing	300 feet, unless progressive movement not impacted	
Criteria - Major Street Volume and Crossing Volume	See Figure Below	

Figure 4C-6 & Figure 4C-8 (Warrant 4 Four Hour & Peak Hour - 70% Factor)



Warrant 5, School Crossing	
Condition Satisfied?	**Not Satisfied**
Criteria - School Crossing Data	- 20 or more schoolchildren crossing during the highest hour. - Consideration given to other remedial measures. - 300 feet or more to nearest controlled crossing, or proposed signal will not restrict progression. - Engineering study showing inadequate gaps in traffic.

Warrant 6, Coordinated Signal System	
Condition Satisfied?	**Not Satisfied**
Criteria - Coordinated Signal System	- If one-way, the adjacent traffic control signals are too far apart to provide the necessary degree of vehicular platooning. - If two-way, the adjacent traffic control signals do not provide the necessary degree of platooning, but will collectively provide a progressive operation with the proposed traffic control signal. - Resultant spacing of traffic control signal is 1,000 feet or greater.

Traffic Signal Warrant Analysis

Warrants 7-9 (Crash, Network, Rail Crossing)

Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	East Access/Church Access
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	5928 vehicles	Total Approach Volume	152 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	3 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	0 percent applied

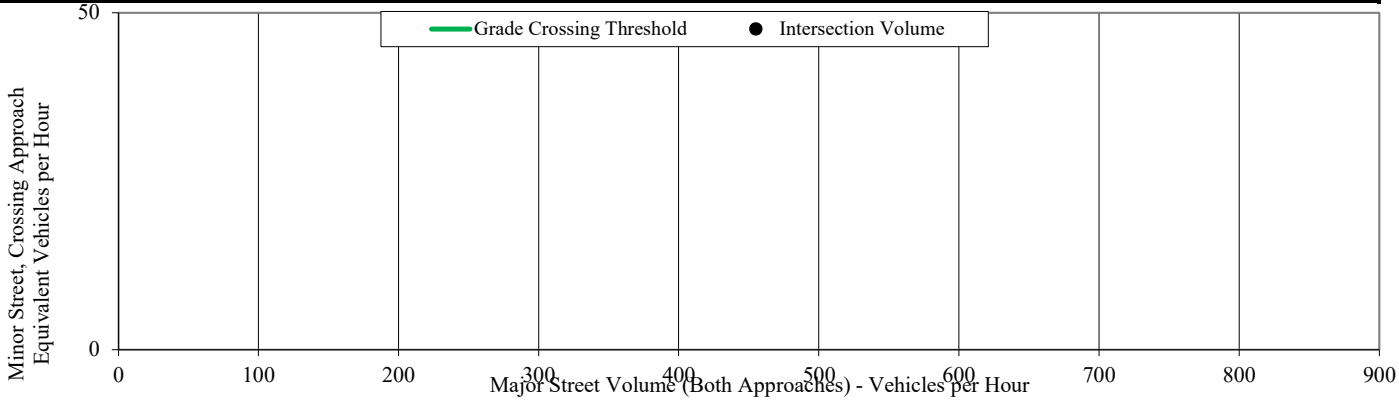
Reduction applied to the Crash and Roadway Network Warrant thresholds due to isolated community.

Warrant 7, Crash Experience	
Condition Satisfied?	**Not Satisfied**
Required values reached for	Alternatives not tried, 4 or less correctable crashes, 0 hours (Veh. Vol.), 0 hours (Ped 4-Hour), and 0 hours (Ped Peak Hour)
Criteria - Alternatives	Adequate trial has failed to reduce the crash frequency
Criteria - Reported Crashes (within 12-month period)	5 or more crashes susceptible to correction by a traffic control signal
Criteria - Major Street (veh/hr) - Minor Street (veh/hr)	From Warrant 1: 280 (Cond. A), 420 (Cond. B) From Warrant 1: 84 (Cond. A), 42 (Cond. B)
(Alternative Volume Requirement) Criteria - Pedestrian Volume	80 percent of the Pedestrian Volume Warrant requirements

Warrant 8, Roadway Network	
Condition Satisfied?	**Not Satisfied**
Required values reached for	Not an intersection of 2 major routes, but does not satisfy volume/warrant or alternative volume requirements
Criteria - Common Intersection of Two Major Routes	- Part of the street or highway system, or - Includes rural or suburban highways outside, entering, or traversing a city, or - Appears as or major route on an official plan.
Criteria - Existing or Immediately Projected Entering Volume	1,000 or more vehicles per typical peak hour
Criteria - Warrants	Satisfies Warrants 1, 2, or 3 with 5-year projected volumes
(Alternative Requirement) Criteria - Non-normal Business Day	1,000 or more vehicles per hour for any 5 hours

Warrant 9, Intersection Near a Grade Crossing	
Condition Satisfied?	**Not Examined**
Required values reached for	
Criteria - Alternatives	
Criteria - Max. Distance to Nearest Controlled Crossing	
Criteria - Major Street Volume and Crossing Volume	

Figure 4C-10 (Two or More Approach Lanes): Distance D =



Traffic Signal Warrant Analysis

Multi-Way Stop Warrants

Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	East Access/Church Access
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	5928 vehicles	Total Approach Volume	152 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	3 crossings
Right turn reduction of	100 percent applied	Right turn reduction of	0 percent applied

Reduction applied to Multi-Way Stop Warrant thresholds due to high speeds on CSAH 11 and isolated community.

Condition A - Traffic Signal Warrant	
Condition Satisfied?	**Not Satisfied**
Criteria*	Traffic Signal Warranted & Justified

* Multi-way stop control may be used as an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

Condition B - Crash Experience	
Condition Satisfied?	**Not satisfied**
Required values reached for	less than 4 correctable crashes
Criteria - Crash Experience	5 or more correctable crashes in 12-month period

Condition C - Intersection Volume & Delay	
Condition Satisfied?	**Not Satisfied**
Required values reached for	0 hours & 1 sec. average delay/veh
Criteria - Major Street (veh/hr)	210 for any 8 hours of an average day
Criteria - Minor Street (total vol-veh, ped, & bikes/hr)	140 for the same 8 hours of an average day
Criteria - Delay (average sec/veh)	30 during the highest hour

Condition D - Combination Volume, Crash Experience, & Delay	
Condition Satisfied?	**Not Satisfied**
Required values reached for	0 hours, less than 4 crashes, & 1 sec. average delay/veh
Criteria - Major Street (veh/hr)	240 for any 8 hours of an average day
Criteria - Minor Street (total vol-veh, ped, & bikes/hr)	160 for the same 8 hours of an average day
Criteria - Crash Experience	4 or more correctable crashes in 12-month period
Criteria - Delay (average sec/veh)	24 during the highest hour

Traffic Signal Warrant Analysis

Warrants 1 - 3 (Volume Warrants)

Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	Wildwood Ln
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	5833 vehicles	Total Approach Volume	89 vehicles
Total Ped/Bike Volume	2 crossings	Total Ped/Bike Volume	2 crossings
Right turn reduction of	100 percent applied	Right turn reduction of	0 percent applied

Reduction applied to Volume Warrant thresholds due to isolated community.

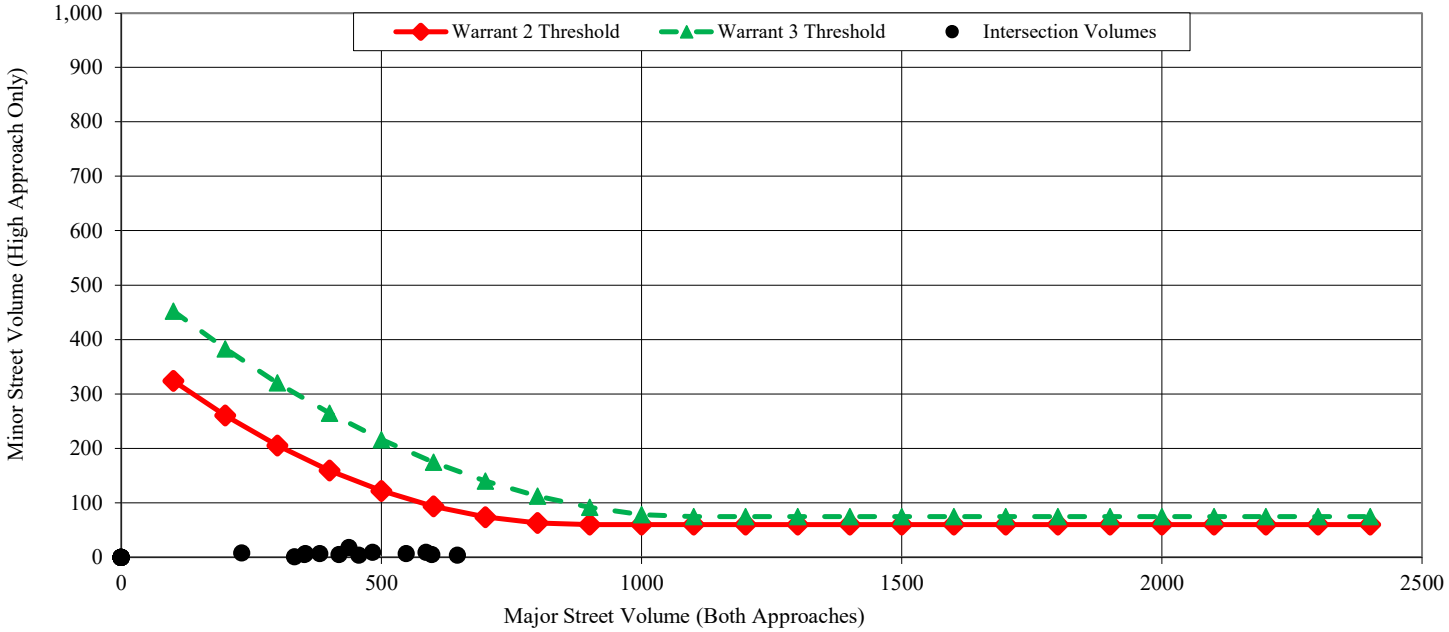
Warrant 1, Eight Hour Vehicular Volume			
	Condition A	**Condition B**	**Condition A+B***
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**	**Not Satisfied**
Required values reached for	0 hours	0 hours	0 (Cond. A) & 0 (Cond. B)
Criteria - Major Street (veh/hr)	350	525	280 (Cond. A) & 420 (Cond. B)
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)

* Should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Warrant 2, Four Hour Vehicular Volume	
Condition Satisfied?	**Not Satisfied**
Required values reached for	0 hours
Criteria	See Figure Below

Warrant 3, Peak Hour Vehicular Volume		
	Condition A	**Condition B**
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**
Required values reached for	0 total, minor, 0 delay	0 hours
Criteria - Total Approach Volume (veh in one hour)	650	See Figure Below
Criteria - Minor Street High Side Volume (veh in one hour)	150	
Criteria - Minor Street High Side Delay (veh-hrs)	5	

Figure 4C-2 (Warrant 2 - 70% Factor) & Figure 4C-4 (Warrant 3 - 70% Factor)



Traffic Signal Warrant Analysis

Warrants 4 to 6 (Pedestrian, School, Coordinated Systems)

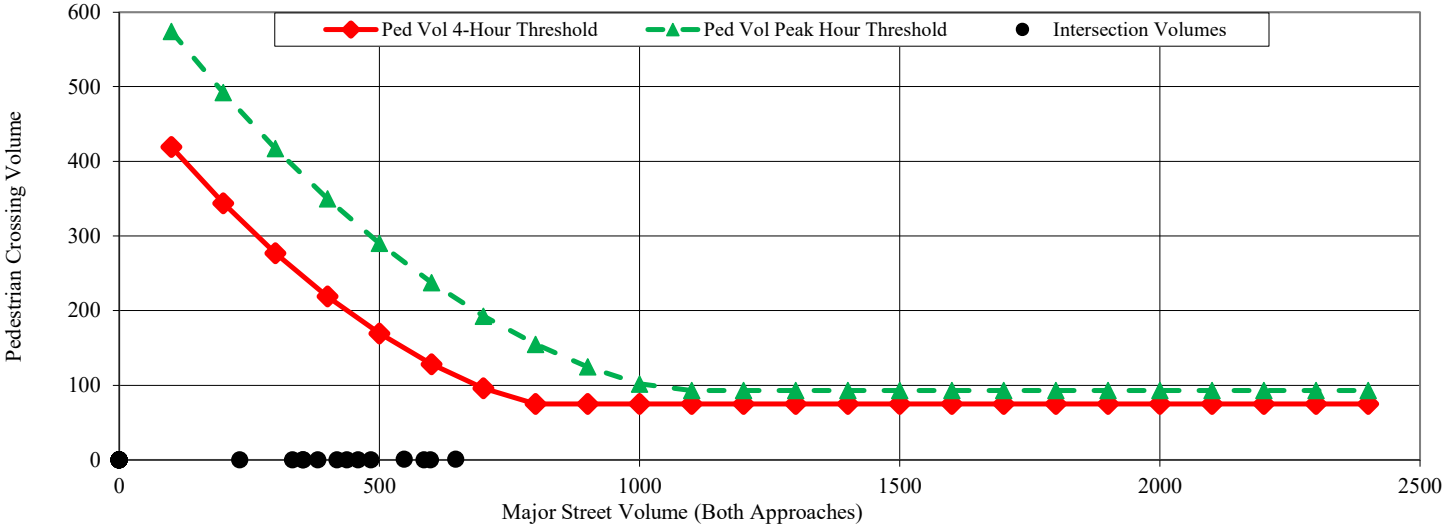
Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	Wildwood Ln
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	5833 vehicles	Total Approach Volume	89 vehicles
Total Ped/Bike Volume	2 crossings	Total Ped/Bike Volume	2 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	0 percent applied

Reduction applied to Pedestrian Warrant thresholds due to high speeds on CSAH 11 and isolated community.

Warrant 4, Pedestrian Volume		
	Condition A - Four Hour Vol.	**Condition B - Peak Hour Vol.**
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**
Required values reached for	0 hours	0 hours
Criteria - Min. Distance to Nearest Controlled Crossing	300 feet, unless progressive movement not impacted	
Criteria - Major Street Volume and Crossing Volume	See Figure Below	

Figure 4C-6 & Figure 4C-8 (Warrant 4 Four Hour & Peak Hour - 70% Factor)



Warrant 5, School Crossing	
Condition Satisfied?	**Not Satisfied**
Criteria - School Crossing Data	- 20 or more schoolchildren crossing during the highest hour. - Consideration given to other remedial measures. - 300 feet or more to nearest controlled crossing, or proposed signal will not restrict progression. - Engineering study showing inadequate gaps in traffic.

Warrant 6, Coordinated Signal System	
Condition Satisfied?	**Not Satisfied**
Criteria - Coordinated Signal System	- If one-way, the adjacent traffic control signals are too far apart to provide the necessary degree of vehicular platooning. - If two-way, the adjacent traffic control signals do not provide the necessary degree of platooning, but will collectively provide a progressive operation with the proposed traffic control signal. - Resultant spacing of traffic control signal is 1,000 feet or greater.

Traffic Signal Warrant Analysis

Warrants 7-9 (Crash, Network, Rail Crossing)

Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	Wildwood Ln
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	5833 vehicles	Total Approach Volume	89 vehicles
Total Ped/Bike Volume	2 crossings	Total Ped/Bike Volume	2 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	0 percent applied

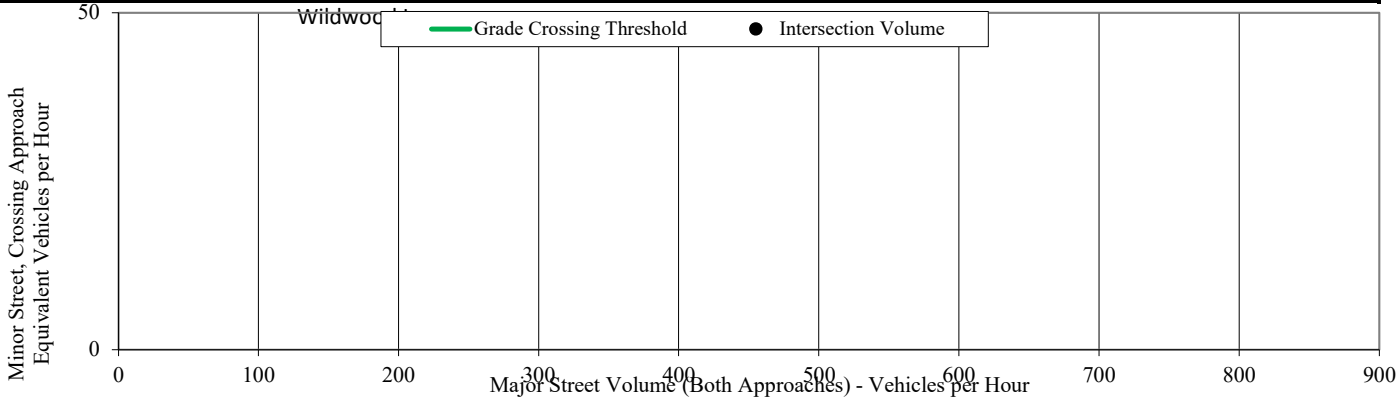
Reduction applied to the Crash and Roadway Network Warrant thresholds due to isolated community.

Warrant 7, Crash Experience	
Condition Satisfied?	**Not Satisfied**
Required values reached for	Alternatives not tried, 4 or less correctable crashes, 0 hours (Veh. Vol.), 0 hours (Ped 4-Hour), and 0 hours (Ped Peak Hour)
Criteria - Alternatives	Adequate trial has failed to reduce the crash frequency
Criteria - Reported Crashes (within 12-month period)	5 or more crashes susceptible to correction by a traffic control signal
Criteria - Major Street (veh/hr) - Minor Street (veh/hr)	From Warrant 1: 280 (Cond. A), 420 (Cond. B) From Warrant 1: 84 (Cond. A), 42 (Cond. B)
(Alternative Volume Requirement) Criteria - Pedestrian Volume	80 percent of the Pedestrian Volume Warrant requirements

Warrant 8, Roadway Network	
Condition Satisfied?	**Not Satisfied**
Required values reached for	Not an intersection of 2 major routes, but does not satisfy volume/warrant or alternative volume requirements
Criteria - Common Intersection of Two Major Routes	- Part of the street or highway system, or - Includes rural or suburban highways outside, entering, or traversing a city, or - Appears as or major route on an official plan.
Criteria - Existing or Immediately Projected Entering Volume	1,000 or more vehicles per typical peak hour
Criteria - Warrants	Satisfies Warrants 1, 2, or 3 with 5-year projected volumes
(Alternative Requirement) Criteria - Non-normal Business Day	1,000 or more vehicles per hour for any 5 hours

Warrant 9, Intersection Near a Grade Crossing	
Condition Satisfied?	**Not Examined**
Required values reached for	
Criteria - Alternatives	
Criteria - Max. Distance to Nearest Controlled Crossing	
Criteria - Major Street Volume and Crossing Volume	

Figure 4C-10 (Two or More Approach Lanes): Distance D =



Traffic Signal Warrant Analysis

Multi-Way Stop Warrants

Project Name	CSAH 11 Traffic and Site Ciruclation Study
Project/File #	25X139457000
Scenario	Existing Conditions (2025)

Intersection Information			
Major Street (E/W Road)	CSAH 11	Minor Street (N/S Road)	Wildwood Ln
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	5833 vehicles	Total Approach Volume	89 vehicles
Total Ped/Bike Volume	2 crossings	Total Ped/Bike Volume	2 crossings
Right turn reduction of	100 percent applied	Right turn reduction of	0 percent applied

Reduction applied to Multi-Way Stop Warrant thresholds due to high speeds on CSAH 11 and isolated community.

Condition A - Traffic Signal Warrant	
Condition Satisfied?	**Not Satisfied**
Criteria*	Traffic Signal Warranted & Justified

* Multi-way stop control may be used as an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

Condition B - Crash Experience	
Condition Satisfied?	**Not satisfied**
Required values reached for	less than 4 correctable crashes
Criteria - Crash Experience	5 or more correctable crashes in 12-month period

Condition C - Intersection Volume & Delay	
Condition Satisfied?	**Not Satisfied**
Required values reached for	0 hours & 0 sec. average delay/veh
Criteria - Major Street (veh/hr)	210 for any 8 hours of an average day
Criteria - Minor Street (total vol-veh, ped, & bikes/hr)	140 for the same 8 hours of an average day
Criteria - Delay (average sec/veh)	30 during the highest hour

Condition D - Combination Volume, Crash Experience, & Delay	
Condition Satisfied?	**Not Satisfied**
Required values reached for	0 hours, less than 4 crashes, & 0 sec. average delay/veh
Criteria - Major Street (veh/hr)	240 for any 8 hours of an average day
Criteria - Minor Street (total vol-veh, ped, & bikes/hr)	160 for the same 8 hours of an average day
Criteria - Crash Experience	4 or more correctable crashes in 12-month period
Criteria - Delay (average sec/veh)	24 during the highest hour

Appendix E: Opportunities and Dismissals

OPPORTUNITIES AND DISMISSALS

FEEDBACK

Ideas Identified from Public Engagement and Alternatives Analysis:

- Opportunities: Potential improvements to the school site or access points, regardless of the selected alternative; also useful for long-term planning.
- Dismissals: Concepts reviewed but not pursued due to safety concerns, design flaws, or inability to meet standards.

Appendix F: Public Engagement Summary

Eagle View & CSAH 11 Study

Crow Wing County, MN

INPUTiD Comment Report (as of Oct. 6th, 2025)

October 2025

Map Document: \\arcserver1\BMI_GIS\MINNESOTA\CWCO\25X139457000\Pro\CSAH11Study_INPUTiD\CSAH11Study_INPUTiD.aprx | Username: davidsa | Date Saved: 10/6/2025 4:51 PM

Map ID 1 — Concerns

Citizen Category: Nearby Resident

11 | 0 — There is no easy way to expand this end of Nickel Road; it is already an incredibly dangerous intersection for residents on this road. Furthermore, it would be very difficult/expensive to make it usable for more traffic since there is Rice Lake, a power line corridor, low lands, and steep terrain behind Eagle View Elementary. Nickel Road is, for all intents and purposes, one step above a minimum maintenance road. It is a quiet residential area. — 8/30/2025

3 | 0 — It would be really nice to put 55MPH speed signs up next to the 30MPH when flashing to remind drivers to resume normal speed on each ends of the school zones — 9/2/2025

0 | 0 — If the proposed housing development comes to fruition, another set of issues will be presented. — 9/23/2025

Map ID 2 — Ideas and Opportunities

Citizen Category: Automobile User

2 | 0 — I like roundabouts in many situations. Here, though, a 24/7 12 month slow-down, consuming fuel and brakes, to fix a twice daily 9 month problem is not appropriate.
Traffic lights that would flash yellow on 11, red at entrances most of the time and control 11 when buses move in and out would be better.

(Cameras to catch speeders would be nice; not sure of MN law on that.) — 9/22/2025

0 | 0 — If the proposed housing development comes to fruition, that presents another set of problems. — 9/23/2025

Map ID 3 — Ideas and Opportunities

Citizen Category: Student/Teacher/Parent

6 | 0 — Adding a turn lane into the corner of the parking lot so cars can bypass the crowded center lane and enter more smoothly, regardless of whether a stoplight or roundabout is added later. — 9/4/2025

Map ID 4 — Ideas and Opportunities

Citizen Category: Student/Teacher/Parent

12 | 0 — Create a right turn lane on the northwest end of the parking lot (near hunt blvd). This would allow greater visibiity to those turning left out of the main entrance/exit onto county road 11. Right now it is DANGEROUS to make a left turn out of the main exit due to the right turn lane obstructing visibilty of traffic continuing East on CR 11. — 8/29/2025

2 | 8 — I would suggest a traffic light to allow people to turn LEFT at intervals. This would reduce backups into the parking lots as well and reduce frustration when leaving. — 9/1/2025

Map ID 5 — Ideas and Opportunities

Citizen Category: Student/Teacher/Parent

1	6	Make this whole thing a two lane. That way people can get out in the traffic and merge back in instead of waiting 3 business days to pull out of the school. — 8/27/2025
7	0	I do agree the roads need to change so the traffic flows better getting in and out of the school — 8/27/2025
1	11	Is there a problem to fix? Do we have any accident reports to warrant a change? I think people slow down enough on this stretch of highway. No reason to make a change for a possible incident that might occur. — 8/28/2025
5	0	We need something. Even with police, people speed and it's really scary. Someone is going to get seriously injured and don't want to — 8/29/2025
2	0	Wait for that to happen to do something about it. Especially bad in winter, when it rains, is foggy and sun hits your line of vision. — 8/29/2025
4	0	Do a test now, place temporary traffic control lights during the beginning, ending of school and for special events. Problem with the reduced speed limit is drivers still don't have to stop and wait for busses to all pull out. Pretty sure traffic lights can be set to only change red when traffic is approaching from the schools 2 entrance's. — 9/5/2025
0	0	Speed limits and flashing lighted signs have not kept the speed under control. Multiple police can sit there and enforce the speed, but this is not a long term solution for the officers. — 9/12/2025
2	0	Need to find a way to support the long line of buses to safely enter CR 11, acknowledging the continuous flow coming out of the parent pick up/drop off line at the same time as oncoming traffic concerns. — 9/12/2025

Map ID 6 — Ideas and Opportunities

Citizen Category: Student/Teacher/Parent

5	1	We really only need traffic control for 45 minutes in the morning and 45 minutes in the afternoon. Instead of looking at a construction project, is it possible/ safe/ cost effective to pay a police officer from Pequot to do traffic control for those short time frames? Could admin/ teachers from the school do it? Why spend money and inconvenience all the traffic on CR11 for what amounts to short periods of time, twice a day, for not even the entire school year? — 9/19/2025
1	0	I disagree. There are many other school events, sporting events after school and all through the summer etc. I get what you're saying but there are many other times as a parent of three kids currently at eagleview that it feels unsafe coming and going! — 9/22/2025

Map ID 7 — Ideas and Opportunities

Citizen Category: Nearby Resident

21	4	During Sturgis they have temporary lights they put up during the rally to control traffic. Truly there are only 2 busy times on that road. During drop off in the am and pick up in the evening. It doesnt make sense to spend millions of dollars of taxpayers money to make a roundabout or two lanes as it is not needed year round. Even if we put lights up permanently. I believe it would be more cost effective way to render the problem. I know parents get frustrated with the amount of time they have to wait at thiose times but there are the options of bussing for children and/or patience. — 8/27/2025

18 6	I feel that the lights would be a good alternative to the roundabout. I think that they should have lights at both entrances into the school so that the buses are able to get in and out equally as easy.	8/27/2025
28 3	Traffic control lights would be a cost effective way, and only need to be in use during the school year during pre-set times. It would also be a benefeit if these can be activated by the school for special events that may be held that will increase traffic ingressing/egressing.	8/27/2025
16 6	Roundabouts I feel wouldn't solve a thing. I like the idea of stop lights	8/27/2025
13 0	For the safety of kids, parents, and bus drivers this needs to be addressed ASAP	8/27/2025
8 5	A round about would not impede the flow of traffic. And people leaving the school would have a safer option to exit.	8/28/2025
6 8	There needs to be a designated speed zone through there that it remains 30 MPH at all times and definitely a roundabout is needed. 11 is always busy with traffic, myself and my husband drive it all year around for work. A stoplight would cause to much congestion during drop off and pick up.	8/28/2025
9 8	It needs a roundabout. It's dangerous as is during pickup and drop off. You can't see when leaving the school as heavy traffic is continuing on 11 or turning north or south from	8/29/2025
4 0	I like the idea of traffic lights, we just need something!!!! It's really scary having to navigate traffic especially going left and don't want to wait to do something until someone gets seriously injured. Especially scary in the winter, when it rains, is foggy and the sun hits your line of vision.	8/29/2025
3 0	Round about or traffic light but we need something.	8/30/2025
3 0	Traffic lights, round about….just do something! I've almost been hit by busses too! Taking a left hand turn is impossible. Maybe it's the traffic flow in the school drop off areas.	8/31/2025
5 3	Traffic lights are the win here!	9/1/2025
3 1	Lights temporarily and the plans for a roundabout!	9/1/2025
0 6	No round abouts. Lights- yes! Maybe study is needed about why there are so many parent pick up and drop offs? Is it due to no busses to pick up the child, is the child in a different town and attends due to open enrollment borders? What would create less traffic? Could doors at the school be opened earlier/available staff?	9/2/2025
4 2	Traffic lights would just back this stretch even worse. Roundabouts keep traffic going and would be the ideal option.	9/5/2025
1 0	And roundabouts slow people down.	9/12/2025
1 0	What if the current field was made into the new parking lot and the current parking lot baseball fields? More parking, more room for parent pick up/drop off cars	9/19/2025
0 1	But a J turn to force right turns and put in roundabout at the bus entrance/exit.	9/19/2025

1 2	I think a round-about solves all issues- reduces speed, reduces having to turn left on the road, constant flow of traffic (vs stopping altogether at a light- though I'll take a light over nothing at all!), and consistency on the road year round rather than locals and visitors alike having to read multiple signs regarding speed zones and rules for the road.	9/19/2025
0 0	I don't think people understand how expensive roundabouts are. We're talking at least $1 million per roundabout. They're not a perfect solution, either, with increased risk for pedestrian traffic trying to walk or bike through the intersection - which is important to consider for a school.	9/19/2025

Map ID 8 — Ideas and Opportunities

Citizen Category: Student/Teacher/Parent

1 0	Can we look closely at (for example) bus scheduling and how to get more kids to take the bus to school instead of being driven by parents? Can we clear at least some of this up by looking at why so many parents need to drive their kids to school? My kids are driven because the bus pick-up is an absurd 6:20am. I'm not putting my kids on the bus for almost two hours when my kids could WALK to school in less than an hour. I'd happily bus my kids if the ride were reasonable, taking my car out of this equation. How much of the congestion could be cleaned up without having to add anything to CR11?	9/19/2025
0 0	I don't think this is a big enough problem to worry about, everyone knows it's a school zone....slow down, pay attention, be careful and considerate for those brief time frames that are affected daily. Personally added construction and increased taxes won't ever change the fact that it's a school zone and my earlier comments will still apply.	9/23/2025

Map ID 9	Ideas and Opportunities	
Citizen Category:		
15 / 19	Perhaps there could be an outlet on Nickel Road to divert the bus traffic or the parking lot traffic away from the main traffic area during busy hours.	8/27/2025
16 / 0	Wouldn't that just cause the same congestion issues at the Nickel Road intersections?	8/29/2025
6 / 0	I wonder if residents on Nickle were ever told that all traffic would maintain off of CR11. Offloading from 2 outlets to 4 may reduce some congestion, but in reality it's just dispersing to other outlets.	8/29/2025
10 / 0	You will have the same issues trying to get on to 11 at either stop sign from Nickle Road. All drivers will now be dealing with traffic at 55mph instead of 30mph since Nickle road is out of the school zone of reduced speed. We do not need a longer stretch of a school zone reduced speed	8/30/2025
12 / 0	I don't understand how that could be justified when a county road runs directly parallel. Nickel Road is not built for that amount of traffic. It's a 35mph, narrow, residential road that hasn't even got lane lines painted let alone the width to support turn lanes that I'm sure would inevitably be argued for. It reads like the solution being presented is to disrupt a quiet neighborhood by turning it into a miniature version of CR-11? Would they not be better off diverting resources to a roundabout or light that only runs during arrival and release or any other plethora of solutions that minimally disrupt an already busy road bordered by commercial properties? I just don't see how this can even be presented as a serious solution. As tax payers we are already paying for another referendum. Do we need to be further burdened by a disruption to our property values or even potential loss of property due to increased traffic and likely road projects required to accommodate bus traffic?	8/30/2025
11 / 0	this is a terrible idea.	8/30/2025
12 / 0	ultimately the traffic ends up back on 11. nickel road is definitely not a solution and should be taken out of the conversation completely.	8/30/2025
10 / 0	This is a bad idea. Nickel Rd is a quiet residential road, it's not built for that kind of traffic. People jog and walk their dogs on Nickel.	8/30/2025
8 / 0	This is an awful idea. Nickel Road needs less traffic vs more! There is already added traffic during school drop off and pick up where people try to avoid the traffic on CR11 and are zooming way over the 30mph on Nickel Road. It's a nice quiet neighborhood on Nickel and there are people walking, running and biking and this would make that hazardous. Please find a solution that helps CR11 and not include the residential neighborhood in any part of this discussion.	8/30/2025
2 / 0	This spot makes no since because it puts them parallel on Nickel and that road isn't set up for thay	9/2/2025
2 / 0	This is not a solution. There aren't even turn lanes to access Nickel Road and traffic would end up back on 11 anyway. I'd suggest either a traffic light or roundabout(s).	9/8/2025

Map ID 10	Ideas and Opportunities

Citizen Category: Nearby Resident

16 / 14	Perhaps at both entrances, a roundabout could be created? But make the roundabout similar to that over 371. IE, the East entrance (bus entrance), you must always exit heading East. The West entrance is the same - you must head East to hit the East roundabout to then circle around to head West. Similar to exiting from Edgewater Farm - if you want to head East, you enter the roundabout heading West to then be able to head East. This slows traffic down at all times in a school zone, and no need to maintain electronics.	8/27/2025
21 / 10	I do not feel round abouts are necessary since they are very expensive and this road is only really busy 2 times out of the day. Traffic lights would definitely be a more better way to navigate traffic during pick up and drop off times. Something really does need to change though because the school expects parents and kids to be quick and efficient during pick up and drop off but it is hard when yoi get backed up at the road because you can pull out onto the main road very easily at all.	8/27/2025
12 / 12	Traffic lights!	8/28/2025
2 / 13	There needs to be a designated speed zone through there that it remains 30 MPH at all times and definitely a roundabout is needed. 11 is always busy with traffic, myself and my husband drive it all year around for work.	8/28/2025
4 / 1	My only comment would be if you put a roundabout here, how would you handle the long line of buses that exit at the same time	8/28/2025
5 / 3	I agree that roundabouts are prohibitively expensive. Traffic lights are a much more practical solution, and they can be activated when needed, or set to flashing amber when not needed.	8/29/2025
6 / 8	I agree, I think there needs to be a roundabout! And I agree about the speed limit always being 30MPH. It is a busy road & if roundabouts get out in, you have to go slower than 55MPH to go through them.	8/29/2025
4 / 0	It may be good to comment what a roundabouts installation and maintenance cost by the county is compared to a standard install and maintenance of traffic lights. Along with accident rates between the 2. Not only do we need to be budget conscious, but also keeping in mind what is safer for everyone during the most times. Speed limit will force users to slow down at all times. It also slows traffic for any and all events that may be at the school or businesses across the road.	8/29/2025
2 / 5	Traffic lights at both entrances!	8/31/2025
0 / 1	I had to start turning right (as exiting first entrance out of Eagle view) because a left was impossible. Then I'd turn around just past the bank. But school busses are crazy there exiting and it's super dangerous.	8/31/2025
5 / 3	Round abouts would be a great idea. It would slow the speed of traffic and increase safety in the area. At the very least one by the main parking lot would be the most beneficial because last year alone there were multiple accidents that occurred in that location. The kids safety are well worth it and lights would definitely impede the flow of traffic compared to a round about in my opinion (plus just a really weird spot for one and I can see people still going through it.	9/2/2025

0 / 8	is the most practical, safest, and least cost solution is to not allow access at all from the school onto the county road but to require traffic accessing the school site to access off nickel road-?	9/5/2025
1 / 5	I do not feel that roundabout is necessary. It's an additional expense that would only be utilized twice a day for about 2/3 of the year. Perhaps al do not feel that roundabout is necessary. It's a additional expense that would only be utilized twice a day for about 2/3 of the year. I think by slowing the traffic to 30 miles an hour should be sufficient	9/5/2025
0 / 3	A multi faceted solution could include; staggered arrival and dismissal times, more volunteers/staff/police directing traffic, a walking/bike path from Pequot to Breezy Point to allow safe walking and biking, a carpooling program at the school as well as added turn lanes and lights during arrival and dismissal.	9/6/2025
4 / 0	I recall a long time ago that a police officer would direct traffic for 20 minutes each morning and afternoon. That was perfect at the time.	9/12/2025
0 / 2	A round about here is ideal for a couple of reasons. First, you virtually eliminate all severe accidents and that safety factor alone may be worth the investment. Second, stoplights are also expensive but not as safe and doesn't keep traffic moving.	9/17/2025
1 / 0	We cannot have traffic diverted to the residential neighborhood via Nickel Road. The traffic STILL HAS TO FUNNEL ONTO COUNTY RD 11!!!! Both sides of Nickel Road are past the school zone area and WE DO NOT NEED TO EXTEND THAT! When school is out, all of the out of town tourist ALWAYS slow down to 30mph even though they do not have to. Let's not make that even longer on 11.	9/19/2025
2 / 0	The hard part with the teardrop roundabout, is that everyone has to be funneled into the same area, not matter what direction they need to go. As someone who leaves the East exit regularly, it makes it very difficult to get out when people coming from the West exit come and turn around in the bank/church parking lot, so they can make a right turn to go West. When people turn around in those parking lots, it only adds to the amount of traffic trying to move and get out of the East exit....and those people really have no reason to come east at that point. I do feel that the slower speed zone has helped people be able to get in and out of the school parking lots, but it is not enough. This overall is a tough problem to solve!! But a roundabout or stop light would help at least control the flow.	9/22/2025
1 / 0	As one of the bus drivers, I agree something needs to be done here. As others have stated there are only 169 school days. Buses begin exiting at 7:47 and are all done by about 8. In the afternoons it's about 3:05 to 3:10. I love a roundabout but this not needed here. Stop lights at the location of the current school zone flashing lights that would stop traffic on 11 for 20 to 30 seconds every 2 minutes or so would be enough to fix the congestion at all the intersections in the school zone. This could so easily be tested by renting the stoplight used in construction areas.	9/25/2025

Map ID 11 — Ideas and Opportunities

Citizen Category:

1 / 0	Would be nice to have a left turn bay for the bank and storage garage or a bypass lane for the eastbound traffic	9/8/2025

Map ID 12	Concerns

Citizen Category:

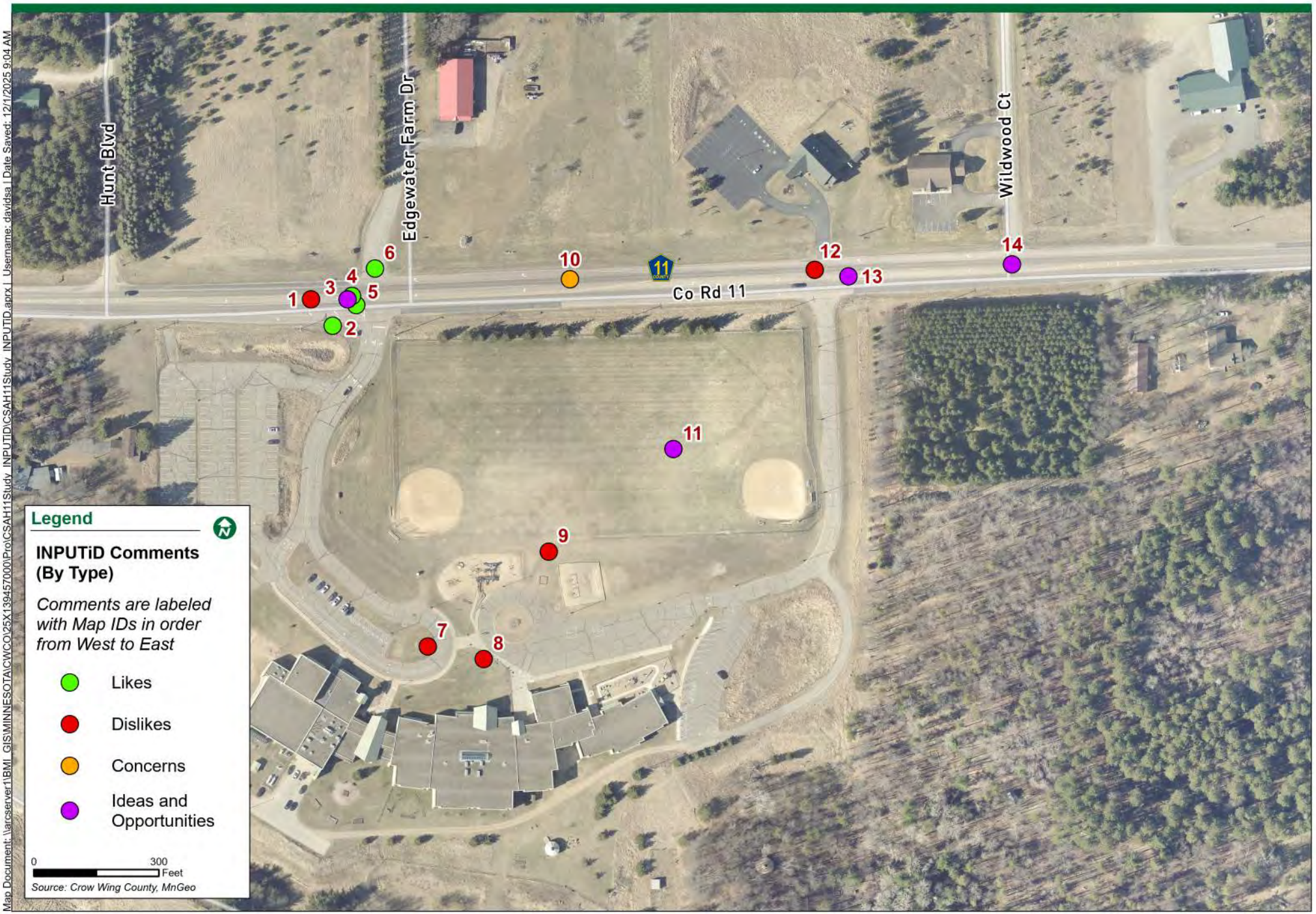
4	0	These intersections for the few that actually live on Nickle Road are already extremely dangerous. If you are waiting to turn on the highway, there are many that do not see your signal due to distractions or inappropriate defensive driving skills . Nickel Road is essentially the equivalent of Bushman Road if you're looking to bypass County Road 11. 9/11/2025
2	0	Except on buschman road your wheels will fly off and your car will be destroyed by driving on it. We better hope that the city of breezy doesn't get involved in this. It'll never get fixed just like buschman 9/20/2025

Eagle View & CSAH 11 Study

Crow Wing County, MN

INPUTID Comment Map (Alternatives Phase)

December 2025



Map Document: \\arcserver1\BMI_GIS\MINNESOTA\CWCO\25X139457000\Pro\CSAH11Study_INPUTID\CSAH11Study_INPUTID.aprx | Username: davidsa | Date Saved: 12/1/2025 9:04 AM

Map ID 1 — Dislikes

Citizen Category: Student/Teacher/Parent — Roundabouts

5 | 1 — Roundabouts will slow the flow of traffic all day/year for a few times a day 9 months a year problem. For those that use 11 other than just for school drop-off/pick-up this is no ideal. — 11/6/2025

Map ID 2 — Likes

Citizen Category: Student/Teacher/Parent — Roundabouts

2 | 6 — I think a roundabout is a good balance of safety and convenience. — 11/6/2025

Map ID 3 — Ideas and Opportunities

Citizen Category: Student/Teacher/Parent — Signals

6 | 0 — Could lights be added but only used during those peak drop-off/pick-up times and otherwise the roads function as they do currently? — 11/6/2025

4 | 0 — These lights could only be used during certain time so the busses can get in and out am and pm — 11/6/2025

4 | 0 — The congestion issues here are for a TOTAL of One Hour out of the day for 9 months out of the year. A traffic light that is programmable to be in use for the congestion issues is the best solution. Tearing up the road for a round about to solve an hour of congestion is way to expensive and unnecessary. — 11/8/2025

1 | 0 — Agree with the comment above. Program signals during peak hours. Have signal length be longer than usual to allow for many cars to pour out. Keep signals green all the time on Cty Rd 11 outside of school hours. Make sure turn lanes are long enough since there will be a lot of cars at these times. — 11/12/2025

2 | 0 — This idea makes the most sense. The issue of congestion is a minimal amount of time in a 24 hour period and No Congestion issue for 3 months out of the year. IF the light is programmable for the congestion times only and allows for longer periods of green to let a lot of card out, then it is the way to go. — 11/13/2025

Map ID 4 — Likes

Citizen Category: Student/Teacher/Parent — Roundabouts

2 | 2 | Yes — 11/6/2025

0 | 2 | This seems to be the best solution from the choices given. There is not a way to get traffic diverted over to Nickel Rd due to the steepness of the terrain and cost to resolve that is prohibitively expensive. Single entrance and exit solutions require cutting off the park and fields from the kids, requiring manpower to make sure the kids are crossing safely during all hours is expensive and tedious. Someone gets complacent due to repetitiveness and someone could get hurt. Not a risk the school should be taking as they would be held liable for the incident. The roundabout in its current form I do feel has the entrances onto the roundabout as a bit extreme of an angle, but as a design starting point it gets it across and shows how it would look. This allows vehicles on and off County Rd 11 safely and consistently. Helps with cross traffic in both entrances for the school and the daycare across the street. Keeps the church happy as parents will stop turning around in their parking lot. — 11/6/2025

Map ID 5 — Likes

Citizen Category: — Roundabouts

2 | 5 | Roundabout seems to be the most effective solution. Cost being the only main outlier, I believe this is the best solution, Maintains traffic flow and reduces speed through the school zone. Win Win! — 11/6/2025

4 | 1 | Difficult for large vehicles — 11/6/2025

1 | 0 | I'm not convinced that roundabouts maintain traffic flow during heavy congestion periods. Is there any backup or studies that show roundabouts are efficient for heavy traffic flows? — 11/13/2025

Map ID 6 — Likes

Citizen Category: Nearby Resident — Roundabouts

1 | 0 | They may have more upfront costs, but very little maintenance after and no power outage issues. They keep traffic moving and allow separation of busses and parent pickup vehicles. It will also slow traffic the entire stretch between roundabouts. — 11/13/2025

Map ID 7 — Dislikes

Citizen Category: Student/Teacher/Parent — Single Entrance A

1 | 0 | Crossing a roadway is not a solution we should be comfortable with for kids getting to their parks and playground. This maybe limited to school traffic unlike the one way road, but it doesn't solve the problem with getting vehicles onto and off County Rd 1. — 11/6/2025

Map ID 8 — Dislikes

Citizen Category: — One Way Loop

4	0	Having the kids crossing a road is not desired for me.	11/6/2025
4	0	Having a one way street going through the middle of the play yard is not ideal and potentially dangerous. We just spent money on a new playground. Don't make it hard to use by constantly crossing a through roadway.	11/6/2025
3	0	This still appears not safe and too much congestion with the busses and the parents in the same areas. It also does not help the traffic slow on 11 to allow the busses to get out.	11/6/2025
1	0	This option is too unsafe.	11/12/2025

Map ID 9 — Dislikes

Citizen Category: Student/Teacher/Parent — Single Entrance B

1	0	Crossing a roadway is not a solution we should be comfortable with for kids getting to their parks and playground. This maybe limited to school traffic unlike the one way road, but it doesn't solve the problem with getting vehicles onto and off County Rd 11.	11/6/2025

Map ID 10 — Concerns

Citizen Category: Student/Teacher/Parent — Signals

0	0	I think people would get stuck between the lights without enough space	11/12/2025

Map ID 11 — Ideas and Opportunities

Citizen Category: Student/Teacher/Parent — Opps. & Dismissals

0	1	Has the idea been brought forward to change the current field into the parking lot, keeping the same entrance and exits, and make the existing parking lot the new field? Staff alone take up 3/4 of the current parking lot so add families, parent pick up, etc...its crowded. Since they are thinking about buying that property next to the school, the "new field" would have plenty of space.	11/6/2025

Map ID 12 — Dislikes

Citizen Category: Nearby Resident — Signals

2	4	Traffic flows currently. I think this is the worst solution by far. Currently it takes about 5 minutes to get from North Star to 371, this could double that.	11/5/2025
1	4	Traffic lights are not the solution. For something that is primarily busy doing dropoff/pickup having lights all day slows down traffic. Also, clearing traffic from the school lines gets delayed further causing issues with kid dropoff/pickup.	11/6/2025
5	0	This is a way that the busses can have the traffic stop so they can get out on 11. Since there is no other way traffic will stop or slow down to allow busses to get out.	11/6/2025

Map ID 13 Ideas and Opportunities

Citizen Category: Student/Teacher/Parent — Roundabouts

1 0 Has this been discussed with the bus drivers to see if they will find a significant improvement in how fast they get out onto 11 or do they still think with it being a bus it will still take longer with the traffic coming from their left. 11/11/2025

0 0 I feel like a round about will still present an issue with exiting out from the school. With everone exiting to the right and a stedy flow of cars from the left, it will be difficult to know if the oncoming cars from the left will be going into the school or continuing east on cty rd 11. This will create hesitency with drivers exiting from the school therefore creating a backup. 11/13/2025

Map ID 14 Ideas and Opportunities

Citizen Category: Student/Teacher/Parent — Roundabouts

1 0 Give the bank and storage site a dedicated turn left turn lane. We are already making changes to the road adding this is just utilizing space that would be wasted currently. 11/6/2025

2 0 these round abouts do not improve the congestion for parents and school busses. 11/6/2025

Appendix G: Benefit Cost Analysis

Opinion of Probable Cost - Preliminary Cost Estimate

CSAH 11 Site Circulation Study: Roundabout Entrances

Crow Wing County, MN

12/15/2025

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	Item	Unit	Total Qty	Unit Price	Total Cost
MAJOR ROADWAY ITEMS (NOTES 1-2)					
	REMOVE BITUMINOUS PAVEMENT	SY	16,360	$ 11.00	$ 180,000
	EXCAVATION - COMMON	CY	19,620	$ 17.00	$ 333,600
	COMMON EMBANKMENT (CV)	CY	1,670	$ 10.00	$ 16,700
	AGGREGATE BASE (CV) CLASS 5	CY	3,850	$ 39.00	$ 150,200
	SELECT GRANULAR EMBANKMENT (CV)	CY	7,770	$ 30.00	$ 233,100
	CONCRETE PAVEMENT 8.0"	SY	1,000	$ 141.00	$ 141,000
	TYPE SP 12.5 WEARING COURSE MIX (4,F)	TONS	5,120	$ 124.00	$ 634,900
	CURB AND GUTTER B624	LF	10,810	$ 30.00	$ 324,300
	4" CONCRETE SIDEWALK	SF	37,030	$ 9.00	$ 333,300
	Subtotal				$ 2,347,000
	All Roadway Construction Subtotal				**$ 2,347,000**
SPECIAL LUMP SUM CONSTRUCTION ITEMS					
	CITY UTILITIES (WATERMAIN/SANITARY/ELECTRIC)	LS		$ -	$ -
(3)	LIGHTING	LS	1	$ 200,000.00	$ 200,000
(4)	URBAN DRAINAGE	LS	1	$ 470,000.00	$ 470,000
	Subtotal				$ 670,000
PERCENTAGE ITEMS					
	MOBILIZATION	5%		of all roadway	$ 150,900
	MISC REMOVALS (CURB, SIGNS, TREES, ETC.)	2%		of all roadway	$ 60,400
	SIGNING & PAVEMENT MARKINGS	3%		of all roadway	$ 90,600
	TURF ESTABLISHMENT AND EROSION CONTROL	5%		of all roadway	$ 150,900
	LANDSCAPING/STREETSCAPE	3%		of all roadway	$ 75,500
	TRAFFIC CONTROL/STAGING	5%		of all roadway	$ 150,900
	CONTINGENCY FOR MISSING ITEMS	20%		of all roadway	$ 603,400
	Subtotal				$ 1,283,000
				Construction Cost (2027 Dollars)	$ 4,300,000
				Anticipated Right-of-Way Cost (2027 Dollars)	$ 80,000
				Engineering Cost (2027 Dollars)	$ 860,000
				Total Cost (2027 Dollars)	**$ 5,240,000**

Notes:

1. County road pavement section assumed is 10 inch bituminous pavement,12 inch aggregate base, and 24 inch sand.
2. Local road pavement section assumed is 4 inch bituminous pavement,6 inch aggregate base, and 24 inch sand.
3. Includes wire, conduit, source of power, base, etc. Assuming MnDOTs LED-40 foot standard poles
4. Storm sewer cost is 20% of roadway construction cost

Opinion of Probable Cost - Preliminary Cost Estimate

CSAH 11 Site Circulation Study: West Roundabout

Crow Wing County, MN

12/15/2025

BOLTON & MENK
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	Item	Unit	Total Qty	Unit Price	Total Cost
MAJOR ROADWAY ITEMS (NOTES 1-2)					
	REMOVE BITUMINOUS PAVEMENT	SY	10,260	$ 11.00	$ 112,900
	EXCAVATION - COMMON	CY	11,430	$ 17.00	$ 194,400
	COMMON EMBANKMENT (CV)	CY	1,670	$ 10.00	$ 16,700
	AGGREGATE BASE (CV) CLASS 5	CY	2,330	$ 39.00	$ 90,900
	SELECT GRANULAR EMBANKMENT (CV)	CY	4,790	$ 30.00	$ 143,700
	CONCRETE PAVEMENT 8.0"	SY	600	$ 141.00	$ 84,600
	TYPE SP 12.5 WEARING COURSE MIX (4,F)	TONS	3,090	$ 124.00	$ 383,200
	CURB AND GUTTER B624	LF	4,820	$ 30.00	$ 144,600
	4" CONCRETE WALK	SF	22,100	$ 9.00	$ 198,900
	Subtotal				$ 1,370,000
	All Roadway Construction Subtotal				**$ 1,370,000**
SPECIAL LUMP SUM CONSTRUCTION ITEMS					
	CITY UTILITIES (WATERMAIN/SANITARY/ELECTRIC)	LS		$ -	$ -
(3)	LIGHTING	LS	1	$ 100,000.00	$ 100,000
(4)	URBAN DRAINAGE	LS	1	$ 270,000.00	$ 270,000
	Subtotal				$ 370,000
PERCENTAGE ITEMS					
	MOBILIZATION	5%		of all roadway	$ 87,000
	MISC REMOVALS (CURB, SIGNS, TREES, ETC.)	2%		of all roadway	$ 34,800
	SIGNING & PAVEMENT MARKINGS	3%		of all roadway	$ 52,200
	TURF ESTABLISHMENT AND EROSION CONTROL	5%		of all roadway	$ 87,000
	LANDSCAPING/STREETSCAPE	3%		of all roadway	$ 43,500
	TRAFFIC CONTROL/STAGING	5%		of all roadway	$ 87,000
	CONTINGENCY FOR MISSING ITEMS	20%		of all roadway	$ 348,000
	Subtotal				$ 740,000
				Construction Cost (2027 Dollars)	$ 2,480,000
				Anticipated Right-of-Way Cost (2027 Dollars)	$ 60,000
				Engineering Cost (2027 Dollars)	$ 500,000
				Total Cost (2027 Dollars)	**$ 3,040,000**

Notes:

1. County road pavement section assumed is 10 inch bituminous pavement,12 inch aggregate base, and 24 inch sand.
2. Local road pavement section assumed is 4 inch bituminous pavement,6 inch aggregate base, and 24 inch sand.

Opinion of Probable Cost - Preliminary Cost Estimate

CSAH 11 Site Circulation Study: East Roundabout

Crow Wing County, MN

12/15/2025

BOLTON & MENK
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	Item	Unit	Total Qty	Unit Price	Total Cost
MAJOR ROADWAY ITEMS (NOTES 1-2)					
	REMOVE BITUMINOUS PAVEMENT	SY	7,640	$ 11.00	$ 84,100
	EXCAVATION - COMMON	CY	8,740	$ 17.00	$ 148,600
	COMMON EMBANKMENT (CV)	CY	1,670	$ 10.00	$ 16,700
	AGGREGATE BASE (CV) CLASS 5	CY	1,830	$ 39.00	$ 71,400
	SELECT GRANULAR EMBANKMENT (CV)	CY	3,460	$ 30.00	$ 103,800
	CONCRETE PAVEMENT 8.0"	SY	400	$ 141.00	$ 56,400
	TYPE SP 12.5 WEARING COURSE MIX (4,F)	TONS	2,390	$ 124.00	$ 296,400
	CURB AND GUTTER B624	LF	4,440	$ 30.00	$ 133,200
	4" CONCRETE WALK	SF	20,650	$ 9.00	$ 185,900
	Subtotal				$ 1,097,000
	All Roadway Construction Subtotal				**$ 1,097,000**
SPECIAL LUMP SUM CONSTRUCTION ITEMS					
	CITY UTILITIES (WATERMAIN/SANITARY/ELECTRIC)	LS		$ -	$ -
(3)	LIGHTING	LS	1	$ 100,000.00	$ 100,000
(4)	URBAN DRAINAGE	LS	1	$ 220,000.00	$ 220,000
	Subtotal				$ 320,000
PERCENTAGE ITEMS					
	MOBILIZATION	5%		of all roadway	$ 70,900
	MISC REMOVALS (CURB, SIGNS, TREES, ETC.)	2%		of all roadway	$ 28,400
	SIGNING & PAVEMENT MARKINGS	3%		of all roadway	$ 42,600
	TURF ESTABLISHMENT AND EROSION CONTROL	5%		of all roadway	$ 70,900
	LANDSCAPING/STREETSCAPE	3%		of all roadway	$ 35,500
	TRAFFIC CONTROL/STAGING	5%		of all roadway	$ 70,900
	CONTINGENCY FOR MISSING ITEMS	20%		of all roadway	$ 283,400
	Subtotal				$ 603,000
				Construction Cost (2027 Dollars)	$ 2,020,000
				Anticipated Right-of-Way Cost (2027 Dollars)	$ 30,000
				Engineering Cost (2027 Dollars)	$ 400,000
				Total Cost (2027 Dollars)	**$ 2,450,000**

Notes:

1. County road pavement section assumed is 10 inch bituminous pavement,12 inch aggregate base, and 24 inch sand.
2. Local road pavement section assumed is 4 inch bituminous pavement,6 inch aggregate base, and 24 inch sand.

Opinion of Probable Cost - Preliminary Cost Estimate

CSAH 11 Site Circlulation Study: Signal Entrances

Crow Wing County, MN

12/15/2025

BOLTON & MENK
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	Item	Unit	Total Qty	Unit Price	Total Cost
MAJOR ROADWAY ITEMS (NOTE 1)					
	COMMON EMBANKMENT (CV)	CY	3,080	$ 10.00	$ 30,800
	AGGREGATE BASE (CV) CLASS 5	CY	210	$ 39.00	$ 8,200
	4" CONCRETE SIDEWALK	SF	16,760	$ 9.00	$ 150,900
	Subtotal				$ 190,000
	All Roadway Construction Subtotal				**$ 190,000**
SPECIAL LUMP SUM CONSTRUCTION ITEMS					
	TRAFFIC SIGNAL SYSTEM	LS	2	$ 550,000.00	$ 1,100,000
	CITY UTILITIES (WATERMAIN/SANITARY/ELECTRIC)	LS		$ -	$ -
(2)	RURAL DRAINAGE	LS	1	$ 20,000.00	$ 20,000
	Subtotal				$ 1,320,000
PERCENTAGE ITEMS					
	MOBILIZATION	5%		of all roadway	$ 75,500
	MISC REMOVALS (CURB, SIGNS, TREES, ETC.)	2%		of all roadway	$ 30,200
	SIGNING & PAVEMENT MARKINGS	3%		of all roadway	$ 45,300
	TURF ESTABLISHMENT AND EROSION CONTROL	5%		of all roadway	$ 75,500
	LANDSCAPING/STREETSCAPE	3%		of all roadway	$ 37,800
	TRAFFIC CONTROL/STAGING	5%		of all roadway	$ 75,500
	CONTINGENCY FOR MISSING ITEMS	15%		of all roadway	$ 226,500
	Subtotal				$ 566,000
				Construction Cost (2027 Dollars)	$ 2,100,000
				Anticipated Right-of-Way Cost (2027 Dollars)	$ -
				Engineering Cost (2027 Dollars)	$ 400,000
				Total Cost (2027 Dollars)	**$ 2,500,000**

Notes:

1. Sidewalk pavement section assumed is 4 inch concrete pavement and 4 inch aggregate base
2. Storm sewer cost is 20% of roadway construction cost

Opinion of Probable Cost - Preliminary Cost Estimate

CSAH 11 Site Circulation Study: One Way School Loop Entrance

Crow Wing County, MN

12/15/2025

	Item	Unit	Total Qty	Unit Price	Total Cost
MAJOR ROADWAY ITEMS (NOTE 1)					
	REMOVE BITUMINOUS PAVEMENT	SY	2,610	$ 11.00	$ 28,800
	EXCAVATION - COMMON	CY	1,310	$ 17.00	$ 22,300
	AGGREGATE BASE (CV) CLASS 5	CY	200	$ 39.00	$ 7,800
	SELECT GRANULAR EMBANKMENT (CV)	CY	800	$ 30.00	$ 24,000
	TYPE SP 12.5 WEARING COURSE MIX (4,F)	TONS	290	$ 124.00	$ 36,000
	CURB AND GUTTER B412	LF	280	$ 30.00	$ 8,400
	Subtotal				$ 127,000
	All Roadway Construction Subtotal				**$ 127,000**
SPECIAL LUMP SUM CONSTRUCTION ITEMS					
	CITY UTILITIES (WATERMAIN/SANITARY/ELECTRIC)	LS		$ -	$ -
(2)	URBAN DRAINAGE	LS	1	$ 30,000.00	$ 30,000
	Subtotal				$ 30,000
PERCENTAGE ITEMS					
	MOBILIZATION	5%		of all roadway	$ 7,900
	MISC REMOVALS (CURB, SIGNS, TREES, ETC.)	5%		of all roadway	$ 7,900
	SIGNING & PAVEMENT MARKINGS	10%		of all roadway	$ 15,700
	TURF ESTABLISHMENT AND EROSION CONTROL	5%		of all roadway	$ 7,900
	LANDSCAPING/STREETSCAPE	3%		of all roadway	$ 4,000
	TRAFFIC CONTROL/STAGING	5%		of all roadway	$ 7,900
	CONTINGENCY FOR MISSING ITEMS	20%		of all roadway	$ 31,400
	Subtotal				$ 83,000
				Construction Cost (2027 Dollars)	$ 240,000
				Anticipated Right-of-Way Cost (2027 Dollars)	$ -
				Engineering Cost (2027 Dollars)	$ 50,000
				Total Cost (2027 Dollars)	**$ 290,000**

Notes:

1. Local road pavement section assumed is 4 inch bituminous pavement,6 inch aggregate base, and 24 inch sand.
2. Storm sewer cost is 20% of pavement construction cost

Opinion of Probable Cost - Preliminary Cost Estimate

CSAH 11 Site Circulation Study: Raised Concrete Gore West Intersection

Crow Wing County, MN

12/15/2025

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Item		Unit	Total Qty	Unit Price	Total Cost
MAJOR ROADWAY ITEMS (NOTES 1-2)					
	REMOVE BITUMINOUS PAVEMENT	SY	740	$ 11.00	$ 8,200
	AGGREGATE BASE (CV) CLASS 5	CY	260	$ 37.00	$ 9,700
	SELECT GRANULAR EMBANKMENT (CV)	CY	510	$ 29.00	$ 14,800
	CURB AND GUTTER B624	LF	590	$ 29.00	$ 17,200
	24" SOLID LINE PAINT GR IN (WR)	LF	40	$ 13.00	$ 600
	4" CONCRETE MEDIAN	SF	2,500	$ 8.00	$ 20,000
	Subtotal				$ 108,000
	All Roadway Construction Subtotal				**$ 108,000**
SPECIAL LUMP SUM CONSTRUCTION ITEMS					
	CITY UTILITIES (WATERMAIN/SANITARY/ELECTRIC)	LS		$ -	$ -
	Subtotal				$ -
PERCENTAGE ITEMS					
	MOBILIZATION	5%		of all roadway	$ 5,400
	MISC REMOVALS (CURB, SIGNS, TREES, ETC.)	2%		of all roadway	$ 2,200
	SIGNING & PAVEMENT MARKINGS	3%		of all roadway	$ 3,300
	TURF ESTABLISHMENT AND EROSION CONTROL	5%		of all roadway	$ 5,400
	LANDSCAPING/STREETSCAPE	3%		of all roadway	$ 2,700
	TRAFFIC CONTROL/STAGING	5%		of all roadway	$ 5,400
	CONTINGENCY FOR MISSING ITEMS	20%		of all roadway	$ 21,600
	Subtotal				$ 46,000
				Construction Cost (2026 Dollars)	$ 154,000
				Anticipated Right-of-Way Cost (2026 Dollars)	$ -
				Engineering Cost (2026 Dollars)	$ 31,000
				Total Cost (2026 Dollars)	**$ 185,000**

Notes:

1. Assume 14' wide concrete gore area
2. County road pavement section assumed is 10 inch bituminous pavement,12 inch aggregate base, and 24 inch sand.

Opinion of Probable Cost - Preliminary Cost Estimate

CSAH 11 Site Circulation Study: Raised Concrete Gore East Intersection

Crow Wing County, MN

12/15/2025

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Item		Unit	Total Qty	Unit Price	Total Cost
MAJOR ROADWAY ITEMS (NOTES 1-3)					
	REMOVE BITUMINOUS PAVEMENT	SY	740	$ 11.00	$ 8,200
	AGGREGATE BASE (CV) CLASS 5	CY	410	$ 37.00	$ 15,200
	SELECT GRANULAR EMBANKMENT (CV)	CY	820	$ 29.00	$ 23,800
	CURB AND GUTTER B624	LF	590	$ 29.00	$ 17,200
	24" SOLID LINE PAINT GR IN (WR)	LF	40	$ 13.00	$ 600
	4" CONCRETE MEDIAN	SF	2,500	$ 8.00	$ 20,000
	Subtotal				$ 164,000
	All Roadway Construction Subtotal				**$ 164,000**
SPECIAL LUMP SUM CONSTRUCTION ITEMS					
	CITY UTILITIES (WATERMAIN/SANITARY/ELECTRIC)	LS		$ -	$ -
	Subtotal				$ -
PERCENTAGE ITEMS					
	MOBILIZATION	5%		of all roadway	$ 8,200
	MISC REMOVALS (CURB, SIGNS, TREES, ETC.)	2%		of all roadway	$ 3,300
	SIGNING & PAVEMENT MARKINGS	3%		of all roadway	$ 5,000
	TURF ESTABLISHMENT AND EROSION CONTROL	5%		of all roadway	$ 8,200
	LANDSCAPING/STREETSCAPE	3%		of all roadway	$ 4,100
	TRAFFIC CONTROL/STAGING	5%		of all roadway	$ 8,200
	CONTINGENCY FOR MISSING ITEMS	20%		of all roadway	$ 32,800
	Subtotal				$ 70,000
				Construction Cost (2026 Dollars)	$ 234,000
				Anticipated Right-of-Way Cost (2026 Dollars)	$ -
				Engineering Cost (2026 Dollars)	$ 47,000
				Total Cost (2026 Dollars)	**$ 281,000**

Notes:

1. Assume 14' wide concrete gore area
2. County road pavement section assumed is 10 inch bituminous pavement,12 inch aggregate base, and 24 inch sand.
3. 250' Northbound Right Turn Lane assumed

CMF / CRF Details

CMF ID: 211

Conversion of stop-controlled intersection into single-lane roundabout

Description:

Prior Condition: ***No Prior Condition(s)***

Category: Intersection geometry

Study: ***Observational Before-After Study of the Safety Effect of U.S. Roundabout Conversions Using the Empirical Bayes Method*****, Persaud et al., 2001**

Star Quality Rating:	

Crash Modification Factor (CMF)	
Value:	0.18
Adjusted Standard Error:	0.16
Unadjusted Standard Error:	0.09

Crash Reduction Factor (CRF)	
Value:	82 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	16
Unadjusted Standard Error:	9

Applicability

Crash Type:	All
Crash Severity:	A (serious injury),B (minor injury),C (possible injury)
Roadway Types:	Not specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Rural
Traffic Volume:	
Time of Day:	

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	Not specified
Traffic Control:	Stop-controlled
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	
Municipality:	
State:	
Country:	
Type of Methodology Used:	2

Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Dec-01-2009
Comments:	

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CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 229

Convert intersection with minor-road stop control to modern roundabout

Description:

Prior Condition: ***No Prior Condition(s)***

Category: Intersection geometry

Study: ***NCHRP Report 572: Applying Roundabouts in the United States,*** **Rodegerdts et al., 2007**

Star Quality Rating:	★★★☆☆

Crash Modification Factor (CMF)	
Value:	0.29
Adjusted Standard Error:	0.05
Unadjusted Standard Error:	0.04

Crash Reduction Factor (CRF)	
Value:	71 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	5

Unadjusted Standard Error:	4

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not Specified
Number of Lanes:	1
Road Division Type:	
Speed Limit:	
Area Type:	Rural
Traffic Volume:	
Time of Day:	

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	4-leg
Traffic Control:	Stop-controlled
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	
Municipality:	
State:	

Country:	
Type of Methodology Used:	2
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	Yes. HSM lists this CMF in **bold** font to indicate that it has the highest reliability since it has an adjusted standard error of 0.1 or less.
Date Added to Clearinghouse:	Dec-01-2009
Comments:	Countermeasure name changed from "convert two-way stop-controlled intersection to roundabout" to match HSM

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CMF / CRF Details

CMF ID: 7983

Install a traffic signal

Description:

Prior Condition: Intersections with a stop sign on minor roads

Category: Intersection traffic control

Study: *Safety Evaluation of Signal Installation With and Without Left Turn Lanes on Two Lane Roads in Rural and Suburban Areas*, Srinivasan et al., 2014

Star Quality Rating:	★★★★☆ [View score details]

Crash Modification Factor (CMF)	
Value:	0.639
Adjusted Standard Error:	
Unadjusted Standard Error:	0.033

Crash Reduction Factor (CRF)	
Value:	36.1 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	

Unadjusted Standard Error:	3.3

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	2
Road Division Type:	
Speed Limit:	
Area Type:	All
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Not specified
Intersection Geometry:	3-leg,4-leg
Traffic Control:	Stop-controlled
Major Road Traffic Volume:	2480 to 18025 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	746 to 6829 Annual Average Daily Traffic (AADT)

Development Details

Date Range of Data Used:	1992 to 2012
Municipality:	
State:	NC

Country:	
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Nov-10-2016
Comments:	The CMF was developed for both rural and suburban areas.

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CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 8499

CMF Name: Change right-turn lane geometry to increase line of sight (approach

Description: Changes made to study approaches include: sharpening the flat ap

Prior Condition: Traditional right-turn lane design

Category: Intersection geometry

Study ID: *Effectiveness Evaluation of a Modified Right-Turn Lane Design at Intersections*, Schattler et al. 2016

Star Quality Rating	
Star Quality Rating:	4 Stars

Crash Modification Factor (CMF)	
Value:	0.404
Adjusted Standard Error:	
Unadjusted Standard Error:	0.113

Crash Reduction Factor	
Value:	59.6
Adjusted Standard Error:	
Unadjusted Standard Error:	11.27

Applicability	
Crash Type:	Right turn
Crash Severity:	All
Roadway Types:	All
Minimum Number of Lanes:	
Maximum Number of Lanes:	
Number of Lanes Direction:	
Number of Lanes Comment:	
Road Division Type:	
Minimum Speed Limit:	25
Maximum Speed Limit:	45
Speed Unit:	mph
Speed Limit Comment:	
Area Type:	
Traffic Volume:	
Average Traffic Volume:	
Time of Day:	
If countermeasure is intersection-based.	
Intersection Type:	Other
Intersection Geometry:	No values chosen.
Traffic Control:	Other
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Average Major Road Volume:	
Average Minor Road Volume:	

Development Details

Date Range of Data Used:	2003 to 2014
Municipality:	
State:	IL
Country:	
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size (crashes):	161 crashes before, 45 crashes after
Sample Size (sites):	7 sites before, 7 sites after
Sample Size (site-years):	**site-years before, 21 site-years after**

Other Details

Included in HSM:	No
Date Added to Clearinghouse:	Mar 13, 2017
Comments:	CMF applies only to treated approaches. Intersection AADT ranges from 15,558 to 29,992. CMF applies to both stop-controlled and signalized intersections. Roadway/roadway both interchange and not-interchange related.

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	CSAH 11	**District**	3	**County**	Crow Wing
Begin RP		**End RP**		**Miles**	
Location	East and West access at Eagle View Elementary				

B. Project Description

Proposed Work	Install single lane roundabout (dual roundabout alternative and west roundabout alternative)		
Project Cost*		**Installation Year**	2027
Project Service Life	20 years	**Traffic Growth Rate**	0.500%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

	Fatal (K) Crashes	**Reference**	CMF ID 229
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	PDO
	Possible Injury (C) Crashes		
0.29	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	CMF ID 211
0.18	**Serious Injury (A) Crashes**		
0.18	**Moderate Injury (B) Crashes**	**Crash Type**	A,B,C
0.18	**Possible Injury (C) Crashes**		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2020	**End Date**	12/31/2024	5 years
Data Source	MnDOT			

Crash Severity	PDO	A,B,C
K crashes		
A crashes		
B crashes		1
C crashes		
PDO crashes	1	

F. Benefit-Cost Calculation

$1,028,482	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**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	$16,500,000
A crashes	$1,700,000
B crashes	$380,000
C crashes	$180,000
PDO crashes	$18,000

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

Real Discount Rate:	3.1%	**Revised**
Traffic Growth Rate:	0.500%	**Revised**
Project Service Life:	20 years	**Revised**

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	0.82	0.16	$62,286
C crashes	0.00	0.00	$0
PDO crashes	0.71	0.14	$2,555
			$64,840

H. Amortized Benefit

Year	Crash Benefits	Present Value
2027	$64,840	$64,840
2028	$65,165	$63,205
2029	$65,490	$61,611
2030	$65,818	$60,058
2031	$66,147	$58,543
2032	$66,478	$57,067
2033	$66,810	$55,628
2034	$67,144	$54,225
2035	$67,480	$52,857
2036	$67,817	$51,524
2037	$68,156	$50,225
2038	$68,497	$48,958
2039	$68,840	$47,724
2040	$69,184	$46,520
2041	$69,530	$45,347
2042	$69,877	$44,204
2043	$70,227	$43,089
2044	$70,578	$42,002
2045	$70,931	$40,943
2046	$71,286	$39,910
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 = $1,028,482

NOTE:
This calculation relies on the real discount rate, which accounts for inflation. No further discounting is necessary.

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	CSAH 11	**District**	3	**County**	Crow Wing
Begin RP		**End RP**		**Miles**	
Location	East and West access at Eagle View Elementary				

B. Project Description

Proposed Work	Install signal (dual roundabout alternative and west roundabout alternative)		
Project Cost*		**Installation Year**	2027
Project Service Life	20 years	**Traffic Growth Rate**	0.5%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.33	**Fatal (K) Crashes**	**Reference**	CMF ID: 323
0.33	**Serious Injury (A) Crashes**		
0.33	**Moderate Injury (B) Crashes**	**Crash Type**	Angle
0.33	**Possible Injury (C) Crashes**		
0.33	**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	1/1/2020	**End Date**	12/31/2024	5 years
Data Source	MnDOT			

Crash Severity	Angle	< optional 2nd CMF >
K crashes		
A crashes		
B crashes	1	
C crashes		
PDO crashes	1	

F. Benefit-Cost Calculation

$845,474	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**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	$16,500,000
A crashes	$1,700,000
B crashes	$380,000
C crashes	$180,000
PDO crashes	$18,000

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

Real Discount Rate:	3.1%	**Revised**
Traffic Growth Rate:	0.500%	**Revised**
Project Service Life:	20 years	**Revised**

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	0.67	0.13	$50,892
C crashes	0.00	0.00	$0
PDO crashes	0.67	0.13	$2,411
			$53,303

H. Amortized Benefit

Year	Crash Benefits	Present Value
2027	$53,303	$53,303
2028	$53,569	$51,959
2029	$53,837	$50,648
2030	$54,106	$49,371
2031	$54,377	$48,126
2032	$54,649	$46,912
2033	$54,922	$45,729
2034	$55,197	$44,576
2035	$55,473	$43,452
2036	$55,750	$42,356
2037	$56,029	$41,288
2038	$56,309	$40,247
2039	$56,590	$39,232
2040	$56,873	$38,242
2041	$57,158	$37,278
2042	$57,443	$36,338
2043	$57,731	$35,422
2044	$58,019	$34,528
2045	$58,309	$33,658
2046	$58,601	$32,809
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 = $845,474

NOTE:
This calculation relies on the real discount rate, which accounts for inflation. No further discounting is necessary.

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	CSAH 11	**District**	3	**County**	Crow Wing
Begin RP		**End RP**		**Miles**	
Location	East access to Eagle View Elementary (part of proposed one way loop alternative)				

B. Project Description

Proposed Work	Install single lane roundabout		
Project Cost*		**Installation Year**	2027
Project Service Life	20 years	**Traffic Growth Rate**	0.500%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

	Fatal (K) Crashes	**Reference**	CMF ID 229
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	PDO
	Possible Injury (C) Crashes		
0.29	**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	1/1/2020	**End Date**	12/31/2024	5 years
Data Source	MnDOT			

Crash Severity	**PDO**	**< optional 2nd CMF >**
K crashes		
A crashes		
B crashes		
C crashes		
PDO crashes	1	

F. Benefit-Cost Calculation

$40,521	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**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	$16,500,000
A crashes	$1,700,000
B crashes	$380,000
C crashes	$180,000
PDO crashes	$18,000

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

Real Discount Rate:	3.1%	**Revised**
Traffic Growth Rate:	0.500%	**Revised**
Project Service Life:	20 years	**Revised**

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	0.00	0.00	$0
PDO crashes	0.71	0.14	$2,555
			$2,555

H. Amortized Benefit

Year	Crash Benefits	Present Value
2027	$2,555	$2,555
2028	$2,567	$2,490
2029	$2,580	$2,427
2030	$2,593	$2,366
2031	$2,606	$2,306
2032	$2,619	$2,248
2033	$2,632	$2,192
2034	$2,645	$2,136
2035	$2,659	$2,082
2036	$2,672	$2,030
2037	$2,685	$1,979
2038	$2,699	$1,929
2039	$2,712	$1,880
2040	$2,726	$1,833
2041	$2,739	$1,787
2042	$2,753	$1,742
2043	$2,767	$1,698
2044	$2,781	$1,655
2045	$2,795	$1,613
2046	$2,809	$1,572
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 = $40,521

NOTE:
This calculation relies on the real discount rate, which accounts for inflation. No further discounting is necessary.

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	CSAH 11	**District**	3	**County**	Crow Wing
Begin RP		**End RP**		**Miles**	
Location	East access to Eagle View Elementary (part of proposed one way loop alternative)				

B. Project Description

Proposed Work	Install signal		
Project Cost*		**Installation Year**	2027
Project Service Life	20 years	**Traffic Growth Rate**	0.5%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.33	**Fatal (K) Crashes**	**Reference**	CMF ID: 323
0.33	**Serious Injury (A) Crashes**		
0.33	**Moderate Injury (B) Crashes**	**Crash Type**	Angle
0.33	**Possible Injury (C) Crashes**		
0.33	**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 1/1/2020 **End Date** 12/31/2024 5 years

Data Source MnDOT

Crash Severity	Angle	< optional 2nd CMF >
K crashes		
A crashes		
B crashes		
C crashes		
PDO crashes	1	

F. Benefit-Cost Calculation

$38,238	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**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	$16,500,000
A crashes	$1,700,000
B crashes	$380,000
C crashes	$180,000
PDO crashes	$18,000

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

Real Discount Rate:	3.1%	**Revised**
Traffic Growth Rate:	0.500%	**Revised**
Project Service Life:	20 years	**Revised**

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	0.00	0.00	$0
PDO crashes	0.67	0.13	$2,411
			$2,411

H. Amortized Benefit

Year	Crash Benefits	Present Value
2027	$2,411	$2,411
2028	$2,423	$2,350
2029	$2,435	$2,291
2030	$2,447	$2,233
2031	$2,459	$2,177
2032	$2,472	$2,122
2033	$2,484	$2,068
2034	$2,496	$2,016
2035	$2,509	$1,965
2036	$2,521	$1,916
2037	$2,534	$1,867
2038	$2,547	$1,820
2039	$2,559	$1,774
2040	$2,572	$1,730
2041	$2,585	$1,686
2042	$2,598	$1,643
2043	$2,611	$1,602
2044	$2,624	$1,562
2045	$2,637	$1,522
2046	$2,650	$1,484
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 = $38,238

NOTE:
This calculation relies on the real discount rate, which accounts for inflation. No further discounting is necessary.

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	CSAH 11	**District**	3	**County**	Crow Wing
Begin RP		**End RP**		**Miles**	
Location	CSAH 11				

B. Project Description

Proposed Work	Change Right Turn Lane Geometry to Increase Line of Sight		
Project Cost*		**Installation Year**	2026
Project Service Life	20 years	**Traffic Growth Rate**	0.500%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.40	**Fatal (K) Crashes**	**Reference**	CMF ID 8499
0.40	**Serious Injury (A) Crashes**		
0.40	**Moderate Injury (B) Crashes**	**Crash Type**	All
0.40	**Possible Injury (C) Crashes**		
0.40	**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	1/1/2020	**End Date**	12/31/2024	5 years
Data Source	MnDOT			

Crash Severity	**All**	**< optional 2nd CMF >**
K crashes		
A crashes		
B crashes		
C crashes		
PDO crashes	1	

F. Benefit-Cost Calculation

$34,015	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**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	$16,500,000
A crashes	$1,700,000
B crashes	$380,000
C crashes	$180,000
PDO crashes	$18,000

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

Real Discount Rate:	3.1%	**Revised**
Traffic Growth Rate:	0.500%	**Revised**
Project Service Life:	20 years	**Revised**

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	0.00	0.00	$0
PDO crashes	0.60	0.12	$2,144
			$2,144

H. Amortized Benefit

Year	Crash Benefits	Present Value
2026	$2,144	$2,144
2027	$2,155	$2,090
2028	$2,166	$2,038
2029	$2,177	$1,986
2030	$2,188	$1,936
2031	$2,199	$1,887
2032	$2,210	$1,840
2033	$2,221	$1,793
2034	$2,232	$1,748
2035	$2,243	$1,704
2036	$2,254	$1,661
2037	$2,265	$1,619
2038	$2,277	$1,578
2039	$2,288	$1,539
2040	$2,300	$1,500
2041	$2,311	$1,462
2042	$2,323	$1,425
2043	$2,334	$1,389
2044	$2,346	$1,354
2045	$2,358	$1,320
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 = $34,015

NOTE:
This calculation relies on the real discount rate, which accounts for inflation. No further discounting is necessary.