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FEASIBILITY STUDY OF CSAH 2/CR 180, CSAH 43 AND CR 171 INTERSECTION IMPROVEMENTS

Prepared for:
Steele County, Minnesota Highway Department

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Project Location

The project encompasses three intersections located in the village of Havana, approximately 3 miles southeast of the City of Owatonna. The main intersection includes County State Aid Highway 2 (CSAH 2) / County Road 180 (CR 180) and County State Aid Highway 43 (CSAH 43). The second intersection of 18th Street SE and CSAH 43 is located 160 feet to the south of CSAH 2 / CR 180. The third intersection of County Road 171 (CR 171) and CSAH 43 and 110 feet north of CSAH 2 / CR 180. A railroad crossing for the Canadian Pacific Kansas City (CPKC) Railroad is located between the intersection of CSAH 2 / CR 180 and CSAH 43, and the intersection of 18th Street SE and CSAH 43.



Map of the project location



Inset Map of the project location

Project Need

Safety

Multiple vehicular crashes have been reported at the intersection of CSAH 2 / CR 180 and CSAH 43. The 2040 Transportation Plan prepared by Steele County identified the intersection as the top ranked crash location in the county based on 2016 – 2020 crash data. Another study, the 2012 County Road Safety Plan also showed the intersection as a high-risk intersection.

The project area includes three intersections and a railroad crossing that are spaced close together, resulting in multiple decisions that need to be processed by a driver in a short amount of time. CSAH 2 / CR 180, CSAH 43 and CR 171 are all high-speed roadways, and have less time to react to cross-traffic that pulls out onto the road at the wrong time. The distance between the railroad crossing and CSAH 2 / CR 180 is approximately 80 feet, which limits the storage space available for vehicles to wait when a train is traveling through the railroad crossing. This distance is especially tight for semi-trailers, which frequently use the intersection to turn right from northbound CSAH 43 to eastbound CSAH 2 / CR 180. The alignment of CSAH 2 / CR 180 runs at a 20-degree skew in relation to CSAH 43 and causes poor sight distance when drivers travelling along CSAH 43 need to watch for cross traffic on CSAH 2 / CR 180.

Changes to Traffic

In 2021, MnDOT reconstructed US Highway 14 (US 14) between Dodge Center and Owatonna. The project expanded the number of lanes from 2 to 4 and reduced the number of access points for local and county roads to the highway. As a result, CSAH 43 is now the only location for local traffic to access US 14 for a 9.5 mile stretch between Claremont and Owatonna. This has led to an increase in traffic on CSAH 43, in addition to an increase in semi-truck traffic using northbound CSAH 43 to eastbound CR 180 to access the Al-Corn Clean Fuel facility just outside of Claremont. The old US 14 roadway was turned back to the County, and became CSAH 2, which also lead to a change in traffic volumes on CSAH 2 / CR 180.

CSAH 43 was also designated as the future location of a major beltline as the City of Owatonna residential development expands to the east. The 2011 Owatonna East Beltline Corridor Study conducted by WSB concluded that the existing alignment of CSAH 43 should be used as the beltway and anticipated an increase in traffic volumes travelling along the roadway. The County has also planned to eventually expand CSAH 43 to a 4-lane roadway, and MnDOT has committed to building an interchange at the intersection of US 14 and CSAH 43 as traffic grows.

The County is also planning to improve a railroad underpass along CR 180 to the west of the project intersection. This project would increase the vertical clearance between the railroad bridge and CR 180 to meet state aid standards and is expected to increase the amount of truck traffic traveling along CR 180.

The combination of crash history at the intersection and anticipated increases in traffic along both corridors indicates a clear need to improve the intersection.

Proposed Concept Alternatives

Four different intersection layouts were explored as alternatives to the existing intersection layout to improve safety. The goal of each alternative was to try and either improve the geometric layout of the existing intersection, reduce the number of intersections, or provide additional spacing between the intersections to reduce driver speed crossing the intersections, reduce the number of decisions made by the driver and create additional time to make those decisions.

Alternative 1 – Roundabout

The first alternative looked at replacing the intersections of CSAH 2 / CR 180 and CSAH 43 and CR 171 and CSAH 43 with a five-legged roundabout. Roundabouts are a very effective traffic control measure that can be implemented to reduce the number of severe right-angle crashes at an intersection. The intersection of 18th Street SE and CSAH 43 would remain as side street stop control but would be relocated further south of the existing intersection. A display of Alternative 1 can be found in Appendix A.

Alternative 2 – Realign CSAH 2 / CR 180 to CR 171

The second alternative shifted the alignment of CSAH 2 / CR 180 to the north, running through the middle of a farm field, then parallel to the existing alignment of CR 171. The proposed CR 171 would intersect as a tee intersection into the new alignment for CSAH 2 / CR 180, and the new intersection for CSAH 2 / CR 180 would be relocated to the north of the existing intersection with side street stop control. Right and left turn lanes would be added to CSAH 43 for northbound and southbound traffic at the intersection with CSAH 2 / CR 180. The intersection of 18th Street SE and CSAH 43 would remain as side street stop control but would be relocated further south of the existing intersection. An additional intersection off the new alignment for CSAH 2 / CR 180 would be added to provide access to the residential houses along the existing CSAH 2 / CR 180 alignment. The CPKC railroad crossing would be widened to accommodate the northbound turn lanes for CSAH 43 traffic. A display of Alternative 2 can be found in Appendix A.

Alternative 3 – Realign CSAH 2 / CR 180 slightly north of CR 171

The third alternative shifted the alignment of CSAH 2 / CR 180 farther north of the existing CR 171 intersection. The new alignment of CSAH 2 / CR 180 would run along the southwest edge of a farm field and through the backyards of some residential lots. The proposed CR 171 would intersect as a tee intersection into the new alignment for CSAH 2 / CR 180, and the new intersection for CSAH 2 / CR 180 would be relocated to the north of the existing intersection with side street stop control. Right and left turn lanes would be added to CSAH 43 for northbound and southbound traffic at the intersection with CSAH 2 / CR 180. The intersection of 18th Street SE and CSAH 43 would remain as side street stop control but would be relocated further south of the existing intersection. An additional intersection off the new alignment for CSAH 2 / CR 180 would be added to provide access to the residential houses along the existing CSAH 2 / CR 180 alignment. The CPKC railroad crossing would be widened to accommodate the northbound turn lanes for CSAH 43 traffic. A display of Alternative 3 can be found in Appendix A.

Alternative 4 – Realign CSAH 2 / CR180 & CSAH 43 farther north of CR 171

The fourth alternative shifted the alignment of CSAH 2 / CR 180 far enough north that the proposed CSAH 2 / CR 180 and CSAH 43 intersection/turn lanes are out of the existing CR 171 intersection. The proposed CSAH 43 intersection would utilize side street stop sign control on CSAH 2 / CR 180. The new alignment of CSAH 2 / CR 180 would run along the southwest edge of one farm field and through the middle of two farm fields. The proposed CR 171 would intersect into the new alignment for CSAH 2 / CR 180. Right and left turn lanes would be added to CSAH 43 for northbound and southbound traffic

at the intersection with CSAH 2 / CR 180. The intersection of 18th Street SE and CSAH 43 would remain as side street stop control but would be relocated further south of the existing intersection. An additional intersection off the new alignment for CSAH 2 / CR 180 would be added to provide access to the residential houses along the existing CSAH 2 / CR 180 alignment. The CPKC railroad crossing would remain as-is. A display of Alternative 4 can be found in Appendix A.

Alternative 4B – Realign CSAH 2 / CR 180 to the north property line of adjacent farmland

Another alternative was briefly considered to shift CSAH 2 / CR 180 even further north to minimize the acquisition impacts to the farmland on the northwest and northeast sides of the existing CSAH 43 and CR 171 intersection. See the Open House #2 section of this report for additional analysis. A display of Alternative 4B can be found in Appendix A.

Traffic Control Analysis

WHKS prepared an Intersection Control Evaluation (ICE) Report for the intersection to determine which traffic control is desirable at the intersection of CSAH 2 / CR 180 and CSAH 43.

Traffic Volume

24-hour traffic counts were recorded at all three intersections and extrapolated the future 20-year volumes on all roadways based on annual compounding growth and the anticipated growth provided in the 2011 Beltline Corridor Study. The volumes of each intersection can be found in Appendix F. The data determined that CSAH 43 had the highest peak hour traffic, then CSAH 2 / CR 180, then CR 171 and finally 18th Street SE.

Crash History

The report also analyzed the previous 10 years (2014 – 2024) of crash history at the intersection using MnDOT's MnCMAT database. From 2014 to 2024, there were 15 recorded crashes at the three intersections: nine crashes at the CSAH 2 / CR 180 and CSAH 43 intersection, four crashes at the CR 171 and CSAH 43 intersection, and two crashes at the 18th Street SE and CSAH 43 intersection. Most of the crashes (47%) were right angle crashes, with eight crashes resulting in some type of injury. A detailed list of crash data can be found in Appendix F.

The crash data was entered into MnDOT's online crash calculator to determine the intersection crash rate per million vehicles entering the intersection. This crash rate is compared to the state's crash rate goal of 1.0 crash per million entering vehicles (MEV) for all intersections. Based on the current traffic counts and crash data, the crash rate at the location was 1.81 MEV. This result is higher than MnDOT's crash rate goal and was consistent with crash data from the 2040 Transportation Plan.

Level of Service/ Capacity

The ICE Report used the 20-year volumes calculated from the traffic counts and analyzed the average delay in vehicles per second for a roundabout, traffic signal, multi-way stop, and side street stop control at the intersection. This analysis is based on Highway Capacity Manual methodology, where Level of Service is given a letter grade based on the delay at an intersection. An intersection at LOS A represents good operations (less delay) and an intersection at LOS F represents poor operations (more delay). An intersection at LOS E is considered at capacity. A summary of LOS for each traffic control alternative can be found in Appendix F.

The analysis for all forms of traffic control provided an acceptable LOS.

Warrant Analysis

The Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD) lists a variety of warrants that can be examined at a particular intersection to determine if multi-way stop control or traffic signal control is warranted for traffic control. There are no warrants for the installation of roundabouts. However, MnDOT's current policy states that roundabouts are considered warranted if traffic volumes meet the criteria for either multi-way stop or traffic signal control warrants. The warrant summary for the intersection of CSAH 2 / CR 180 and CSAH 43 can be found in Appendix F.

None of the Multi-way Stop Warrants were met based on the criteria.

Signal Control warrants 1-8 were not met based on the criteria. Warrant 9 would be met if future traffic is observed and the current intersection alignment is not improved. The existing queue distance between the intersection of CSAH 2 / CR 180 and CSAH 43 and the railroad crossing is only 65 feet, where 130 feet would be required. All four proposed alternative layouts meet the queue distance requirement, so Warrant 9 would not be met.

NCHRP report 825 Exhibit 17 suggests that two-way stop control is appropriate for all proposed alternatives.

Right of Way Impacts

All the proposed alternatives will result in Right of Way impacts to adjacent property owners. A project map of all adjacent parcels can be found in Appendix C.

Fee Acquisition & Relocation

Alternative 1 will require the acquisition and relocation of four parcels that contain single unit residential homes. Parcels 07-018-2201, 07-017-3301, and 07-020-4411 would be required to construct the roundabout; and parcel 07-019-1103 would be required to re-align 18th Street SE.

Alternative 2 will require the acquisition and relocation of four parcels: three containing single unit residential homes, and one containing multi-unit residential apartments. Parcels 07-018-2201, 07-017-3301, and 07-020-4412 would be required to construct the re-aligned CSAH 2 / CR 180 intersection; and parcel 07-019-1103 would be required to re-align 18th Street SE.

Alternative 3 will require the acquisition and relocation of three parcels that contain single unit residential homes. Parcels 07-018-2201 and 07-017-3301 would be required to construct the re-aligned CSAH 2 / CR 180 intersection; and parcel 07-019-1103 would be required to re-align 18th Street SE.

Alternative 4 will require the acquisition and relocation of one parcel that contains a single unit residential home. Parcel 07-019-1103 would be required to re-align 18th Street SE.

It should be noted that in Alternatives 2, 3, and 4, Parcel 07-020-4411 would need to be purchased to construct the cul-de-sac or curve option along Claremont Road (existing CSAH 2 / CR 180) as shown on Inset A of each display. The installation of a hammerhead, as shown on the main displays, would not require the acquisition of parcel 07-020-4411.

The property owner of parcel 07-019-1103 has previously been in contact with Steele County about selling the property.

Relocation assistance and benefits for the relocation of a property owner require extensive requirements and special knowledge to perform relocation services. It is recommended that the County work directly with MnDOT Office of Land Management regarding the handling of property relocation.

Fee Acquisition

Alternative 1 will require partial acquisition of farmland from two parcels. Part of parcel 07-017-3300 would be required to construct the roundabout, and part of parcel 07-019-1100 would be required to re-align 18th Street SE.

Alternative 2 will require partial acquisition of farmland from five parcels. Part of parcels 07-017-3300, 07-017-2400, 07-020-4100, and 07-020-1100 would be required to re-align CSAH 2 / CR 180 and part of parcel 07-019-1100 would be required to re-align 18th Street SE.

Alternative 3 will require partial acquisition of seven parcels: four parcels containing farmland and three parcels containing the backyard of a single unit residential home. Part of Parcels 07-018-2200, 07-017-3300, 07-020-4406, 07-020-4404, 07-020-4401, and 07-020-4100 would be required to re-align CSAH 2 / CR 180 and part of parcel 07-019-1100 would be required to re-align 18th Street SE.

Alternative 4 will require partial acquisition of farmland from five parcels. Part of parcels 07-018-2200, 07-017-3300, 07-017-2400, and 07-020-4100 would be required to re-align CSAH 2 / CR 180 and part of parcel 07-019-1100 would be required to re-align 18th Street SE.

Partial acquisition of all properties would need to follow the Acquisition process provided in Chapter 5.2 of the MnDOT State Aid Manual.

Temporary Easement

All four alternatives will require temporary easement from multiple parcels for grading work during construction.

A summary of Right of Way Impacts can be found below:

RIGHT OF WAY IMPACTS						
		Alternative 1	Alternative 2	Alternative 3	Alternative 4	
Relocation + Fee Acquisition	No. Parcels	4	4	3	1	
	Acres	15.80	15.32	14.80	0.44	
Fee Acquisition	No. Parcels	2	5	7	5	
	Acres	1.03	6.39	6.21	13.41	
Total Acquisition Impacts *	Relocations	4	4	4	1	
	Acres	16.83	21.71	21.01	13.73	

Table 1 – A summary of Right of Way impacts

* There may be opportunities to sell existing Right of Way along the existing roadway alignment back to individual property owners during final design and reduce the total acquisition of Right of Way for each alternative.

Engagement and Input

WHKS and the County met with residents of Havana and additional members of the public on two separate occasions to discuss the project, share the proposed alternatives, and receive feedback. The first open house was held on October 10, 2024, and the second open house was held on January 30, 2025. Both open houses were held at the Havana Town Hall. All four project alternatives were also shared with CPKC Railroad for their comments and feedback. A preliminary utility information meeting was held on January 23, 2025, with companies that have utilities within the project limits to inform them of the project and the anticipated improvements. Additional utility coordination will be required during the final design process.

Open House #1

At the first open house, the design team presented Alternatives 1, 2, 3, and 4 to all open house attendees and collected comments and feedback. The following is a summary of comments that were received. A list of attendees to the first open house can be found in Appendix D.

Alternative 1:

- Residential owners whose homes were impacted by the project strongly objected to relocating due to construction of the roundabout.
- One residential owner had concerns about the raised median of the roundabout approach section limiting access in and out of their driveway.
- The residential house located on parcel 07-019-1103 is a rental. The property owner has been in contact with Steele County about selling the property.

Alternative 2:

- Residential owners whose homes were impacted by the project strongly objected to relocating due to the realignment of CSAH 2 / CR 180.
- The owner of parcel 07-020-4100 disliked how the realignment of CSAH 2 / CR 2180 in this alternative cut through the middle of his farm. It would make the parcel unfarmable.
- There was a request to terminate Claremont Road (existing CSAH 2 / CR 180) using a hammerhead instead of a cul-de-sac to prevent relocating the property owner of parcel 07-020-4411.
- There was a request to explore realigning CSAH 43 and the CSAH 2 / CR 180 intersection to the east, through parcel 07-020-4409. According to residents, the house on the property was not in use, only the garage was being used. They would rather see this property acquired than the other properties with homes that were occupied.

Alternative 3:

- Residential owners whose homes were impacted by the project strongly objected to relocating due to the realignment of CSAH 2 / CR 180.
- Owners of farmland on parcels 07-017-3300 and 07-020-4100 preferred this alternative due to the minimal impacts to their farmable land.
- The owner of parcel 07-017-3301 would rather sell his rental house on this property with Alternatives 1, 2, and 3 than lose more farmland with Alternative 4.
- The property owners on parcels 07-020-4404 and 07-020-4401 strongly objected to this alternative because the realignment of CSAH 2 / CR 180 ran through a sizeable portion of their backyards. They also believed the realignment would impact their septic systems and additional underground utilities. The owner of parcel 07-020-4401 stated he would want to be bought out completely and relocated if this option was selected.

Alternative 4:

- Residential owner of Parcel 07-020-4411 disliked the curve shown in this option because it would take out his house. The owner preferred the construction of two hammerheads to save his house and was open to a future purchase agreement with the County to be executed when the house changes occupancy or ownership
- The owner of parcel 07-017-3300 strongly objected to this alternative due to the large impacts to his farmable land. The realignment of CSAH 2 / CR 180 also went through the septic system of his house, and ran through the location of a future shed, house, and septic system he planned to build.
- The owner of parcel 07-017-3201 was concerned about the re-aligned roadway being closer to her house as she has children playing in the yard.
- There was a request to explore relocating CSAH 2 / CR 180 up to Havana Road and turning the existing intersection of CSAH 2 / CR 180 and CSAH 43 into a tee intersection.
- There was a request made by multiple residents to convert the stop control at the intersection of CSAH 2 / CR 180 and CSAH 43 to multi-way stop control instead of realigning the intersection.

The design team made the following changes to each alternative based on feedback from the first open house:

Alternative 1:

- Explored providing median access on the approach legs of the roundabout to allow full access into residential driveways

Alternative 2:

- Replaced the cul-de-sac ending on Claremont Road (existing CSAH 2 / CR 180) with a hammerhead to avoid additional residential property acquisitions and relocations.
- Explored realigning CSAH 43 to the east. This option was ultimately abandoned due to the size of horizontal curve needed on CSAH 43, the relocation of a railroad crossing, and the recommendation of the 2011 Owatonna East Beltline Corridor study to leave CSAH 43 on its existing alignment.

Alternative 3:

- Replaced the cul-de-sac ending on Claremont Road (existing CSAH 2 / CR 180) with a hammerhead to avoid additional residential property acquisitions and relocations.
- Shifted CSAH 2 / CR 180 alignment further north to reduce impacts to residential backyards and septic systems.

Alternative 4:

- Shifted CSAH 2 / CR 180 alignment further east to eliminate impact to construction of future structures on parcel 07-017-3300
- Replaced horizontal curve connecting Claremont Road (existing CSAH 2 / CR 180) to existing CR 171 with two hammerheads to avoid additional residential property acquisitions and relocations.
- Shifted the intersection of CR 171 and CSAH 2 / CR 180 to the south, away from parcel 07-017-2400.
- Explored relocating CSAH 2 / CR 180 up to Havana Road. This option was ultimately abandoned due to the additional length of roadway on Havana Road needed to be widened and paved to meet state aid standards, and due to the large skew of the existing intersection of Havana Road and CR 180 further west.
- Re-evaluated the need for multi-way stop signs at the intersection. It was determined that multi-way stop control could be implemented as a short term, temporary solution to try and reduce the amount of high-speed right-angle crashes at the intersection. It would also function as a

transition for shifting stop control from CSAH 43 to CSAH 2 / CR 180. It was not recommended as a long-term permanent solution to the intersection, as multi-way stop was unwarranted, and did nothing to alleviate the geometric sight distance and decision-making issues the intersection currently faces. See ICE Report in Appendix F for details.

Coordination with CPKC Railroad

CPKC Railroad was asked to review the four alternatives and provide feedback to the design team. A summary of their feedback is provided below:

- The Railroad preferred Alternative 4 out of all the options because it did not require a widening of the railroad crossing to accommodate additional turn lanes and provided the most storage spaces for vehicles when a trail was crossing the tracks.
- Alternative 4 provides the most distance between the intersections and the railroad tracks for construction of a future overpass

A copy of the correspondence with the railroad can be found in Appendix D.

Open House #2

At the second open house, the design team prepared a slideshow discussing an overview of the project, and presented their preferred Alternative, a refined version of Alternative 4. The following is a summary of comments that were received. A list of attendees to the first open house can be found in Appendix D.

- Residential owners whose homes were impacted by the project preferred this alternative because it did not require the acquisition and relocation of their home.
- Residential owners preferred the addition of hammerheads to terminate Claremont Road (existing CSAH 2 / CR 180) and existing CR 171.
- The owner of parcel 07-017-3300 strongly objected to Alternative 4 due to the large impacts to his farmable land.
- The owner of parcel 07-018-2200 understood the safety issues at the intersection, and the need to relocate CSAH 2 / CR 180 to the north was a desirable long-term solution. Even if that meant the realigned roadway would run through his farmland. He requested that the design team explore placing additional horizontal curves along realigned CSAH 2 / CR 180 to shift the roadway to the south and leave a larger chunk of farmable land on his property.
- There was a request to explore shifting CSAH 2 / CR 180 and the intersection with CSAH 43 further north, just south of the property lines of 07-018-2200 and 07-017-3300, to try and mitigate the impacts to farmable land for both properties. WHKS explored this realignment option but ultimately rejected the idea, as the roadbed would sit over an existing floodway and drainage ditch CD 1 and would require a petition to modify or re-route the drainage ditch. Discussions with the Steele County Local Governing Unit determined that this alternative would not be approved for a floodplain permit due to the hardship caused to drainage ditch CD 1. Alternative 4B would also shift the turn lanes for CSAH 43 up into an existing bridge and require the existing structure to be widened. The cost of Alternative 4B would drastically increase due to the additional roadway length required to shift the alignment that far north and was estimated to be \$6,960,000. The minimal additional benefit gained by shifting the roadway is not enough to offset the major floodplain concerns, the additional bridge widening project, and the added project cost.
- It was decided that the relocation of SE 18th Street and CSAH 43 intersection be implemented at a later date to eliminate the need to relocate any property owners as part of the immediate project.

Environmental Impacts

Wetlands

WHKS performed a Level 2 Wetland Delineation to determine the presence and location of wetlands within the boundaries of the proposed alternatives. Level 2 delineations include an on-site assessment to determine the wetland boundaries. The wetland delineation identified seven different wetlands within the project area. Six of the delineated wetlands are anticipated to be regulated under Section 404 of the Clean Water Act (CWA). Five of the delineated wetlands would be regulated under the Minnesota Wetland Conservation Act (WCA). There is also a county drainage ditch within the project limits, County Drainage Ditch #1. This drainage ditch is part of the County Drainage System and is managed by the County Drainage Authority.

As stated in the wetland delineation report, we also recommend that a copy of the report be submitted to the U.S. Army Corps of Engineers, WCA Local Government Unit (LCU) and Minnesota DNR as part of any permit application for impacts to aquatic resources. A table summarizing impacts to delineated wetlands for each alternative is provided below:

A copy of the wetland delineation report can be found in Appendix G.

WETLAND IMPACTS						
Aquatic Resource ID	Area (acres)	Alternative 1 Impacts (acres)	Alternative 2 Impacts (acres)	Alternative 3 Impacts (acres)	Alternative 4 Impacts (acres).	
1	2.00				0.14	
2	0.22				0.16	
3	0.14				0.03	
4	0.34	0.08	0.11	0.13	0.34	
5	0.41				0.15	
6	1.29		0.08	0.27	0.30	
7	1.61				0.18	
TOTAL		0.08	0.19	0.40	1.30	

Table 2 – A summary of Wetland Impacts

Floodplains

Floodplains were identified within the project area using the MN DNR Lake & Flood Elevations Online mapping tool. See the figure below for limits of the floodplain:

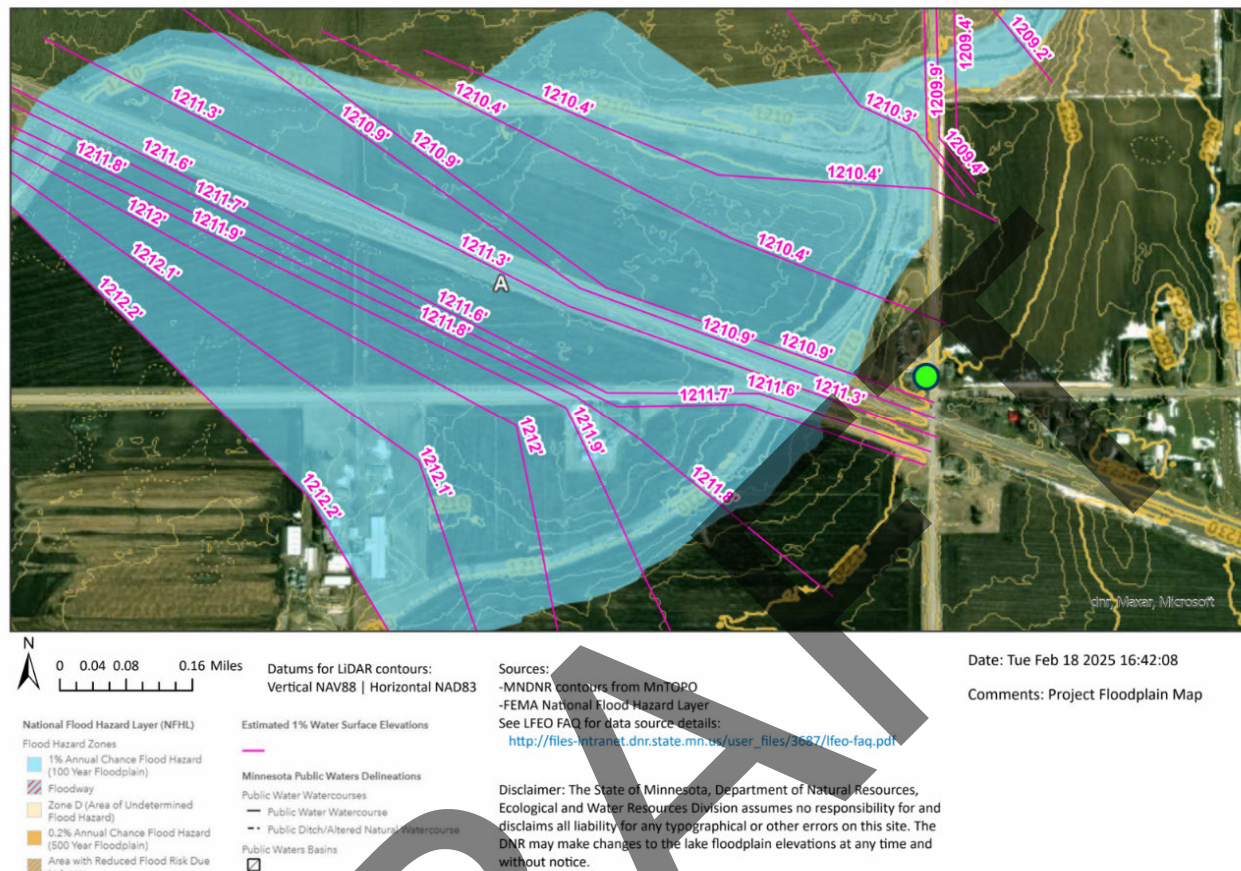


Figure 1 – A map of floodplains within the project area

WHKS held a pre-permit coordination call with Jeff Weiss and Gary Bennett from the MnDNR Floodplains program on 2/13/2025 to discuss potential floodplain impacts from the proposed alternatives. It was noted that the current floodplain map does not appear to account for an area of raised upland located above the 100-year base flood elevations noted in pink in Figure 1 between the two tributaries that form the upstream limits of the area of study. A detailed hydraulic model would need to be completed during final design to update the existing hydraulic model with current LiDAR terrain as well as to delineate the floodway limits along the eastern tributary.

Alternatives 2 and 3 will require a floodplain permit for extension of the existing triple box culvert due to the re-aligned CSAH 2 / CR 180 roadway. Alternative 4 will require a floodplain permit, as the re-aligned CR 180 will run through the floodplain located west of CSAH 43 and will also run through the floodway of the unnamed drainage ditch. The Alternative 4 roadway berm would likely be able to be constructed along the area of upland between the two tributaries as shown in Figure 1. Detailed hydraulic analysis will need to be performed to update the existing hydraulic model with current LiDAR terrain and to delineate the floodway limits, and a “no-rise certification” will need to be documented with the construction of the proposed roadbed and the installation of a new drainage structure along the unnamed drainage ditch.

Environmental Review

Each alternative was compared to the state environmental review requirements listed in the Minnesota Rules Chapter 4410. Table 3 and Table 4 summarize the roadway and wetland project thresholds that would trigger an Environmental Assessment Worksheet (EAW) or an Environmental Impact Statement (EIS):

4410.4300 EAW THRESHOLDS									
Threshold		Threshold Met?							
		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Yes	No	Yes	No	Yes	No	Yes	No
Subp. 22	Construction of road on a new location over one mile in length of two or more lanes, exclusive of auxiliary lanes		X		X		X	X	
	Construction of additional through lanes or passing lanes on an existing road for a length of two or more miles, exclusive of auxiliary lanes		X		X		X		X
	The addition of one or more new interchanges to a completed limited access highway		X		X		X		X
Subp. 27	Projects that will change or diminish the course, current, or cross section of one acre or more of any public water or public waters wetland except for those to be drained without a permit according to Minnesota Statutes, chapter 103G		X		X		X		X
	Projects that will cause an impact to a total of one acre or more of wetlands, regardless of type, excluding public waters wetlands, if any part of the wetland is within a shoreland area, a delineated floodplain, a state or federally designated wild and scenic rivers district, the Minnesota River Project Riverbend area, or the Mississippi headwaters area		X		X		X		X

Table 3 – EAW Threshold Summary

4410.4400 EIS THRESHOLDS									
Threshold		Threshold Met?							
		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
		Yes	No	Yes	No	Yes	No	Yes	No
Subp. 16	Construction of a road on a new location which is four or more lanes in width and two or more miles in length		X		X		X		X
Subp. 20	Projects that will eliminate a public water or public waters wetland		X		X		X		X

Table 4 – EIS Threshold Summary

Based on the thresholds provided, Alternative 4 is the only Alternative that would require preparation of an EAW.

WHKS explored whether this project could be considered exempt from the EAW process. Chapter 4410.4600 subp.14.A states that highway safety improvement projects can be exempt from preparation of an EAW. A “Highway Safety Improvement Project”, according to Chapter 4410.0200 subp.39 is a project designed to improve safety of highway locations that have been identified as hazardous or potentially hazardous. Projects in this category include the removal, relocation, remodeling, or shielding of roadside hazards; installation or replacement of traffic signals; and the geometric correction of identified high accident locations requiring the acquisition of minimal amounts of right-of-way. Alternative 4 requires the acquisition of multiple acres of right of way to construct and would not be considered a minimal amount of right of way. The exemption would not apply.

If the selected alternative is funded using federal funds, it will automatically require the preparation of environmental documentation as described in Chapter 5.1 of the MnDOT State Aid Manual.

Hydraulics

There were four (4) roadway alternative layouts considered for this feasibility study and required drainage structure sizing recommendations. Drainage structures were analyzed using Autodesk 2024 Hydraflow Express or HEC-RAS 6.5 based on recommended drainage structure types. The runoff for the 2-year through 100-year design storms were obtained from StreamStats for unnamed tributary draining under CSAH 2 / CR 180 near Havana, MN. Drainage structure sizing recommendations were based on the minimum overtopping flood frequency outlined in the Minnesota 2024 Drainage Manual Chapter 5.

The recommended drainage structure sizing for each alternative is as followed:

1. Alternative 1:
 - a. No change to Bridge No. 95786 on SE 18th Street as part of this project.
 - b. Extend the concrete box culverts of Bridge No. 96797 on CSAH 2 / CR 180 as needed to meet proposed grading limits.
 - c. Recommended channel shaping and sediment removal per the field investigation site photos of Bridge No. 95786 and Bridge No. 96797. Proper channel shaping should reduce future sediment deposits, but the county should set a maintenance schedule for annual site visits. Sediment deposits removal will restore the culverts to their full design capacity.
2. Alternative 2 & Alternative 3:
 - a. No change to Bridge No. 95786 on SE 18th Street as part of this project.
 - b. Extend the concrete box culverts of Bridge No. 96797 on CSAH 2 / CR 180 as needed to meet proposed grading limits.
 - c. Recommended channel shaping and sediment removal per the field investigation site photos of Bridge No. 95786 and Bridge No. 96797. Proper channel shaping should reduce future sediment deposits, but the county should set a maintenance schedule for annual site visits. Sediment deposits removal will restore the culverts to their full design capacity.
 - d. Install two (2) separate segments of 36”x58.5” reinforced concrete arch pipe or equivalent 48” reinforced concrete pipe for each culvert crossing on CR 171 East.
 - e. Install two (2) separate segments of 30” reinforced concrete pipe for each culvert crossing on CSAH 2 / CR 180 East.

3. Alternative 4:

- a. No change to Bridge No. 95786 on SE 18th Street as part of this project.
- b. Remove concrete box culverts of Bridge No. 96797 on CSAH 2 / CR 180 per the exhibit.
- c. Recommended channel shaping and sediment removal per the field investigation site photos of Bridge No. 95786 and Bridge No. 96797. Proper channel shaping should reduce future sediment deposits, but the county should set a maintenance schedule for annual site visits. Sediment deposits removal will restore the culverts to their full design capacity.
- d. Install double 8'x6' precast concrete box culverts and single 14'x8' precast concrete box culvert OR 70' x 35' concrete slab span bridge. Additional flood plain coordination and HEC-RAS modeling will be needed to establish the floodway, which may result in a longer bridge length than 70'.
- e. Install two (2) separate segments of 36"x58.5" reinforced concrete arch pipe or equivalent 48" reinforced concrete pipe for each culvert crossing on CR 171 East.
- f. Install two (2) separate segments of 30" reinforced concrete pipe for each culvert crossing on CSAH 2 / CR 180 East.

Proposed Alternative Cost Estimates

The estimated project costs for each alternative are shown in below:

	ALTERNATE 1	ALTERNATE 2	ALTERNATE 3	ALTERNATE 4	ALTERNATE 4B
TOTAL COST	\$3,440,000	\$4,710,000	\$4,500,000	\$5,620,000	\$6,960,000

Table 5 – Cost Estimate for proposed intersection improvements

Recommended Alternative

Alternatives were compared based on the conceptual cost of construction, benefit and utilization provided to the public, and feedback received from the Public Information Meetings. A Decision Matrix with the three alternatives was also compiled to visually compare the benefits and costs of each option. The Decision Matrix is in Appendix E.

Alternative 4 was identified as the preferred option because it did not result in the acquisition and relocation of any residential houses, it provided the most space between the railroad tracks, CSAH 2 / CR 180, and 18th Street SE for future improvements to the intersection. It also provides the most room for a future railroad overpass when future traffic demands are met and provides the most space at the intersection of CSAH 2 / CR 180 and CSAH 43 for future upgrades to the intersection. The cost of Alternative 4 was also comparable to the costs of Alternatives 2 and 3 but provided far greater short-term and long-term benefits.

Alternative 4 also does not require any modifications to the existing CPKC railroad crossing.

Grant and Funding Opportunities

State Aid Funds

State Aid Funding is used by counties and cities for reconstruction, construction, and maintenance projects on designated state aid routes. Funds can be spent on a wide variety of roadway and structural items. The amount of funding available each year varies and is determined using a distribution formula that is established by statutes and the respective county and city screening boards.

Local Road Improvement Program (LRIP)

LRIP provides funding to local agencies for construction, reconstruction, and reconditioning projects with regional significance. Funding is split between the TH Corridor Projects Account, Local Road Account for Routes of Regional Significance, and the Rural Road Safety Account. Items eligible for funding include any reasonable elements of roadway construction, and includes many landscaping, fencing, lighting, and other aesthetic items. The Rural Road Safety Account is intended to assist counties on capital improvement projects on CSAH that are intended to reduce traffic crashes, deaths, injuries and property damage.

Turnback Funds

The County received turnback funds from MnDOT as part of the TH 14 realignment project in 2022. These funds are available after a route has been released from the TH system and may be used for road or bridge construction, R/W, Engineering, utility relocation, railroad adjustment and locally furnished materials or labor.

Federal – Highway Safety Improvement Program (HSIP)

This program is part of the Infrastructure Investment and Jobs Act (IIJA) and is intended to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal land. Projects eligible for funding include intersection safety projects, construction and improvement of railway-highway grade crossing safety feature, construction or installation of features, measures and road designs to calm traffic and reduce vehicle speeds, installation or upgrades of traffic control devices for pedestrians and bicyclists, roadway improvements that provide separation between motor vehicles and bicyclists and pedestrian security features design to slow or stop a motor vehicle.

- Estimated \$3.177 billion available for FY 2025 and \$3.246 billion available for FY 2026

Federal – Railway Highway Crossing Program (Section 130)

The Railway Highway Crossing Program is part of the IIJA and provides funding for the elimination of hazards at public railway-highway crossings. Funds are set-aside from the HSIP apportionment, and an annual set-aside of \$245 million scheduled from FY 2022 through FY 2026

Local Option Sales Tax

The County has funds available from an additional local sales tax that could be used for additional funding. This funding source should be considered as a last resort, and other grant and/or funding opportunities should be explored before using this source.