Cliff Road (CSAH 32) Corridor Preliminary Engineering Study

Cliff Road Corridor and Nicollet Ave Alternative Evaluation Report

Report Version 2.0

City of Burnsville, Dakota County

Prepared by:

SRF

June 2024

SRF No. 16643

Table of Contents

Appendices

Appendix A: Cliff Road (CSAH 32) Corridor Preliminary Engineering Traffic Memorandum

Appendix B: Cliff Road Typical Section Memorandum

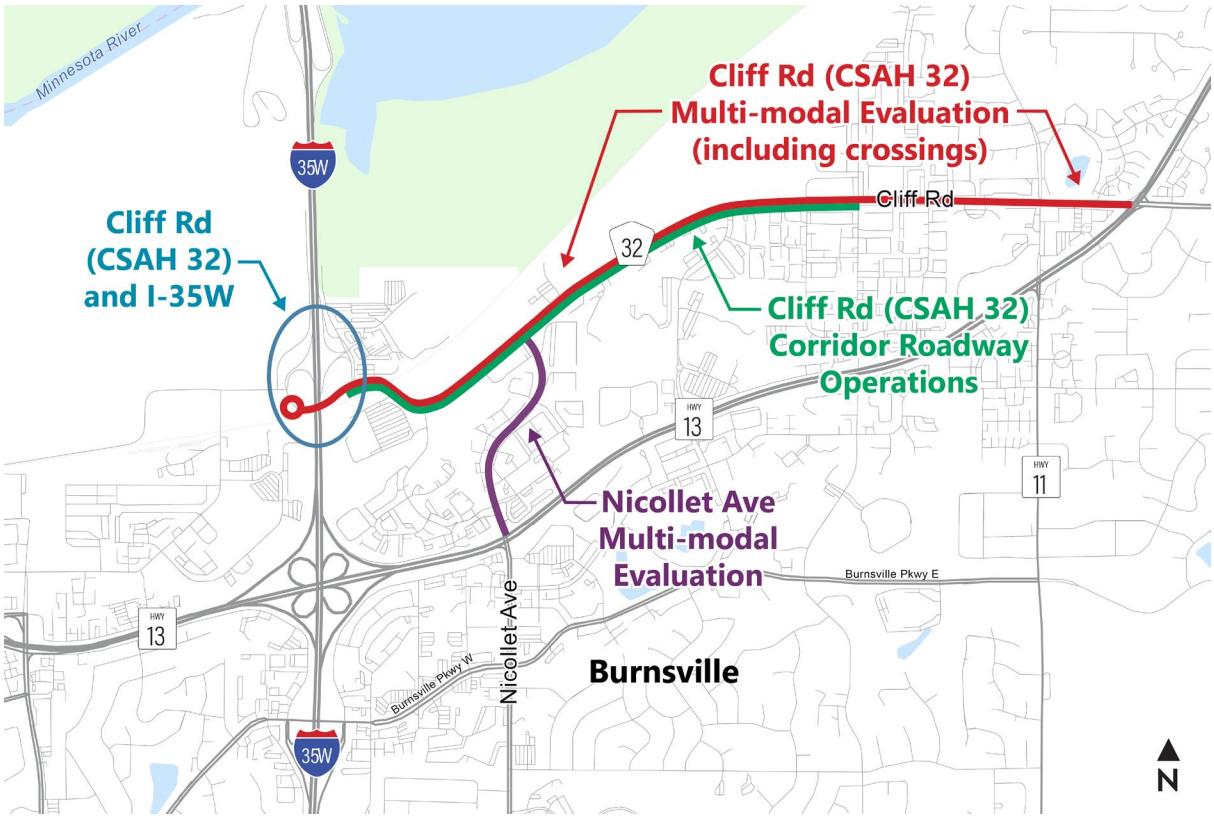
Appendix C: Cliff Road/I-35W Northbound On- and Off-Ramps Alternative Evaluation Report

Appendix D: Cliff Road and Nicollet Avenue – Water Resources Technical Memorandum

Introduction

The City of Burnsville, in partnership with Dakota County conducted a project to explore possible transportation and multimodal improvements to Cliff Road (CSAH 32) from I-35W to Highway 13 and to Nicollet Avenue from Highway 13 to Cliff Road. The project included four study components:

- An analysis and preliminary design for Cliff Road and I-35W. The Minnesota Department of Transportation (MnDOT) is developing plans to resurface I-35W from Cliff Road south to I-35E, and replace bridges at Cliff Road, Highway 13, and Burnsville Parkway. As such, an analysis of Cliff Road under I-35W was conducted to determine a preferred roadway cross section. An analysis and preliminary design on the I-35W northbound on- and off- ramps was also conducted.
- An analysis and preliminary design for Cliff Road from I-35W to 12th Avenue South. A traffic analysis was conducted to review capacity and safety issues on Cliff Road and to develop alternatives of roadway sections, intersection improvements, and access spacing.
- A multimodal evaluation of Cliff Road between I-35W and Highway 13. This evaluation determined infrastructure improvements to accommodate pedestrians and bikers along Cliff Road.
- A multimodal evaluation of Nicollet Avenue between Highway 13 and Cliff Road. This evaluation determined infrastructure improvements to address the incomplete multimodal facilities on Nicollet Avenue.



The purpose of this report is to document the alternative development process for the Cliff Road and Nicollet Ave corridors.

Cliff Road Cross Section at I-35W

Background

MnDOT is currently developing preliminary plans for the I-35W Bridge over Cliff Road (CSAH 32) as part of the I-35W Resurfacing and Bridge Replacement Project (SP 1981-140). The project is planned to be let in the Fall of 2024, with construction beginning in 2025 and continuing into 2026.

MnDOT is currently planning for a three-lane section of Cliff Road with a 13-foot trail on the north side with slope paving under the I-35W bridge (Bridge No. 19911). Dakota County and the City of Burnsville coordinated with MnDOT determine a bridge opening and cross section in the short term that can allow for a future four-lane roadway, including sufficient-width medians/-boulevards and two ten-foot shared-use paths along Cliff Road under I-35W.

Traffic and Operation Analysis

Since 2006, the City of Burnsville has planned to develop the area south of the Minnesota River and west of I-35W, also known as the Minnesota River Quadrant (MRQ). Currently, a majority of the area has heavy industrial businesses, however the city has continually worked with the land owners to develop long range redevelopment and end use plans. This area offers a long-term opportunity for the City to redevelop into a broad mix of residential, business, office, and industrial uses and provide the public riverfront recreational spaces. Cliff Road provides a direct route between the MRQ, I-35W, and the southeast metro. When the MRQ area does develop, Dakota County and the City of Burnsville do not want the overpass of I-35W to become a pinch point for increasing long-term traffic.

More information on traffic analysis for the study is included in the traffic memorandum, attached as Appendix A.

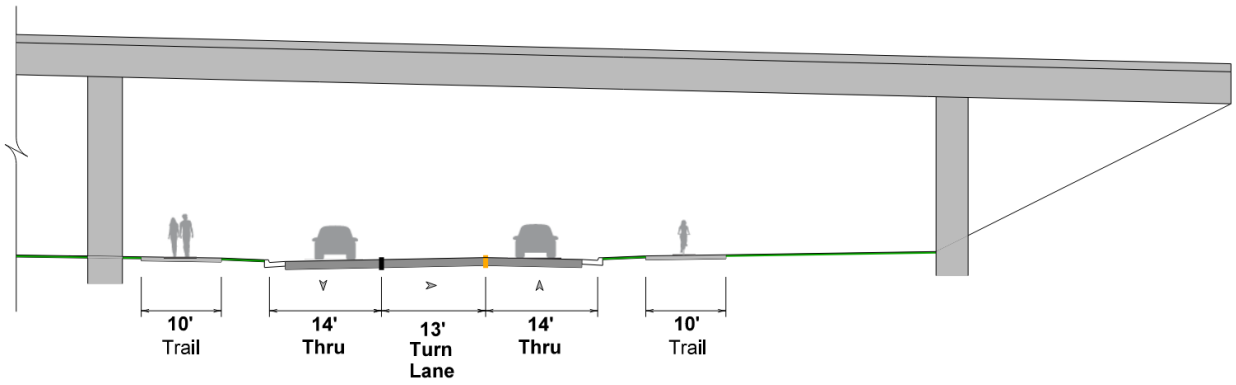
Cliff Road Typical Section Development

A Cliff Road Typical Section Memorandum was provided to MnDOT which presented cross-section dimensions under I-35W considered acceptable to the City of Burnsville and Dakota County. A copy of this memorandum is provided in Appendix B.

The opening to be provided for Cliff Road with the replaced bridge span will be 100 feet based on coordination and written agreements with MnDOT, including local cost participation. Dakota County and the City of Burnsville are supportive of the 100-foot bridge span and the flexibility it will provide for long-term Cliff Road design needs, including possible expansion if needed to four through lanes.

A cross-sectional view of the Cliff Road typical section under I-35W is shown in Figure 1.

Figure 1. Proposed Cliff Road Typical Section Under I-35W



Recommended Roundabout at Cliff Road and the East I-35W Frontage Road

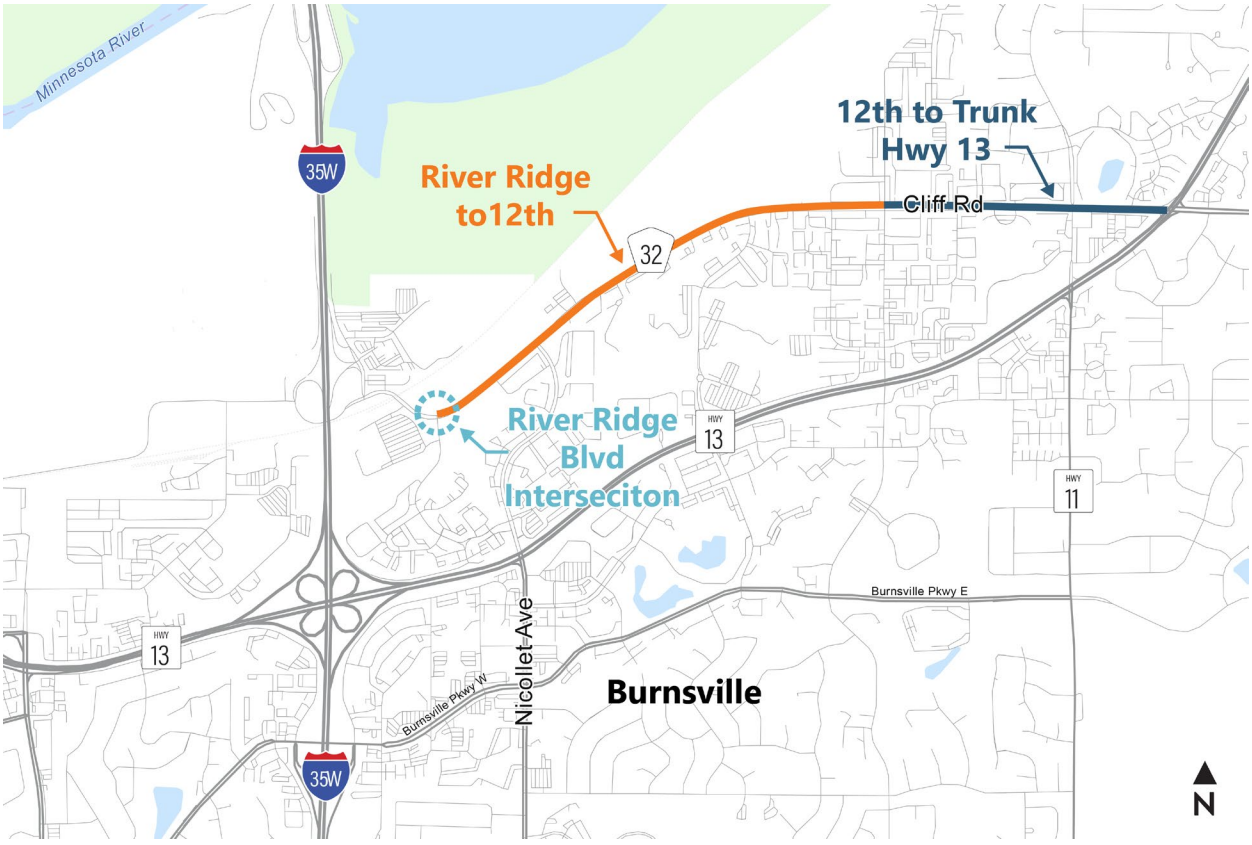
The review of roadway cross section options and design features for Cliff Road under I-35W led to the recommendation to develop a roundabout project at Cliff Road and the East I-35W Frontage Road. This proposed roundabout is anticipated to be the first priority for implementation proceeding east on Cliff Road from I-35W. Dakota County has recently pursued federal funding for the proposed project (2027 construction) and included it in capital improvement plans jointly with the City of Burnsville. See more information about this recommendation in Appendix C, the Cliff Road/I-35W Northbound On- and Off-Ramps Alternative Evaluation Report.

Cliff Road Corridor Analysis and Preliminary Design

Introduction

The Cliff Road corridor analysis was broken up into three segments that were evaluated individually. The first segment was from the railroad crossing to east of River Ridge Blvd, focusing on the intersection at Cliff Road and River Ridge Blvd. The second segment was from the intersection of Cliff Road and Nicollet Ave to 12th Ave S. The third segment was Cliff Road from 12th Ave S to Highway 13. The segments are shown in Figure 2 below.

Figure 2. Cliff Road Corridor Analysis Segments



A corridor traffic study was completed along Cliff Road from I-35W to 12th Ave S. The main objectives of the traffic study were to review the existing operations and safety issues, estimate any future growth, and analyze potential corridor alternatives (Appendix A). A multimodal evaluation was also conducted along the Cliff Road corridor. The evaluation analyzed existing trail gaps and pedestrian crossings, and reviewed Dakota County and the City of Burnsville's pedestrian/bicycle network plans. A study of water resource components related to existing conditions and future improvements was conducted. More information on the water resource components is available in Appendix D.

Geometric alternatives were developed for Cliff Road corridor segments one and two using results of the traffic study and multimodal evaluation. These alternatives were evaluated against a set of criteria. The evaluation matrix included the following criteria: vehicle operations, vehicle safety, pedestrian/bicycle safety, drainage, utility impacts, environmental impacts, pedestrian/bicycle connectivity, use of existing infrastructure/drainage structures, right-of-way impacts, and cost. Only one geometric alternative was presented for segment three, as the focus of the eastern-most segment was solely on connecting existing trails with no change to the roadway approaching Highway 13.

Cliff Road and River Ridge Blvd Intersection

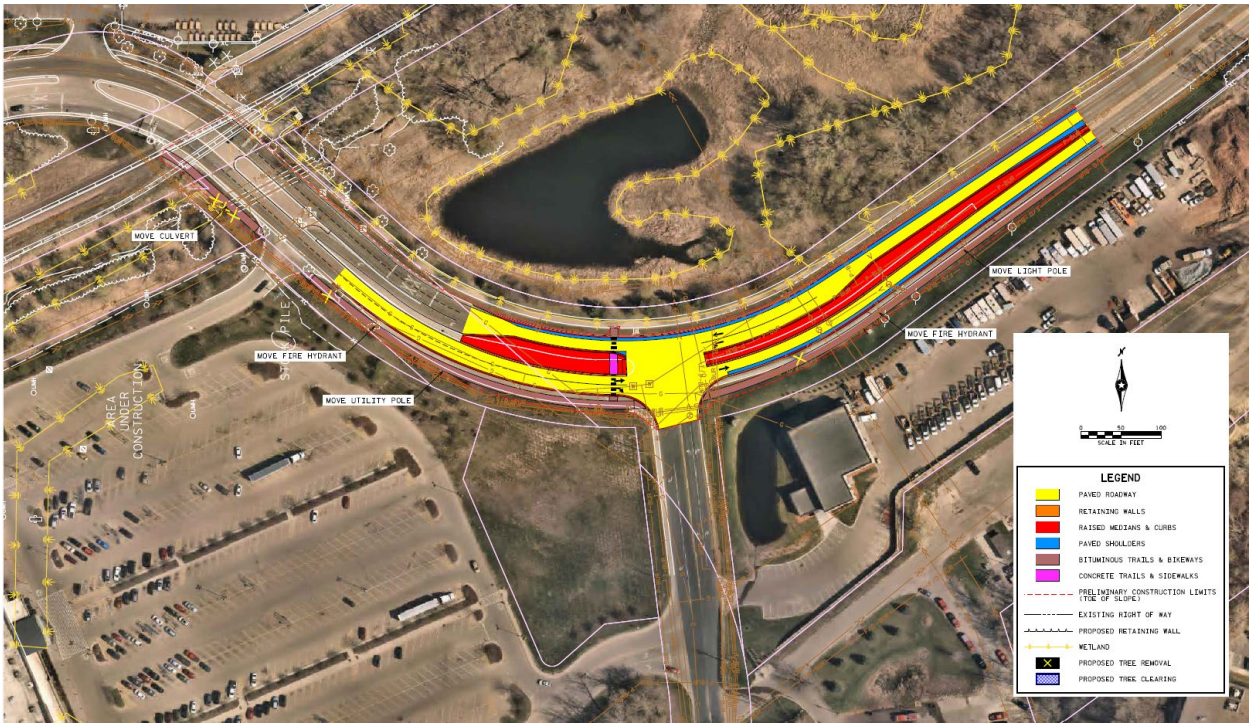
The intersection of Cliff Rd and River Ridge Blvd was evaluated as a unique study area. The area consists of Cliff Road east of the railroad crossing past the T-intersection of River Ridge Blvd. Cliff Road is a 4-lane divided roadway and includes a westbound left turn lane and eastbound right turn lane. River Ridge Blvd is stop controlled with dedicated left and right turn lanes. An unmarked pedestrian crossing is on the west side of River Ridge Blvd connecting the sidewalk on the west side of River Ridge Blvd and the trail on the north side of Cliff Road.

Alternative Development and Evaluation

Two potential alternatives were presented for the intersection - a roundabout and an improved 3-way intersection. Both alternatives looked to tie into the existing western median and lanes to maintain queuing space at the railroad crossing. A pedestrian crossing was implemented in each alternative as well to connect the existing sidewalk on River Ridge Blvd to the existing trail to the north.

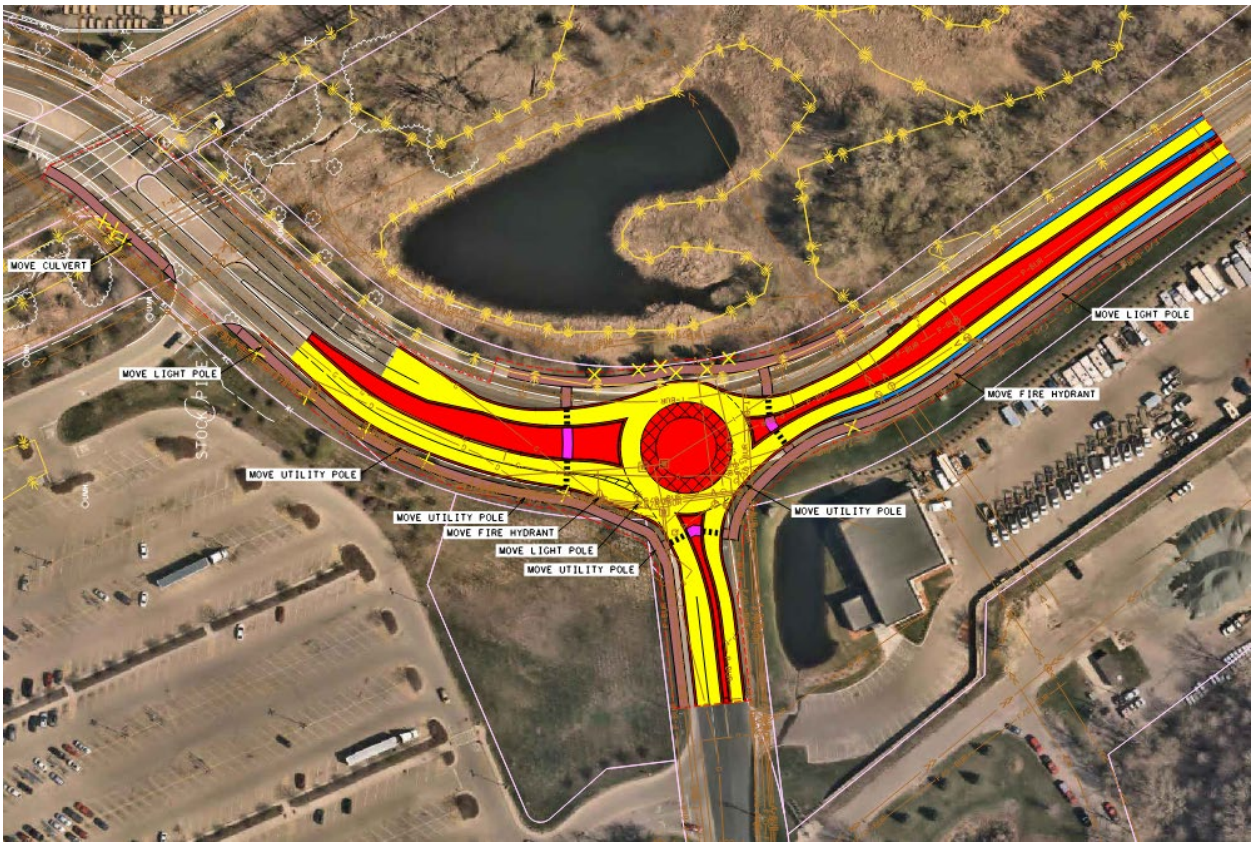
The improved 3-way intersection consisted of bringing the southern curb line north to provide only one thru lane and one right turn lane in the eastbound direction. A single thru lane and a left turn lane is provided for the westbound direction. The turn lanes are maintained on River Ridge Blvd. The improved 3-way intersection alternative is shown in Figure 3.

Figure 3. River Ridge Blvd 3-Way Intersection Alternative



The roundabout alternative presented a single lane roundabout with a right turn lane going eastbound to southbound on River Ridge Blvd. The concrete splitter island medians are tied into existing medians to the west. The roundabout alternative is shown in Figure 4.

Figure 4. River Ridge Blvd Roundabout Alternative



Traffic Analysis

The traffic analysis for the intersection indicated the current level of service (LOS) of A for all areas except for the River Ridge Blvd left turn which has a LOS of B during PM hours. The forecasted 2045 LOS for the roundabout is the same as the existing. If the area was converted to a 3-lane section the Cliff Rd portion of the intersection would have a LOS of A and the River Ridge Blvd section would have a LOS of B in the AM and C in the PM. It is expected that this intersection would run at a LOS of A with the construction of a roundabout with the 2045 predicted capacity.

A crash analysis was also conducted at the intersection and the crash rate was over the average crash rate. The severity rate at this intersection is over the average and the critical rate. This could be due to this intersection having a serious injury type crash. The implementation of a roundabout at this intersection is expected to increase the safety of the intersection.

Multimodal Evaluation

Both alternatives for the River Ridge Blvd segment included the construction of a 10' trail on the south side of Cliff Rd while maintaining the existing 10' trail on the north side of Cliff Rd. The segment was evaluated and crossing points for each alternative were implemented into the geometry. Two crossings were presented in the intersection option: one east/west crossing over southbound River Ridge and one North/South crossing on the west side of the River Ridge and Cliff Rd intersection. The north/south crossing is split by a concrete median, creating a pedestrian refuge. The roundabout alternatives contained 3 crossings, one at each leg of the roundabout. Concrete median islands were present at all crossing points to split the crossing distances. All crossings were designed to be ADA compliant, including driveway and side road crossings. Both options connect the trail to the existing sidewalk running south on River Ridge Blvd.

Decision Matrix Results

Each River Ridge Blvd and Cliff Road intersection alternative was evaluated against a set of criteria. These criteria include vehicle operations and safety, pedestrian safety and connectivity, drainage, utility and environmental impacts, and right of way impacts, and cost. The purpose of the evaluation is to determine the viable alternatives for this intersection. Table 1 provides a summary of the alternative evaluation for the River Ridge Blvd and Cliff Road intersection.

Table 1. River Ridge Blvd Intersection Evaluation

Evaluation Criteria	River Ridge Blvd 3-Way Intersection	River Ridge Blvd Roundabout
Vehicle Operations	Acceptable, minimal delay	Acceptable, minimal delay
Vehicle Safety	No change	Eliminates angle crashes
Pedestrian and Bicycle Safety	Improved	Improved
Drainage – New Impervious	Reconstructed thresholds exceeded	New impervious and reconstructed impervious thresholds exceeded
Utility Impacts	Some utility impacts	Many utility impacts
Environmental Impacts	Minimal tree impacts, minor wetland impacts	Some tree impacts, wetland impact
Pedestrian and Bicycle Connectivity	Implement trail through the River Ridge intersection	Implement trail through the River Ridge intersection
Use of Existing Infrastructure and Drainage Structures	Tie into existing curb line with some exceptions	Tie into existing curb line with some exceptions
Right of Way Impacts	No anticipated impacts	Some ROW impacts and needs
Cost	Low cost	Medium cost

Next Steps

The evaluation of the alternatives for the Cliff Road and River Ridge Blvd intersection determined both alternatives could be viable alternatives to improve this intersection. When the corridor is planned to be reconstructed an Intersection Control Evaluation (ICE) should be conducted to identify the most appropriate intersection control type.

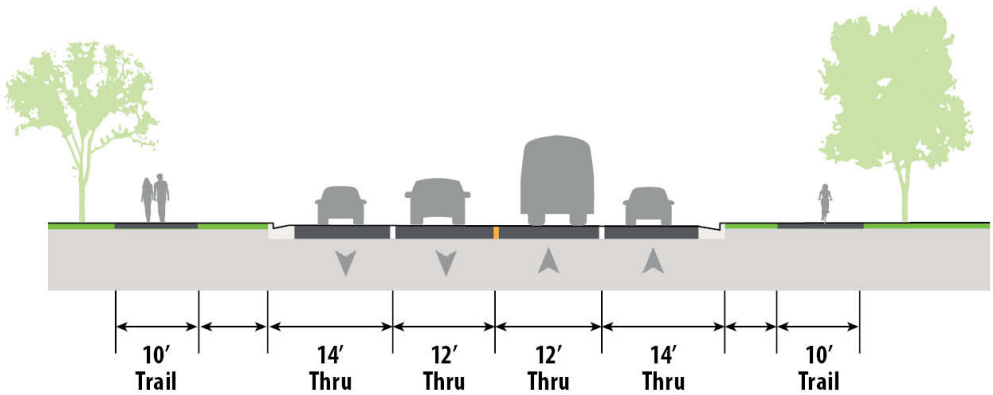
Cliff Road: River Ridge Blvd to 12th Ave S

The second segment of Cliff Road starts at the Nicollet Ave intersection to the western edge of the 12th Ave S intersection. The existing roadway cross section of Cliff Road within this study segment is predominately 4 lanes. The westbound direction has left turn lanes at Nicollet Ave and Riverwood Drive while the eastbound direction has a right turn lane at Nicollet Ave and a left turn lane at 12th Ave S. A 700-foot-long painted median is located near the Cliff Fen Park entrances just east of Nicollet Ave. There are 19 business accesses along Cliff Road within this segment. A 10' bituminous trail runs along the north side of Cliff Road and there is an unmarked pedestrian crossing on the west side of the Nicollet Ave intersection.

Alternative Development and Evaluation

Three geometric alternatives were developed for this segment. The geometrics of the alternatives were guided by the desire to not impact the existing north trail and make efficient use of the existing right of way and infrastructure. The first alternative includes construction of a 10' trail on the south side of Cliff Road and maintains the existing curblines and lane configurations. A typical section of this alternative is shown in Figure 5.

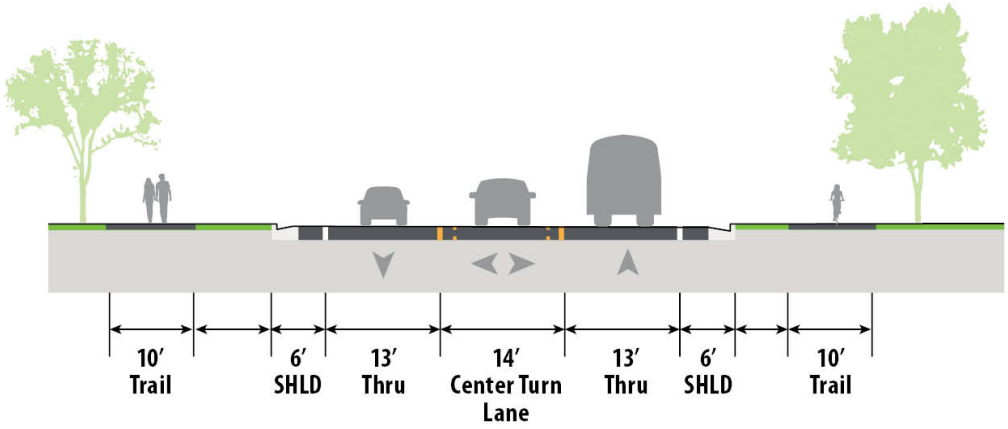
Figure 5. Cliff Road Alternative 1



The second alternative constructs a 10' trail on the south side of Cliff Road and maintains the existing curb lines but restripes the road to a 3-lane roadway section with 6' outside shoulders. This alternative also included eastbound right turn lanes at Nicollet Ave and Portland Ave with raised

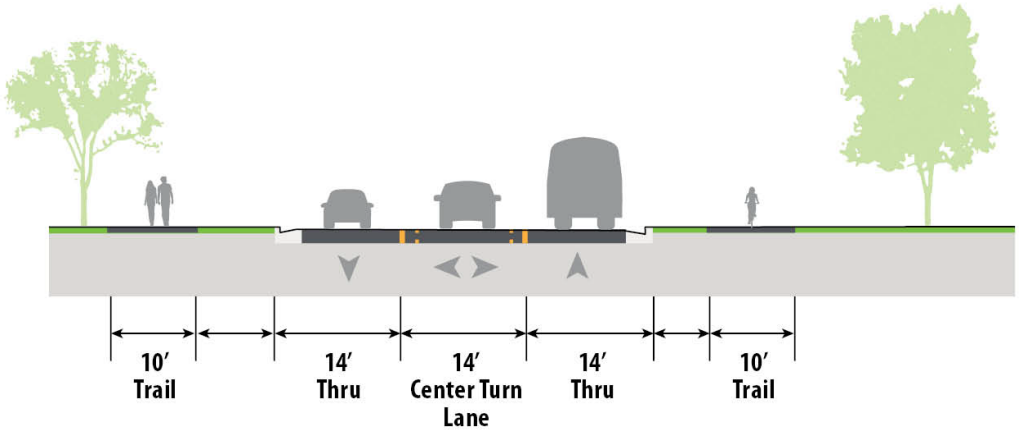
concrete medians on both sides of the Cliff Rd and Nicollet Ave intersection. A typical section of this alternative is shown in Figure 6.

Figure 6. Cliff Road Alternative 2



The third alternative originally maintained the north curbline and brought the south curbline in to create a 3-lane roadway section with 4' outside shoulders and included construction of a 10' trail on the south side of Cliff Road. This alternative was changed to move the south curbline to match with the existing storm sewer trunk lines. This changed the geometry to 2' shoulders on the eastern side of the section and raised concrete medians on both sides of the Cliff Rd and Nicollet Ave intersection. A typical section of this alternative is shown in Figure 7.

Figure 7. Cliff Road Alternative 3



Consolidation of business access along this segment of Cliff Road was evaluated and determined the existing site conditions do not allow for access consolidation. Additionally, no crash data shows any safety concerns for closures.

Traffic Analysis

Operationally, Cliff Road and the various intersections within the study segment are at LOS B or better. Forecasted traffic volumes for this segment of Cliff Road are expected to be 12,300 to 14,250 vehicles per day in year 2045. A corridor capacity review (Appendix A) indicated this segment of Cliff Road would fall into the "Probably Feasible" category described in *FWHA's Road Diet Informational Guide*, meaning a conversion to a 3-lane roadway section could be feasible. Projected LOS for a 3-lane section are not expected to create any operational issues. Riverwood Drive would have a LOS of C in the AM, all other intersections would run at A or B. The maximum vehicles per day in 2045 is below the maximum of 17,000 for a 3-lane roadway set in the Dakota County Transportation Plan.

The crash analysis showed that the current conditions of the various Cliff Road intersections within this study segment are below the average and critical levels for both crash rates and severity levels. A 3-lane roadway in this segment is expected to reduce the amount of rear end, side swipe, and angle-crash probability.

Multimodal Evaluation

Cliff Road is considered a Tier 2 Alignment for Met Council's Regional Bicycle Transportation Network. There is an existing 10' trail on the north side of Cliff Road from I-35W to 12th Ave S. The City of Burnsville and Dakota County include a trail on the south side of Cliff Road as part of their pedestrian/bicycle network plans. This is consistent with Dakota County's policy of including multi-use trails along both sides of County roadways where practicable. Additionally, there are no marked pedestrian crossings within this study segment of Cliff Road.

All three alternatives present the addition of a 10' trial on the south side of Cliff Road. Multiple crossing locations along this segment were evaluated using Dakota County's crossing guidance. Based on observed needs and destinations, the Cliff Fen Park crossing location was deemed to be the best investment, also considering typical section alternatives, traffic volumes, and speeds. All three cross section alternatives therefore include a marked crossing in between the driveways at the Cliff Fen Park. While each crossing varied in size and shape all three alternatives proposed a concrete median island to provide a pedestrian refuge and reduce the total crossing distance. The study determined that reduced speed limits, construction of concrete median islands and lane reduction would help make the crossing safer.

Decision Matrix Results

The three geometric alternatives for this segment of Cliff Road were evaluated against the set of criteria that was presented in the previous section. The purpose of the evaluation is to determine a preferred alternative for this segment of Cliff Road. Table 2 provides a summary of the alternative evaluation for Cliff Road from east of River Ridge Blvd to west of 12th Ave S.

Table 2. Cliff Road Geometric Alternative Evaluation

Evaluation Criteria	Alternative 1 – Construct South Trail Only	Alternative 2 – Construct South Trail and Convert to 3-Lane Roadway Section with Shoulders	Alternative 3 – Construct South Trail and Convert to 3-lane Roadway Section without Shoulders
Vehicle Operations	Operates the same as existing, acceptably	Operates the same as existing, acceptably	Operates the same as existing, acceptably
Vehicle Safety	No change	Improved safety, reduced sideswipe, rear end, and angle crashes likeliness	Improved safety, reduced sideswipe, rear end, and angle crashes likeliness
Pedestrian and Bicycle Safety	Crossing four lane road with median island at crossing location	Crossing two lane road with median island at crossing location	Shorter crossing of two lane road with median island with new southern curb line
Drainage – New Impervious	New impervious and reconstructed impervious thresholds exceeded	New impervious and reconstructed impervious thresholds exceeded	New impervious and reconstructed impervious thresholds exceeded
Utility Impacts	Some utility impacts	Some utility impacts	Minimal utility impacts
Environmental Impacts	Minimal tree impacts, minor wetland impacts, right of way needs from 6 hazardous waste generators	Minimal tree impacts, minor wetland impacts, right of way needs from 6 hazardous waste generators	Minimal tree impacts, minor wetland impacts, right of way needs from 2 hazardous waste generators
Pedestrian and Bicycle Connectivity	Implement trail on south side of Cliff Road	Implement trail on south side of Cliff Road	Implement trail on south side of Cliff Road
Use of Existing Infrastructure and Drainage Structures	Uses existing infrastructure and drainage structures	Uses existing infrastructure and drainage structures	Change road width to match existing drainage trunk line
Right of Way Impacts	Potential impacts	Potential impacts	No anticipated impacts
Cost	Low cost	Medium cost	High cost

Recommended Alternatives

The evaluation of the alternatives for Cliff Road determined the alternatives that reduce Cliff Road to a 3-lane road section, alternatives 2 and 3, should move forward for further evaluation. Each of those alternatives improves vehicle and pedestrian safety all while utilizing existing right of way and infrastructure.

Next Steps

Dakota County will review scheduled pavement rehabilitation plans for Cliff Road and determine if the road diet construction of either Alternative 2 or 3 could coincide. Further discussion about lane configurations and access will be done at a later date. In addition, discussions on speed limit reduction with the potential road diet should take place. With the potential geometric and lane modifications along the corridor, there is an opportunity to design for slower vehicular speeds. This

decision and subsequent potential speed reductions will assist in the decision making process for treatment types for pedestrian crossing improvements.

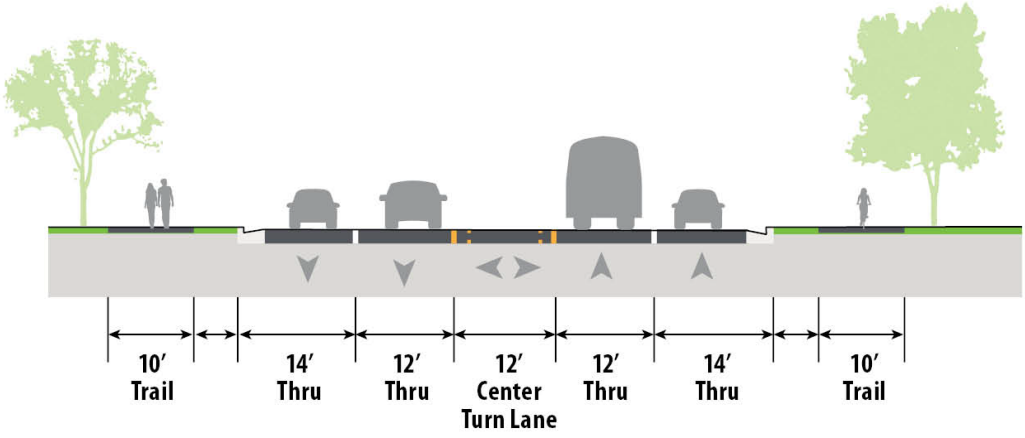
Cliff Road: 12th Ave S to Highway 13

The third segment of Cliff Road focused on filling trail gaps, trail continuity, and pedestrian crossing enhancements along Cliff Road from 12th Ave S to Highway 13. The north side of Cliff Road has an existing 5' sidewalk at various points in this segment while the south side of Cliff Road has a trail from 12th Ave S to Highway 13.

Alternative Development and Evaluation

This segment looked to keep the existing roadway geometrics and connect the trails from 12th Ave S to the to the trail on the west side of southbound Highway 13. The proposed geometrics includes constructing a 10' trail at trail gaps along the north side of Cliff Road and to replace the existing sidewalk with a 10' trail. A 5-to-6-foot boulevard was included from the existing north curb line except at the east end of the segment where no boulevard was used to limit impacts to a property on the north side. A typical section of this alternative is shown in Figure 8.

Figure 8. Cliff Road East of 12th Ave



This segment of Cliff Road also includes improvements at the 12th Ave S signalized intersection. Feedback from the public and a geometric design check determined the corner radii is restrictive to trucks in the area. Truck aprons were designed to allow better truck movements through the intersection. The improvements require reconstruction of the pedestrian ramps and curbs and relocation or replacement of the existing signal poles.

Multimodal Evaluation

This segment of Cliff Road is also within the Tier 2 Alignment for Met Council's Regional Bicycle Transportation Network. The existing signalized intersections at 12th Ave S, W River Hills Dr, and Highway 13 have ADA compliant crossings.

During coordination with the Minnesota Valley Transit Authority (MVTA) it was noted that the orange link service had a routing change at the end of 2023 where it runs along Cliff Road from Walmart/River Ridge Blvd to Highway 13. This service has seen an increase in ridership in the early stages of its availability. Bus stop cutouts were mentioned as a potential option at the intersection of Cliff Road and River Hills Dr. It was noted that extra right of way was available in the SE and NE quadrants of the intersection and could improve the feasibility of implementing cutouts in the area. The needs for such bus-stop features and possible design details should be confirmed in more advanced preliminary design.

Evaluation Results

Implementation of a north side trail requires new right of way and impacts existing private and public utilities. However, a trail would bring Cliff Road one step closer to addressing the Regional Bicycle Network needs.

Next Steps

Further discussions on the needs and impacts of implementing a trail along the north side of Cliff Road in this eastern-most segment will be required. The County and City will need prioritized improvements all along Cliff Road; and this segment could be addressed as a roadway project on Cliff Road or as a stand-alone trail project.

Nicollet Ave Analysis and Preliminary Design

Introduction

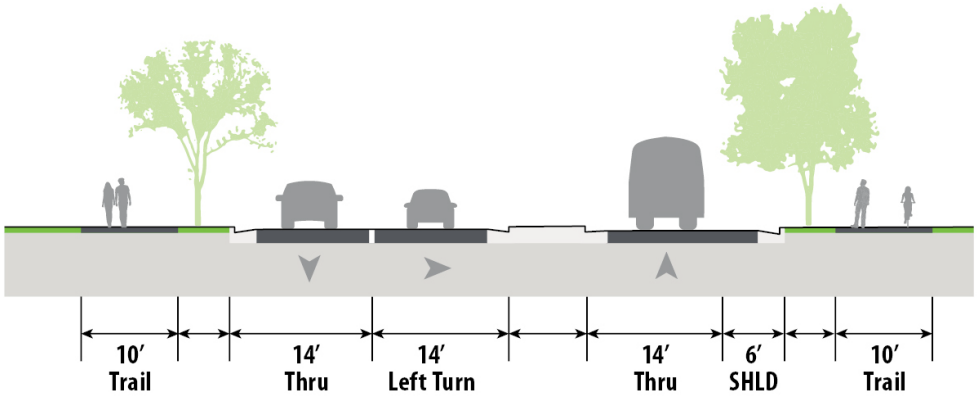
A future interchange project at the intersection of Nicollet Ave and Highway 13 is expected to improve safety for vehicles, pedestrians, and bicycles. However, this project stops at the intersection just north of Highway 13. Nicollet Ave north of this stopping point has some incomplete multimodal facilities. The Nicollet Ave analysis was conducted on this segment of Nicollet Ave to continue improving safety of vehicles and pedestrians. Geometric alternatives were developed based on collected background data and guidance. Each alternative was evaluated by a set of criteria. The evaluation included the following criteria: vehicle operations, vehicle safety, pedestrian and bicycle safety, drainage, utility impacts, environmental impacts, pedestrian and bicycle connectivity, interchange connectivity, use of existing infrastructure/drainage structures, right-of-way impacts, and cost.

Alternative Development and Evaluation

Nicollet Ave from Highway 13 to Cliff Road is a four-lane divided minor arterial roadway that predominately serves business complexes. A 5' sidewalk runs along the west side of Nicollet Ave through the entirety of the study segment.

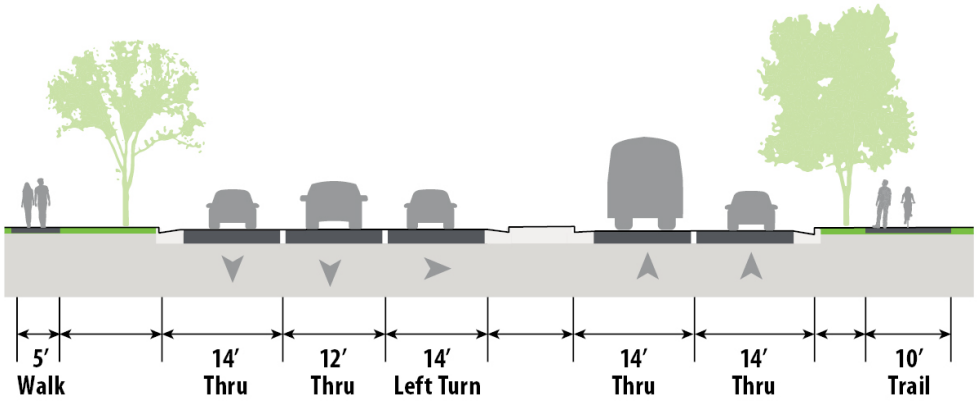
Four original alternatives were presented for this segment of Nicollet Ave with the addition of a fifth alternative after review of the original four. The first alternative moves the curb lines in to create a 3-lane roadway section. The existing raised medians are maintained leaving the middle lane as alternating left turn lanes. Each direction has 14' lanes and 6' shoulders. A 6' boulevard and a 10' trail is included on each side of the road. A typical section of this alternative is shown in Figure 9.

Figure 9. Nicollet Ave Alternative 1



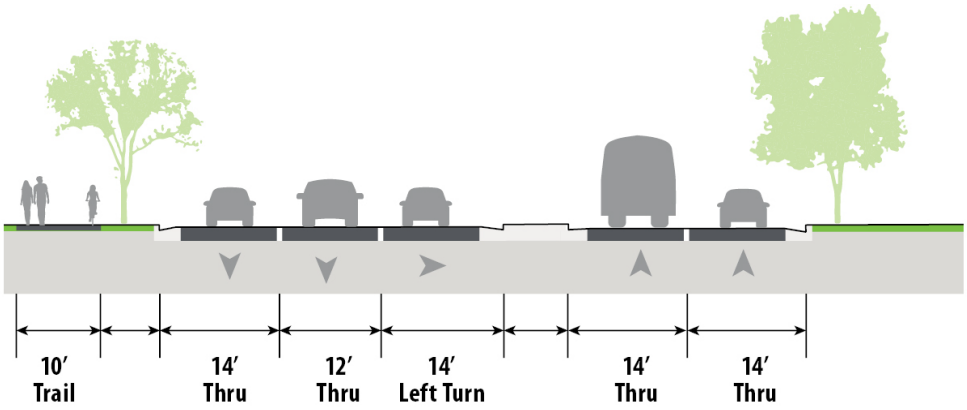
The second alternative includes construction of a 10' trail with a 6' boulevard on the east side of the road and maintains the existing curblines and lane configurations. A typical section of this alternative is shown in Figure 10.

Figure 10. Nicollet Ave Alternative 2



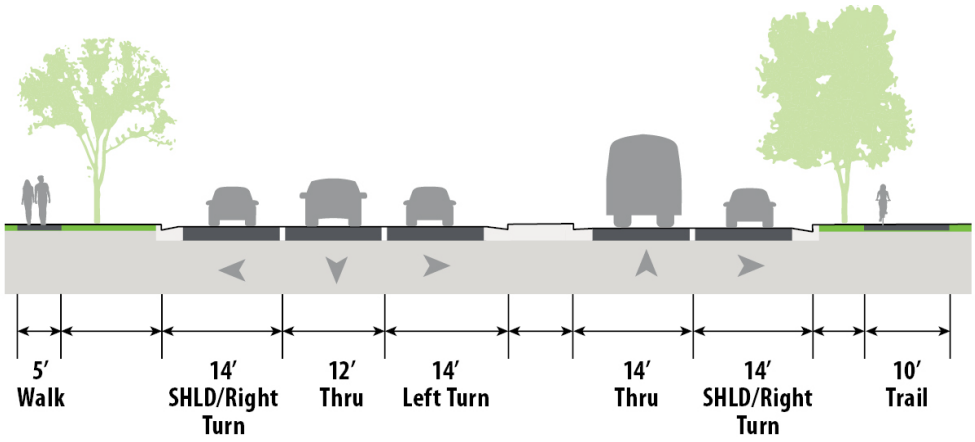
The third alternative removes the 5' sidewalk on the west side of Nicollet Ave and constructs a 10' trail in its place. The outside edge of the proposed trail matches the outside edge of the existing walk. This alternative maintains the existing curblines and lane configurations. Figure 11 shows the typical section of this alternative.

Figure 11. Nicollet Ave Alternative 3



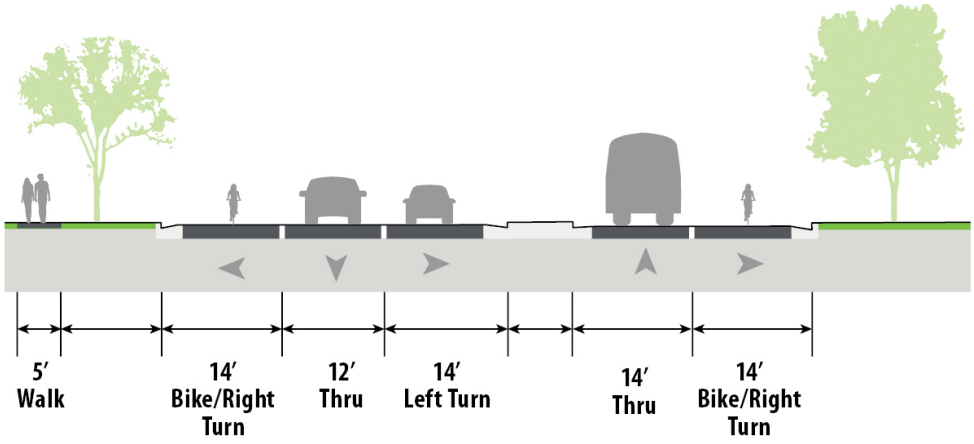
The fourth Nicollet Ave alternative includes restriping the road to a 3-lane section with 14' shoulders/right turns in place of an outside lane for both sides. This alternative also includes a 10' trail on the east side of the road with a 6' boulevard. Figure 12 shows a typical section of this alternative.

Figure 12. Nicollet Ave Alternative 4



The fifth alternative includes restriping the existing section to create on-street bike lanes and right turn lanes in place of the outside lanes. A typical section of this alternative is shown in Figure 13.

Figure 13. Nicollet Ave Alternative 5



Multimodal Evaluation

Nicollet Ave is a Tier 1 alignment of the Met Council Regional Bicycle Transportation Network. Nicollet Ave serves as a connection to regional activity centers including the Minnesota Valley Transit Authority Burnsville Transit Station, the Metro Transit Orange Line Station, Burnsville's Heart of the City, the Black Dog Trail, and the Minnesota River Greenway.

An analysis was done to look at the potential addition of a crossing point along Nicollet Ave in between Highway 13 and Cliff Road. The crossing was only proposed for alternatives one, two, and four due to their addition of a trail on the east side of Nicollet Ave. If there is no lane reduction in the segment, there should be discussion of additional infrastructure being required to increase safety. If the segment is converted to a 2-lane section a marked crosswalk and additional warning signage would be sufficient. Reducing the speed through the segment would further increase safety if feasible with design-speed changes.

Decision Matrix Results

The five geometric alternatives for Nicollet Ave were evaluated against the set of criteria presented in the report section above. The purpose of the evaluation is to determine a preferred alternative for this segment of Nicollet Ave. Table 3 provides a summary of the alternative evaluation for Nicollet Ave from Highway 13 to Cliff Road.

Table 3. Nicollet Ave Alternative Evaluation

Evaluation Criteria	Nicollet Ave Alternative 1	Nicollet Ave Alternative 2	Nicollet Ave Alternative 3	Nicollet Ave Alternative 4	Nicollet Ave Alternative 5
Vehicle Operations	Minimal change	No change	No change	Minimal change	Minimal change
Vehicle Safety	Reduces sideswipe	No change	No change	Reduces sideswipe	Reduces sideswipe
Pedestrian and Bicycle Safety	Improved	Improved	No new crossings	Improved	No new crossings
Drainage – New Impervious	New impervious and reconstructed impervious thresholds exceeded	New impervious and reconstructed impervious thresholds exceeded	Reconstructed thresholds exceeded	New impervious and reconstructed impervious thresholds exceeded	Reconstructed thresholds exceeded
Utility Impacts	Some utility impacts	Some utility impacts	Some utility impacts	Some utility impacts	Minimal utility impacts
Environmental Impacts	Minimal tree impacts	Some tree impacts	Minimal tree impacts	Some tree impacts	No tree impacts
Pedestrian and Bicycle Connectivity	Implement trail on both sides of Nicollet	Implement trail on east side of Nicollet Ave	Implement trail on west side of Nicollet	Implement trail on east side of Nicollet Ave	No off street trail
Interchange Connectivity	Ties to proposed interchange project	Ties to proposed interchange project	Ties to proposed interchange project	Ties to proposed interchange project	Ties to proposed interchange project
Use of Existing Infrastructure and Drainage Structures	Does not use existing curblines	Uses existing infrastructure and drainage structures	Uses existing infrastructure and drainage structures	Uses existing infrastructure and drainage structures	Uses existing infrastructure and drainage structures
Right of Way Impacts	Potential temporary impacts	New right of way needs	Some right of way impacts	New right of way needs	No new right of way
Cost	High cost	Medium cost	Low cost	Medium cost	Low cost

Recommended Alternative

The evaluation of the Nicollet Ave alternatives determined that Alternative 1 is the preferred, viable alternative. This alternative improves vehicle and pedestrian safety/mobility and addresses the Regional Bicycle Transportation Network needs all while maximizing the existing right of way.

Next Steps

Once the construction of the interchange of Nicollet Ave and Highway 13 is complete further design development and evaluation of Nicollet Ave Alternative 1 is expected to be conducted at that time.

Appendix A

Cliff Road (CSAH 32) Corridor Preliminary Engineering Traffic Memorandum

Memorandum

SRF No. 16643

To: Logan Vlasaty, PE, Assistant City Engineer, City of Burnsville
Doug Abere, PE, Senior Project Manager, Dakota County

From: Tom Sachi, PE, Project Manager
Eric Wurst, EIT, Engineer I

Date: June 7, 2024

Subject: Cliff Road (CSAH 32) Corridor Preliminary Engineering; Burnsville, Minnesota

Introduction

As requested, SRF has completed a corridor traffic study along Cliff Road (CSAH 32) from I-35W to 12th Avenue in the City of Burnsville, MN (see Figure 1). The main objectives of the study are to review the existing operations and safety within the study area, estimate any future growth, and analyze potential corridor alternatives that best accommodate pedestrians, bicycles, and vehicles. The following information provides the assumptions, analysis, and recommendations offered for consideration.

Existing Conditions

Existing conditions were reviewed to establish a baseline to identify any future impacts associated with projected growth in the City of Burnsville. The evaluation of existing conditions includes a review of traffic volumes, roadway characteristics, crash analysis, and an intersection capacity analysis, which are summarized in the following sections.

Data Collection

Weekday vehicular turning movement and pedestrian/bicyclist counts were collected by SRF during the week of June 5th, 2023. Ten (10) total study locations were collected. The following four (4) locations were counted for 24 hours:

- Cliff Road/River Ridge Boulevard
- Cliff Road/Nicollet Avenue
- Cliff Road/Portland Avenue
- Cliff Road/Riverwood Drive

The following six (6) locations were counted for 20 hours and used in conjunction with previous counts completed in March 2023:

- Cliff Road/I-35W Southbound Ramps
- Cliff Road/Cliff Frontage Road
- Cliff Road Frontage Rd/I-35W Northbound Ramps
- Cliff Road/Cliff Fen Park West Access
- Cliff Road/Cliff Fen Park East Access
- Cliff Road/12th Avenue

SRF

02416643
June 2024

Project Location

Cliff Road Traffic Study
City of Burnsville

Figure 1

Roadway Characteristics

A field assessment was completed to identify various roadway characteristics within the transportation system study area, such as functional classification, general configuration, and posted speed limit. A summary of these roadway characteristics is shown in Table 1. Note that these are general characteristics and that there are some deviations within the area or segments of the roadways.

Table 1. Existing Roadway Characteristics

Roadway	Functional Classification (1)	General Configuration	Posted Speed Limit (mph)
Cliff Road	A Minor Reliever	4-lane divided/4-lane undivided (2)	30/50/45 mph (3)
Cliff Frontage Road	Local Road	5-lane divided	Unposted
River Ridge Boulevard	Minor Collector	2-lane undivided	30
Nicollet Avenue	A Minor Reliever	4-lane divided	35
Portland Avenue	Minor Collector	2-lane undivided	35
Riverwood Drive	Local Road	2-lane undivided	30
12th Avenue	Minor Collector	4-lane undivided	35

(1) Functional Classification based on the *City of Burnsville 2040 Comprehensive Plan.*
(2) Cliff Road is a 4-lane divided roadway that transitions to a 4-lane undivided roadway approximately 1200 feet east of Nicollet Avenue.
(3) The speed limit on Cliff Road changes from 30 mph to 50 mph approximately 875 feet west of Nicollet Avenue and changes from 50 mph to 45 mph east of Portland Avenue.

Speed data was collected over 48 hours along Cliff Road at two (2) locations near Nicollet Avenue and Portland Avenue. These locations were chosen to find the travel speed of both passenger cars and trucks along the corridor and determine if there is any speed reduction on the large uphill segment in the eastbound direction between Nicollet Avenue and Portland Avenue. Based on the collected data, there is only a one (1) to two (2) mph drop in speed for cars and trucks for both the average and 85th percentile speeds as seen in Table 2. Note the speed limit along this segment is 50 mph.

Table 2. Speed Radar Data

Speed Radar Location	85th Percentile Eastbound Speed	Average Eastbound Speed	85th Percentile Speed Eastbound Heavy Vehicles	50th Percentile Speed Eastbound Heavy Vehicles
Cliff Road (East of Nicollet Avenue)	54 mph	46 mph	52 mph	44 mph
Cliff Road (East of Portland Avenue)	53 mph	46 mph	50 mph	43 mph

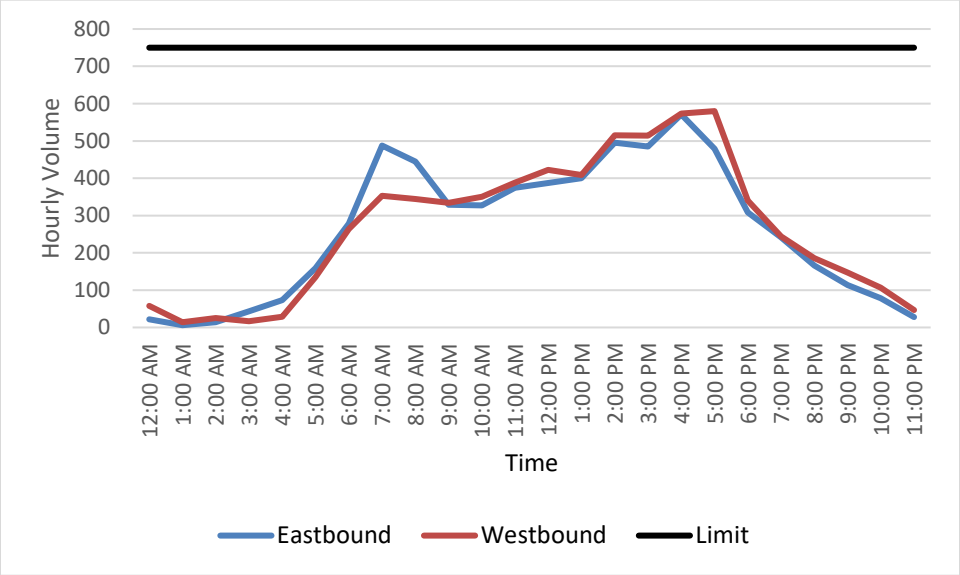
Based on the minimal drop in travel speeds, it is unlikely a truck climbing lane will be needed in the eastbound direction, as vehicles are able to maintain their speeds in this segment between Nicollet Avenue and Portland Avenue. Note, additional speed information by direction is shown in Figure 2A.

From a traffic control perspective, the Cliff Road/I-35W Southbound Ramps intersection is a roundabout, the Cliff Road/12th Avenue intersection is signalized, while the remaining study intersections are unsignalized with side-street stop control. Existing geometrics, traffic controls, and traffic volumes in the study area are shown in Figure 2B.

Traffic Volume Analysis

A review of the eastbound and westbound traffic along Cliff Road was completed to understand the volume of vehicles traveling per hour on the roadway on a typical weekday. Intersection turning movement counts along Cliff Road at Nicollet Avenue were utilized to develop hourly traffic volume profiles and shown in Chart 1. Based on this data, traffic volumes peak between 7:00 and 8:00 a.m. and 4:00 and 5:00 p.m., while other hours of the day are lower than the p.m. peak period. Hourly traffic volumes are generally 600 vehicles or less in each direction. Note, the average daily traffic (ADT) volume along Cliff Road ranges from 11,000 to 12,700 vehicles per day (vpd). This volume is well below the 18,000 vpd limit for a 3-lane roadway. Based on the turning movement counts, heavy vehicles make up around four (4) percent of the traffic on Cliff Road. This is a result of the surrounding area consisting of commercial and industrial land uses.

Chart 1: Hourly Traffic Volumes on Cliff Road east of Nicollet Avenue



SRF

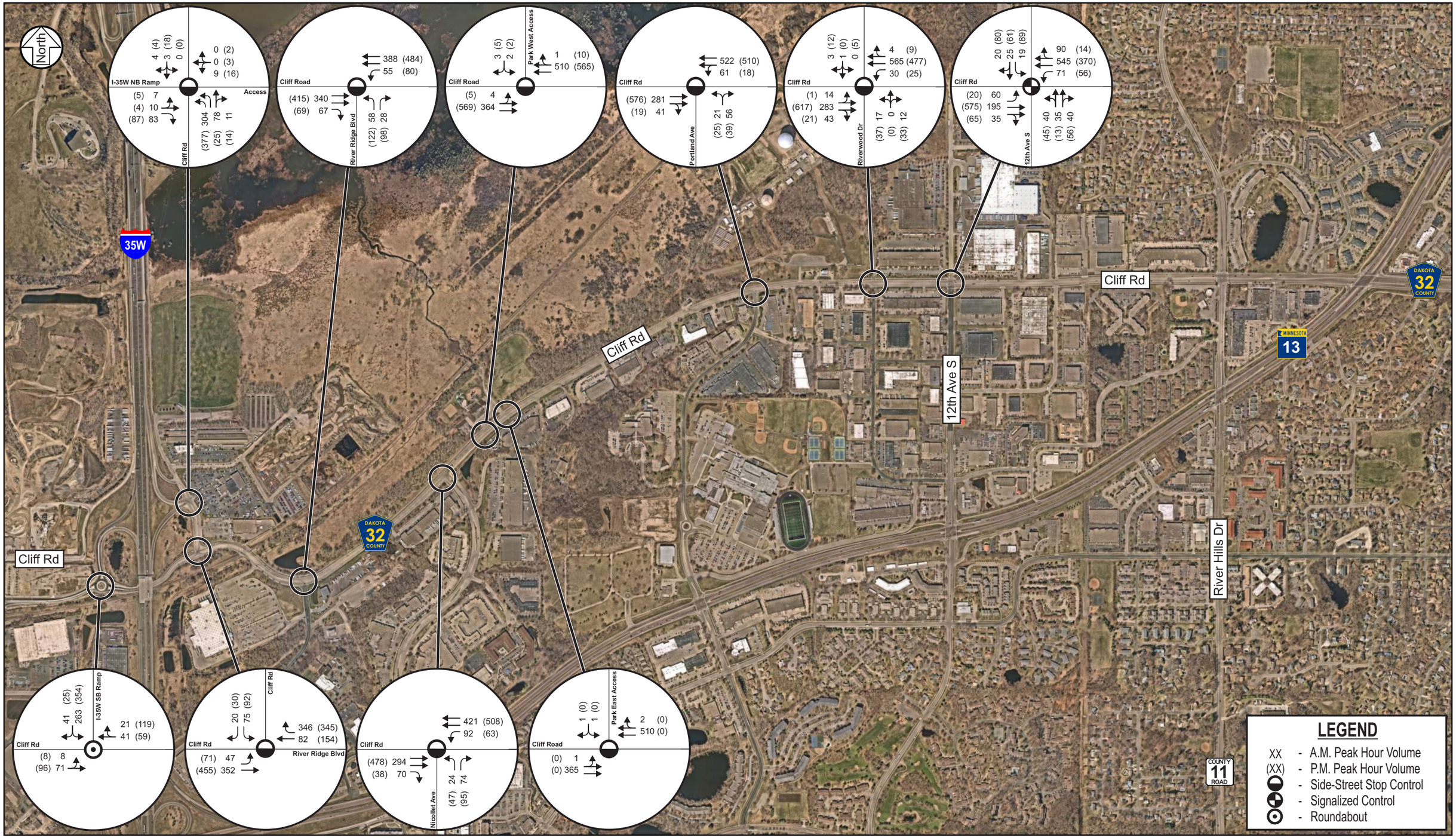
Existing Speed Data

Cliff Road Traffic Study

City of Burnsville

Figure 2A

02416643
June 2024



SRF

Existing Conditions

Cliff Road Traffic Study

City of Burnsville

02416643
June 2024

Figure 2B

A planning-level review of the Cliff Road corridor capacity was completed based on existing traffic volumes to understand if a lane reduction (i.e. road diet) from four lanes to three lanes is feasible. This analysis leveraged guidance from *FHWA's Road Diet Informational Guide*, which looks at the feasibility of reduced lane conditions from a capacity perspective based on the hourly directional traffic volumes. The guide states the following:

- "Probably Feasible" at or below 750 vehicles per hour per direction (vphpd)
- "Consider Cautiously" between 750 and 875 vphpd
- "Feasibility Less Likely" above 875 vphpd

The hourly traffic volume profiles for Cliff Road was reviewed relative to the thresholds from the FHWA guidance, which are illustrated above in Chart 1. Although this is a planning-level review, this approach helps understand how many hours per day each alternative may be over and/or near capacity. Results of the corridor capacity review indicate that Cliff Road study corridor falls in the "Probably Feasible" categories.

Crash Analysis

A review of historical crashes was performed at the study intersections based on the most recent five-years (2018 to 2023) of reported crashes using MnDOTs Crash Mapping Analysis Tool (MnCMAT). Based on this data, there were a total of 43 crashes reported over the analysis period at the study area intersections. Segment crashes along Cliff Road from Cliff Frontage Road to 12th Avenue South within the same time period were also reviewed using MnCMAT. There was a total of 38 segment crashes reported within the study area during the analysis period. A summary of the crash types by intersection and segment is shown in Table 3. Note that left turn and angle crashes make up 58 percent of intersection crashes in the study area. In particular, crashes at the intersections with Cliff Frontage Road, River Ridge Boulevard, and Nicollet Avenue are primarily angle/left turn type crashes.

In addition to reviewing the specific crash types that occurred within the study area, overall intersection and segment crash and severity rates were calculated. The overall intersection and segment crash and severity rates were compared to average rates for intersections and segments with similar characteristics. The average crash and severity rates published by MnDOT (2020 Intersection/Section Green Sheets) were used for comparison purposes. A higher-than-average rate does not necessarily indicate a significant crash problem. Therefore, the critical rates were calculated to determine the statistical significance of the above average rates. If the actual rates are below the critical rates, crashes that occurred are typically due to the random nature of crashes and not necessarily a geometric design or traffic control issue.

Table 3. Crash Summary (2018-2023)

Intersection	Ped/ Bike	Single Veh	Left Turn/ Angle	Head On	Rear End	Side Swipe	Other	Total
Cliff Frontage Road / I-35W Ramps	-	-	-	-	1	1	-	2
Cliff Road / Cliff Frontage Road	-	-	11	-	1	2	-	14
Cliff Road / River Ridge Boulevard	-	-	5	-	2	1	1	9
Cliff Road / Nicollet Avenue	-	-	5	-	1	-	-	6
Cliff Road / Portland Avenue	-	1	1	-	2	1	1	5
Cliff Road / 12th Avenue	-	1	3	-	2	1	1	7
Cliff Road Segment								
Frontage Road to Nicollet Avenue	1	7	-	-	-	4	1	13
Nicollet Avenue to 12th Avenue S	-	7	3	1	4	8	2	25
Total	1	16	28	1	13	18	6	81

Results of the crash and severity rate analysis, shown in Table 4, indicate that the Cliff Road/Cliff Road Frontage Road intersection and the Cliff Road segment from Nicollet Avenue to 12th Avenue South are above the critical crash rate, indicating that there is a statistically significant crash problem at the two locations. Note, this segment was below the critical severity rate threshold but did experience a Serious Injury type crash. This crash was a single vehicle crash at night where both alcohol and snow on the roadway were contributing factors. The Cliff Road and River Ridge Boulevard intersection is at the critical crash rate threshold and over the critical severity rate. There was a Serious Injury type crash at the Cliff Road and River Ridge Boulevard intersection. This crash was an angle crash which occurred due to a vehicle failing to yield the right of way.

Given that these rates are above critical rates, it is recommended that mitigations be considered. These mitigations can include geometric or traffic control changes. At the Cliff Road and Cliff Frontage Road intersection, it is recommended that a single lane roundabout be considered. Roundabouts have the potential to eliminate angle and left turn type crashes at an intersection. Additionally, this control type would mirror the roundabout on the west side of the I-35W bridge over Cliff Road. For the Cliff Road segment from Nicollet Avenue to 12th Avenue South, it is recommended that a four-to-three lane conversion be completed, which would allow for one lane of traffic each direction and a center left-turn lane. A number of the crash that occurred were due to vehicles stopping to turn into an access from Cliff Road. This includes a mix of sideswipe, rear end, and left-turn crashes. Adding a two-way left-turn lane will help to reduce these types of crashes from occurring by allowing turning vehicles to enter their own turn lane. Additionally, if desired, access reductions could occur that eliminates the ability to make these turns. Further discussion of the traffic forecasts and roadway design will be discussed later in this report.

At the Cliff Road and River Ridge Boulevard intersection, a roundabout could be considered to mitigate the crash issues at the intersection. There is further discussion necessary regarding the ultimate roadway geometry needs and design aspects. However, preliminary review indicates a single lane roundabout could be considered at this location. A roundabout would be expected to reduce or eliminate angle type crashes, along with slowing travel speeds.

Table 4. Crash and Severity Rate Analysis

Intersection	Crash Rate			Severity Rate		
	Average	Actual	Critical	Average	Actual	Critical
Cliff Frontage Road and I-35W Ramps	0.128	0.193	0.460	0.311	0.000	7.370
Cliff Road and Cliff Frontage Road	0.128	0.471	0.310	0.311	0.000	3.310
Cliff Road and River Ridge Boulevard	0.128	0.319	0.320	0.311	3.542	3.430
Cliff Road / Nicollet Avenue	0.128	0.217	0.320	0.311	0.000	3.470
Cliff Road / Portland Avenue	0.128	0.181	0.320	0.311	0.000	3.480
Cliff Road / 12th Avenue	0.508	0.197	0.830	0.690	0.000	3.880
Segment						
Frontage Road to Nicollet Avenue	0.507	0.956	1.040	0.766	0.000	7.480
Nicollet Avenue to 12th Avenue S	0.507	0.963	0.890	0.766	3.851	4.890

Intersection Capacity Analysis

An intersection capacity analysis was completed using Synchro/SimTraffic software to establish a baseline condition to which future traffic operations could be compared. Capacity analysis results identify a Level of Service (LOS) which indicates how well an intersection is operating. Intersections are graded from LOS A through LOS F. The LOS results are based on average delay per vehicle, which correspond to the delay threshold values shown in Table 5. LOS A indicates the best traffic operation, while LOS F indicates an intersection where demand exceeds capacity. Overall intersection LOS A though LOS D is generally considered acceptable based on MnDOT guidelines.

Table 5. Level of Service Criteria for Signalized and Unsignalized Intersections

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection Average Delay/Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

For side-street stop/yield-controlled intersections, special emphasis is given to providing an estimate for the level of service of the side-street approach. Traffic operations at an unsignalized intersection with side-street stop/yield control can be described in two ways. First, consideration is given to the overall intersection level of service. This takes into account the total number of vehicles entering the intersection and the capability of the intersection to support these volumes.

Second, it is important to consider the delay on the minor approach. Since the mainline does not have to stop, the majority of delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience high-levels of delay (i.e. poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during peak hour conditions.

Results of the existing capacity analysis, shown in Table 6, indicate that all study intersections currently operate at an acceptable overall LOS B or better during the a.m. and p.m. peak hours, with the existing geometric layout and traffic controls. No significant side-street stop delays were identified. The 95th percentile queue for the northbound left turn lane at the Cliff Road and River Ridge Boulevard intersection reaches 100 feet in the p.m. peak period. Additionally, the Cliff Road and 12th Avenue S intersection has 95th percentile queues up to 145 feet in the westbound approach in the a.m. peak period and queues up to 115 feet in the southbound and eastbound approaches in the p.m. peak period. All other study intersections have 95th percentile queues under 100 feet for all approaches. Based on the operational analysis, there is significant excess capacity available along the corridor.

Table 6. Existing Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Cliff Road/I-35W SB Ramps (1)	A	3 sec.	A	4 sec.
Cliff Road/I-35W NB Ramp (2)	A/A	10 sec.	A/A	8 sec.
Cliff Road/Cliff Frontage Road (2)	A/A	9 sec.	A/B	12 sec.
Cliff Road/River Ridge Boulevard (2)	A/A	9 sec.	A/B	13 sec.
Cliff Road/Nicollet Avenue (2)	A/A	5 sec.	A/A	9 sec.
Cliff Road/Cliff Fen Park West Access (2)	A/A	6 sec.	A/A	7 sec.
Cliff Road/Cliff Fen Park East Access (2)	A/A	8 sec.	A/A	7 sec.
Cliff Road/Portland Avenue (2)	A/A	6 sec.	A/A	9 sec.
Cliff Road/Riverwood Drive (2)	A/A	8 sec.	A/A	9 sec.
Cliff Road/12th Avenue S (3)	B	13 sec.	B	11 sec.

(1) Indicates a roundabout, where the overall LOS and delay is shown.

(2) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.

(3) Indicates a signalized intersection, where the overall LOS and delay is shown.

Access Management

The Dakota County Access Guidelines from the *Dakota County 2040 Transportation Plan* were reviewed for Cliff Road from Cliff Frontage Road to 12th Avenue South. Based on the guidelines, full movement intersections for the segment of Cliff Frontage Road to Nicollet Avenue should be placed every one-quarter mile, and partial movement intersections every one-eighth mile. For the segment of Nicollet Avenue to 12th Avenue South, full movement intersections should be placed every one-quarter mile. The current access density of Cliff Frontage Road to Nicollet Avenue segment is approximately 8.25 accesses per mile, while the access density from Nicollet Avenue to 12th Avenue South is approximately 22 accesses per mile. Based on these access densities, Cliff Road within the study area does not meet the Dakota County Access Guidelines. Note that the Walmart Access along Cliff Road is a partial access intersection, however, this access location does not meet the one-eighth mile access spacing guideline.

As further development of the corridor design is completed, consideration of access restrictions could be implemented. This may help reduce crashes along the corridor, in conjunction with a four-to-three lane conversion and implementation of a center left-turn lane. Note, that if access restrictions are implemented via medians, there is potential for additional U-turns along Cliff Road. Upon initial review, the segment of Cliff Road from Cliff Frontage Road to Nicollet Avenue could accommodate a median with minimal impacts to businesses, including even reducing the current three-quart access to a right-in/right-out. However, the segment of Cliff Road from Nicollet Avenue to 12th Avenue would likely have significant business impacts, in particular to heavy vehicle movements. This segment is likely best suited for a three-lane roadway segment.

There are a few opportunities to reduce access in this area, in particular with several driveways along the south side of Cliff Road near 12th Avenue. Discussion with area businesses should be completed to understand circulation patterns on site and if accesses may be able to be closed. Any reduction in access would likely improve vehicular safety and operations, along with providing a safer and more comfortable experience for pedestrians and bicyclists.

Traffic Forecasts

To account for general background growth in the area, a review of the Dakota County Travel Demand model results was completed. Based on the Travel Demand Model, there was an estimated growth of 0.3 percent between 2020 to 2040 for locations along Cliff Road. Additionally, the City of Burnsville noted that little to no development is expected along the corridor, as it currently built up with minimal locations for new development. Therefore, an annual growth rate of one-half (0.5) percent is assumed in the study area. Note, based on the existing 11,000 to 12,700 vehicles per day (vpd) along Cliff Road, it is expected that there will be a forecasted traffic volume of 12,300 to 14,250 vpd in year 2045. This leaves an excess capacity of 3,750 vpd for a three-lane roadway based on the capacity of 18,000 vpd for a three-lane roadway from the Dakota County Transportation Plan.

Year 2045 Conditions

Cliff Road and Cliff Frontage Road/North Ramps Area

A preliminary review was completed along Cliff Road under the I-35W Bridge and at the Cliff Road/Cliff Frontage Road and Cliff Frontage Road/North I-35W Ramps intersections to understand the interchange configuration and if modifications should be made, regardless of the future layout of Cliff Road. With upcoming construction projects to I-35W, a review of the roadway width under the I-35W bridge and intersection configuration was needed to understand if changes to the construction plans were necessary. Using the forecasted traffic volume information previously discussed, it was estimated that the year 2045 volumes along Cliff Road underneath I-35W would be between 12,300 and 14,500, which fits within the three-lane design section. Note, the newly constructed roundabout on the west side of I-35W is currently a single lane roundabout, which would work with a three-lane section.

Various intersection and design alternatives were reviewed by the City, County, and MnDOT and it was determined that a single lane roundabout be recommended for construction at the Cliff Road and Cliff Frontage Road intersection. This configuration would match the western side of the interchange and would allow for acceptable operations and have a significant reduction in crashes as compared to the existing intersection layout. At the Cliff Frontage Road and I-35 Northbound Ramps intersection, the current free-right turn from northbound I-35W off ramp to Cliff Road was recommended to be removed in an effort to reduce pavement and it is expected to have minimal impact on operations. Additionally, the northbound left-turn from the Cliff Frontage Road to I-35W on-ramp was recommended to be reduced to a single northbound left-turn. The improvements are shown in the Appendix.

Note, while a three-lane section was recommended for the current and 20 year forecasted traffic volumes, the actual right-of-way width is designed to allow for additional lanes, if necessary. The Minnesota River Quadrant (MRQ) redevelopment opportunity in the northwest quadrant of the I-35W and Cliff Road interchange may have a significant impact on traffic volumes in the future. Given than the MRQ redevelopment of this area is expected to be more than 20 years in the future, reliable forecasting and land use planning efforts are not able to be completed at this time.

While accurate forecasts cannot be development, allowing for additional lanes protects the investment of the I-35W bridge over Cliff Road by allowing for roadway expansion, if necessary, without reconstructing the bridge. Future review of the intersection operations for the proposed modifications is shown in later sections of the report.

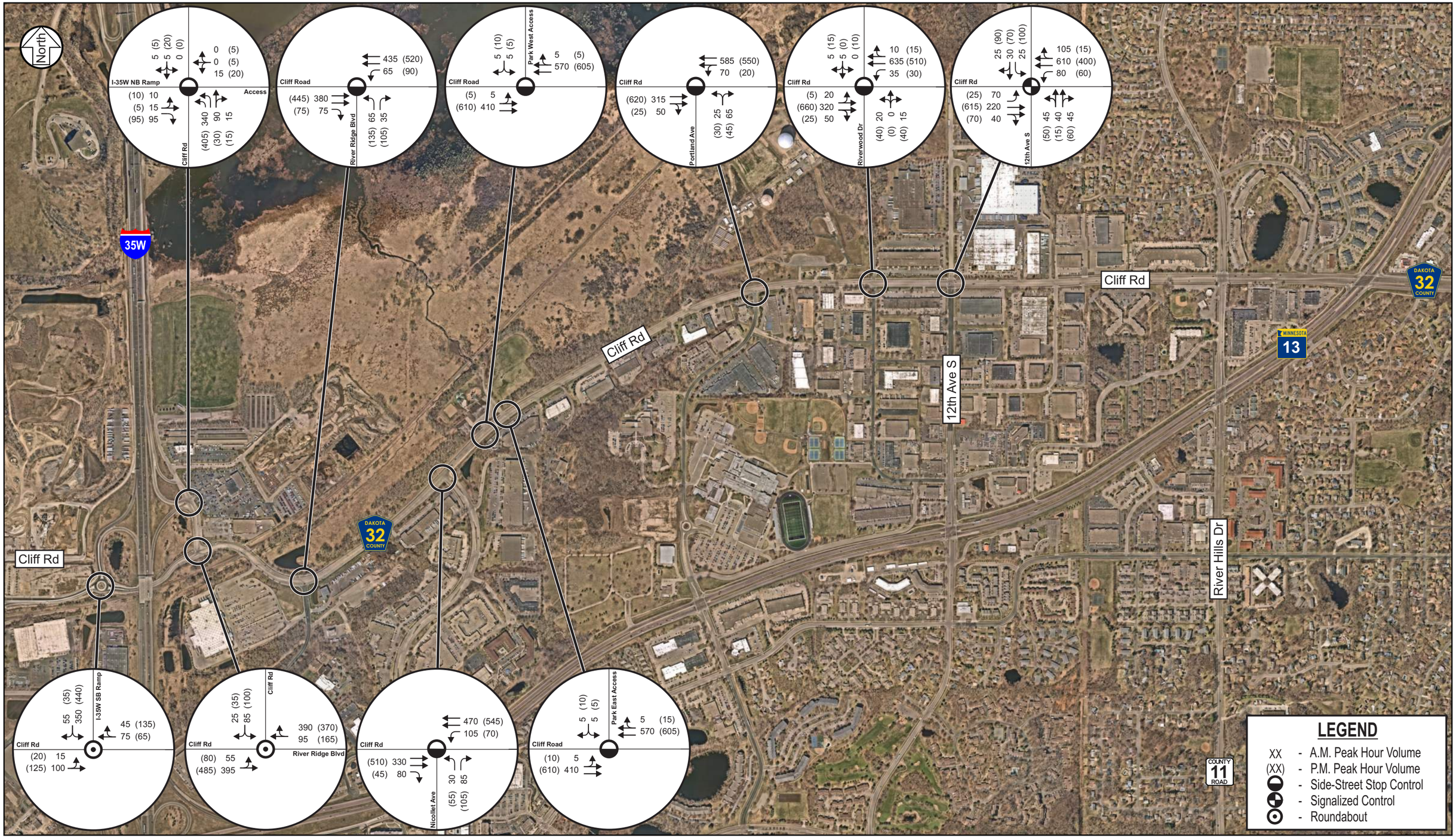
Corridor Operations

Future year 2045 conditions were reviewed to understand how the corridor is expected to operate in the future. Two (2) future scenarios were analyzed for the corridor under year 2045 conditions. Included is both a no build scenario and a scenario with Cliff Road in a modified three-lane configuration, which can be seen in the Appendix.

Note, both scenarios assume the construction of a single lane roundabout at the Cliff Road and Cliff Frontage Road intersection east of I-35W. The year 2045 traffic forecasts, which include general area background growth, are shown in Figure 3. Note, as previously noted, the future year traffic forecasts do not include any development related to the MRQ as that development is expected outside of the 20 year timeframe of this analysis.

Cliff Road No Build Configuration Scenario

To determine how the study intersections would operate under year 2045 conditions with Cliff Road maintaining a four-lane configuration, an intersection capacity analysis was completed using Synchro/SimTraffic software. Results of the analysis, summarized in Table 7, indicate that all study intersections are expected to operate at an acceptable overall LOS B or better during the weekday a.m. and p.m. peak hours. Note that a single lane roundabout is assumed to be constructed at the Cliff Road and Cliff Frontage Road intersection, and it is expected to operate at LOS A. minimal queuing is expected.



SRF

02416643
June 2024

Year 2045 Conditions

Cliff Road Traffic Study

City of Burnsville

Figure 3

Table 7. Year 2045 Four Lane Scenario – Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Cliff Road/I-35W SB Ramps (1)	A	4 sec.	A	4 sec.
Cliff Road/I-35W NB Ramp (2)	A/A	9 sec.	A/A	8 sec.
Cliff Road/Cliff Frontage Road (1)	A	3 sec.	A	3 sec.
Cliff Road/River Ridge Boulevard (2)	A/A	10 sec.	A/B	14 sec.
Cliff Road/Nicollet Avenue (2)	A/A	6 sec.	A/A	9 sec.
Cliff Road/Cliff Fen Park West Access (2)	A/A	6 sec.	A/A	8 sec.
Cliff Road/Cliff Fen Park East Access (2)	A/A	7 sec.	A/A	8 sec.
Cliff Road/Portland Avenue (2)	A/A	6 sec.	A/A	10 sec.
Cliff Road/Riverwood Drive (2)	A/B	10 sec.	A/B	11 sec.
Cliff Road/12th Avenue S (3)	B	13 sec.	B	12 sec.

(1) Indicates a roundabout, where the overall LOS and delay is shown.

(2) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.

(3) Indicates a signalized intersection, where the overall LOS and delay is shown.

Minimal changes in queueing are expected. The 95th percentile queue for the northbound left turn lane at the Cliff Road and River Ridge Boulevard intersection is expected to reach approximately 100 feet in the p.m. peak period. Additionally, the Cliff Road and 12th Avenue S intersection is expected to have 95th percentile queues of approximately 150 feet in the westbound approach in the a.m. peak period and queues of approximately 125 feet in the southbound, eastbound, and westbound approaches in the p.m. peak period. All other study intersections are expected to have 95th percentile queues under 100 feet for all approaches.

Cliff Road 3-Lane Configuration Scenario

An intersection capacity analysis was completed for the scenario of a conversion of Cliff Road to a three-lane roadway from I-35W to 12th Avenue. Results of the analysis, summarized in Table 8, indicate that all study intersections are expected to operate at an acceptable overall LOS B or better during the weekday a.m. and p.m. peak hours with the potential lane reduction.

Table 8. Year 2045 Three Lane Scenario – Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Cliff Road/I-35W SB Ramps (1)	A	4 sec.	A	4 sec.
Cliff Road/I-35W NB Ramp (2)	A/A	8 sec.	A/A	8 sec.
Cliff Road/Cliff Frontage Road (1)	A	4 sec.	A	4 sec.
Cliff Road/River Ridge Boulevard (2)	A/B	11 sec.	A/C	15 sec.
Cliff Road/Nicollet Avenue (2)	A/A	7 sec.	A/B	13 sec.
Cliff Road/Cliff Fen Park West Access (2)	A/A	9 sec.	A/B	12 sec.
Cliff Road/Cliff Fen Park East Access (2)	A/A	5 sec.	A/A	9 sec.
Cliff Road/Portland Avenue (2)	A/A	9 sec.	A/B	12 sec.
Cliff Road/Riverwood Drive (2)	A/C	15 sec.	A/B	12 sec.
Cliff Road/12th Avenue S (3)	B	16 sec.	B	13 sec.

(1) Indicates a roundabout, where the overall LOS and delay is shown.

(2) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.

(3) Indicates a signalized intersection, where the overall LOS and delay is shown.

The 95th percentile queue for the northbound left turn lane at the Cliff Road and River Ridge Boulevard intersection is expected to reach 115 feet in the p.m. peak period. The Cliff Road and Cliff Frontage Road roundabout is expected to have a 95th percentile queue of 100 feet in the eastbound approach in the p.m. peak period. Additionally, the Cliff Road and 12th Avenue S intersection is expected to have 95th percentile queues up to 220 feet in the westbound approach in the a.m. peak period and queues up to 155 feet in the southbound, eastbound, and westbound approaches in the p.m. peak period. All other study intersections are expected to have 95th percentile queues under 100 feet for all approaches. There is not expected to be any operational issues as a result of the potential four to three-lane conversion from an intersection capacity perspective.

Other Considerations

In consideration of the crash rate (at the critical threshold) and severity issues (above the critical severity rate) at the Cliff Road and River Ridge Boulevard intersection, a traffic control modification to a roundabout could be considered to mitigate the crashes that are occurring. This roundabout would also help slow speeds along the corridor in an effort to make the corridor more pedestrian friendly. An intersection capacity analysis was completed at the intersection using HCS software to understand the potential operations impacts of a traffic control modification. Results of the analysis, summarized in Table 9, indicate that the roundabout is expected to operate at an acceptable overall LOS A during the weekday a.m. and p.m. peak hours. Minimal queuing would be expected, with 95th percentile queues all approximately 100 feet or less.

Table 9. Year 2045 Three Lane Scenario – Intersection Capacity Analysis – River Ridge Roundabout

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Cliff Road/River Ridge Boulevard (1)	A	7 sec.	A	9 sec.

(1) Indicates a roundabout, where the overall LOS and delay is shown.

Note that with an upgrade in traffic control to a roundabout, there is potential to reduce the three-quarter access to the west to be a right-in/right-out only, as left-turns into Wal-Mart are expected to be safer and have minimal delay at the roundabout. Further discussion with area stakeholders is necessary before any access restrictions should be considered.

Summary and Conclusions

The following study conclusions and recommendations are offered for consideration:

1) The existing daily volumes along Cliff Road are between 11,000 and 12,700. Hourly volumes are below 600 vehicles per hour in all directions throughout a typical weekday.
2) Based on the daily and hourly volumes, Cliff Road falls in the "Probably Feasible" categories of a four to three-lane conversion based on FHWA Guidance.
3) There was a total of 81 crashes reported over the analysis period at the study area intersections.
4) The Cliff Road/Cliff Frontage Road intersection and the Cliff Road segment from Cliff Frontage Road to 12th Avenue South are above the critical crash rate, indicating that there is a statistically significant crash problem at both locations. Over three-quarters of the crashes at the intersection are left-turn/angle crashes which would be eliminated with the construction of a roundabout at the intersection. Additionally, a four- to three-lane road diet is recommended for the Cliff Road segment in question due to a high number of crashes caused by vehicles turning from Cliff Road to access locations.
5) The Cliff Road and River Ridge Boulevard intersection is at the critical crash rate and over the critical severity rate. A roundabout could be considered to mitigate the crash issue.
6) Results of the existing intersection capacity analysis indicate that the study intersections currently operate at an acceptable overall LOS B or better during the a.m. and p.m. peak hours with the existing geometric layout and traffic controls. No significant side-street delays were identified. Minor queues were observed at the Cliff Road/River Ridge Boulevard and Cliff Road/12th Avenue S intersections.
7) A review of the Dakota County Access Guidelines revealed that both study segments along Cliff Road do not meet access spacing guidelines.
    a. The County could consider a median within the segment of Cliff Road from Cliff Frontage Road to Nicollet Avenue.

   b. The segment from Nicollet Avenue to 12th Avenue is best suited for a three-lane segment with potential access consolidations near 12th Avenue.

8) To account for general background growth in the area, an annual growth rate of one-half (0.5) percent is assumed in the study area.

9) A single lane roundabout is recommended for construction at the Cliff Road and Cliff Frontage Road intersection. This configuration would match the western side of the interchange and would allow for acceptable operations and have a significant reduction in crashes as compared to the existing intersection layout.

10) At the Cliff Frontage Road and I-35 Northbound Ramps intersection, the current free-right turn from northbound I-35W off ramp to Cliff Road was recommended to be removed in an effort to reduce pavement and it is expected to have minimal impact on operations. Additionally, the northbound left-turn from the Cliff Frontage Road to I-35W on-ramp was recommended to be reduced to a single northbound left-turn

11) Two (2) future scenarios were analyzed for the corridor under year 2045 conditions. The first scenario is a no build configuration on Cliff Road, as the roadway operates today. The second scenario is a three-lane configuration on Cliff Road.

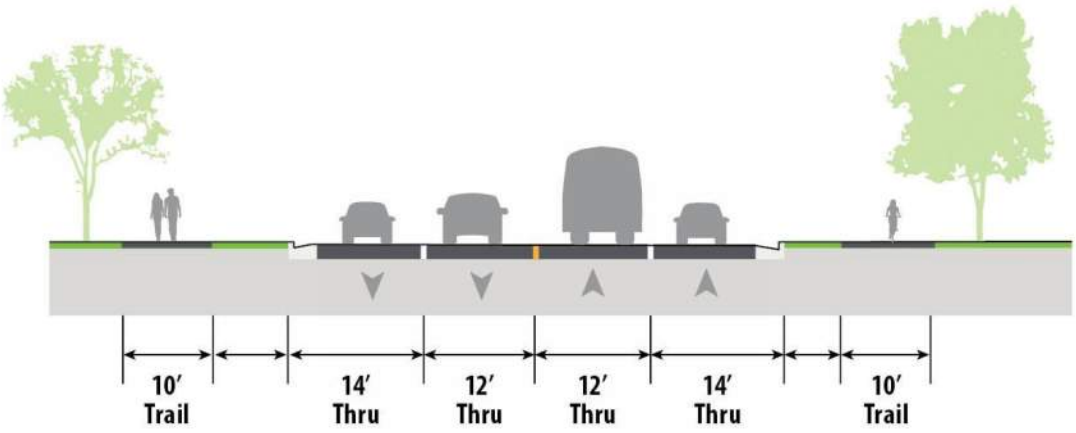
   a. Both scenarios assume the construction of a single lane roundabout at the Cliff Road and Cliff Frontage Road intersection east of I-35W.

12) Results of the analysis for the Cliff Road no build configuration scenario indicate that all study intersections are expected to continue to operate at an acceptable overall LOS B or better during the weekday a.m. and p.m. peak hours.

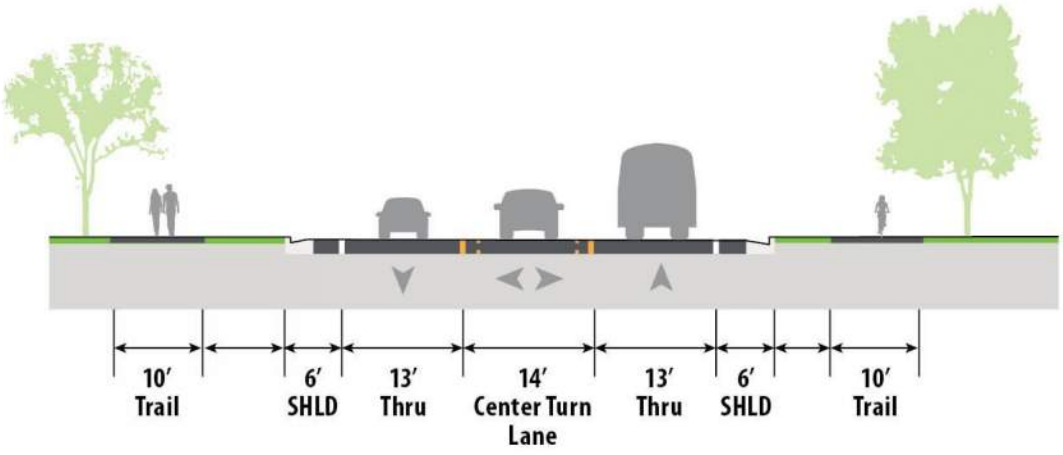
13) Results of the analysis for the Cliff Road three-lane configuration scenario indicate that all study intersections are expected to continue to operate at an acceptable overall LOS B or better during the weekday a.m. and p.m. peak hours.

14) There could be consideration of a single lane roundabout at the Cliff Road and River Ridge Boulevard intersection in order to mitigate the safety issues that are occurring at the intersection. Results of the analysis indicate that the roundabout is expected to operate at an acceptable overall LOS A during the weekday a.m. and p.m. peak hours.

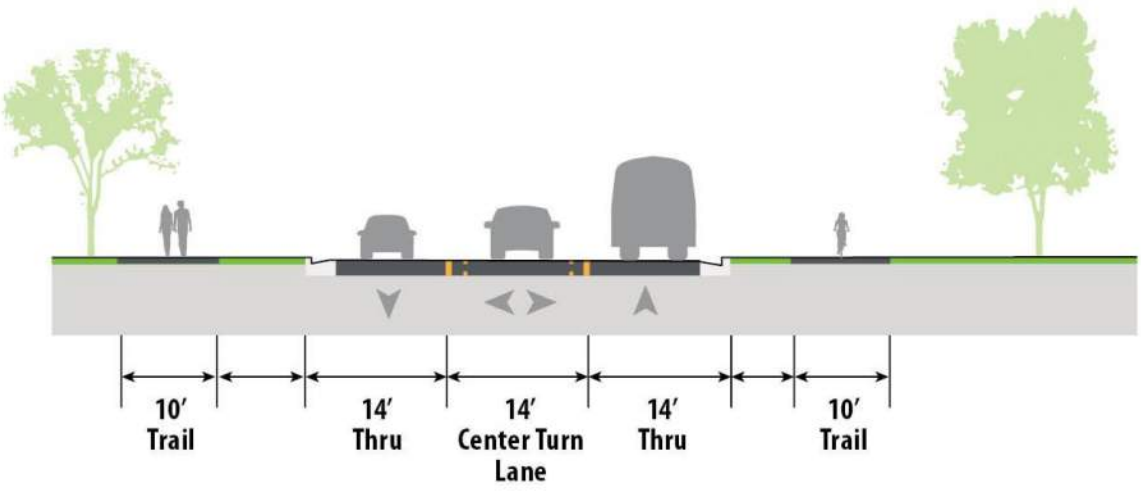
Cliff Road Alternative 1



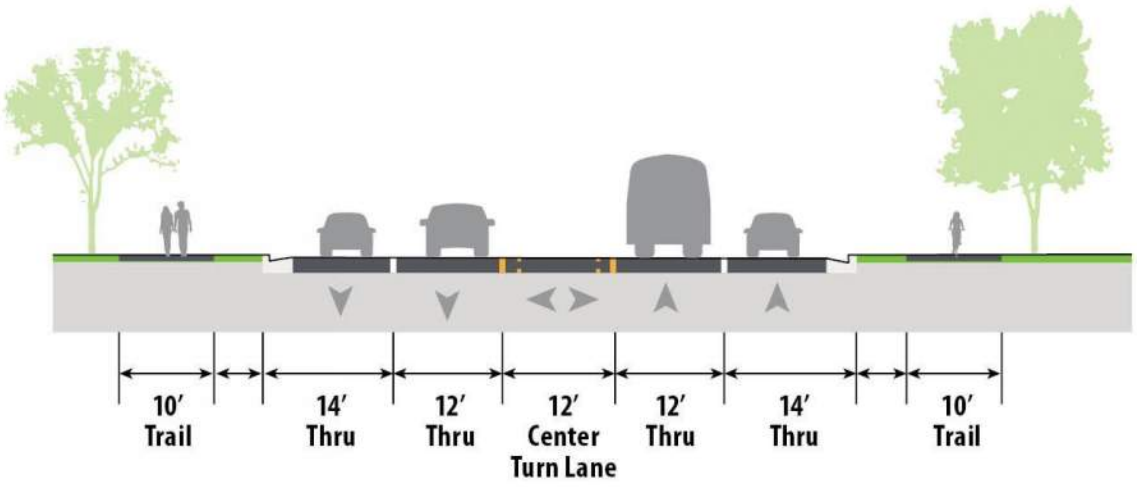
Cliff Road Alternative 2



Cliff Road Alternative 3



Cliff Road Alternative East of 12th Avenue



Appendix B

Cliff Road Typical Section Memorandum

Memorandum

SRF No. 16643

To: Chad Casey, Design Engineer
MnDOT

From: Amber Ortlepp, Design Manager

Date: June 22, 2023

Subject: Cliff Road (CSAH 32) Typical Section Under I-35W

Background and Request

MnDOT is currently developing preliminary plans for the I-35W Bridge over Cliff Road (CSAH 32) as part of the I-35W Resurfacing and Bridge Replacement Project (SP 1981-140). The project is planned to be let in the Fall of 2024, with construction beginning in 2025 and continuing into 2026.

MnDOT is currently planning for a three-lane section of Cliff Road with a 13-foot trail on the north side with slope paving under the I-35W bridge (Bridge No. 19911). Dakota County and the City of Burnsville respectfully request MnDOT to construct a cross section that allows for a future four-lane section, including six-foot boulevards and two ten-foot shared-use paths along Cliff Road under I-35W.

Since 2006, the City of Burnsville has planned to develop the area south of the Minnesota River and west of I-35W, also known as the Minnesota River Quadrant (MRQ). Currently, a majority of the area has heavy industrial businesses, however the city has continually worked with the land owners to develop long range redevelopment and end use plans. This area offers a great opportunity for the city to redevelop into a broad mix of residential, business, office, and industrial uses and provide the public riverfront recreational spaces. Cliff Road provides a direct route between the MRQ, I-35W, and the southeast metro. As the MRQ continues to develop, Dakota County and the City of Burnsville do not want the overpass of I-35W to become a pinch point for these movements.

The purpose of this memorandum is to outline Dakota County and the City of Burnsville's request and document relevant evaluation to support this request.

Technical Evaluation

Thru Lanes

Cliff Road under I-35W currently has 14-foot thru lanes and a 12-foot eastbound left turn lane. This roadway section provides the corridor with reasonable capacity for the existing traffic volumes. Table 1 displays the range of daily capacity thresholds for different facility types. These volumes

were based on the following agencies and publications: MnDOT, Dakota County, FHWA, Highway Capacity Manual, and other State and County agencies.

Table 1. Roadway Capacity Thresholds

Planning Level Daily Thresholds		
Facility Type	**Low End Capacity**	**High End Capacity**
2-Lane Divided Urban/Two-Way Left Turn Lane (TWLTL)	10,000	20,000
4-Lane Divided Urban	18,000	37,000

Source: *Highway Capacity Manual,* 6th Edition*; "Simplified Highway Capacity Calculation Method for the Highway Performance Monitoring System",* FHWA, October 2017.

The Intersection Control Evaluation (ICE) Report for the intersection of Cliff Road W (CSAH 32) and the I-35W South ramps from May 2019 stated forecast traffic volumes are anticipated to reach 26,700 vehicles per day on Cliff Road under I-35W in the year 2042. The forecast traffic volumes were developed after applying a growth factor to the 2019 traffic volume data. As part of the City of Burnsville's Cliff Road Preliminary Engineering Project it was determined the forecasted traffic volume should be revised to 17,200 vehicles per day based on the updated Dakota County Travel Demand Model. The forecasted traffic volumes do not include potential traffic volumes from the MRQ area, so an increase in traffic volumes can be expected as the MRQ develops. The new I-35W bridge over Cliff Road should not preclude this increase in traffic.

Based on the information in Table 1 the updated forecasted traffic volumes are on the cusp of the four-lane capacity, even by excluding any potential traffic volumes from the MRQ area. A four-lane divided facility could potentially supply capacity for 19,500 additional vehicles per day.

Shared-Use Paths

Cliff Road not only provides vehicles a way to cross I-35W it also provides non-motorized vehicles a direct east-west route without the barrier of I-35W. Dakota County and the City of Burnsville have used Cliff Road as part of the designated Black Dog trail route that connects to the Minnesota River Greenway Regional Trail at Black Dog Road. Currently Cliff Road has paved shared-use trails from east of I-35E to I-35W. However only a six-foot walk is provided under I-35W and the MRQ area has very few trail connections. As the MRQ develops, pedestrian accommodations will become important. Therefore, it is a high priority that the section of Cliff Road under I-35W should provide a minimum of ten-foot trails on both sides (12-foot trails if boulevards are not provided).

Dakota County's *2040 Transportation Plan* states the following policy supporting integration of pedestrian and bicycling facilities, "construct off-highway shared use trails in urban and suburban contexts on both sides of County highways". Also "provide for continuous facilities, address physical barriers such as busy roads and water crossings and provide safe facilities for users of all

modes". Constructing shared-use trails along Cliff Road under I-35W would help complete these goals.

Boulevard

Currently the Cliff Road boulevard space on either side of the I-35W bridge is a minimum of six feet. This space provides a buffer between pedestrians and vehicles, and a space for snow storage and sign and utility placement. Maintaining this buffer space under the bridge would provide the same benefits, creates a consistent corridor cross section, and could potentially improve the westbound sightlines approaching the bridge.

Median and Elimination of Eastbound Left-Turn Lane

Medians provide a physical separation between opposing traffic lanes. This safety feature reduces the likelihood of head-on collisions and can reduce vehicle speeds[1]. A raised median provides physical separation and prevents vehicles from illegally turning midblock. A raised median is especially important as vehicles approach a roundabout as is the case for westbound Cliff Road travelers. In addition, raised medians provide a location for traffic signs.

In previous reviews, the possible need to retain an eastbound left-turn lane was noted to serve the frontage road intersection. This concept creates the need for additional width under I-35W, and MnDOT has requested a review of more constrained cross sections. Long-term concepts that eliminate the need for an eastbound left-turn lane are responsive to this request.

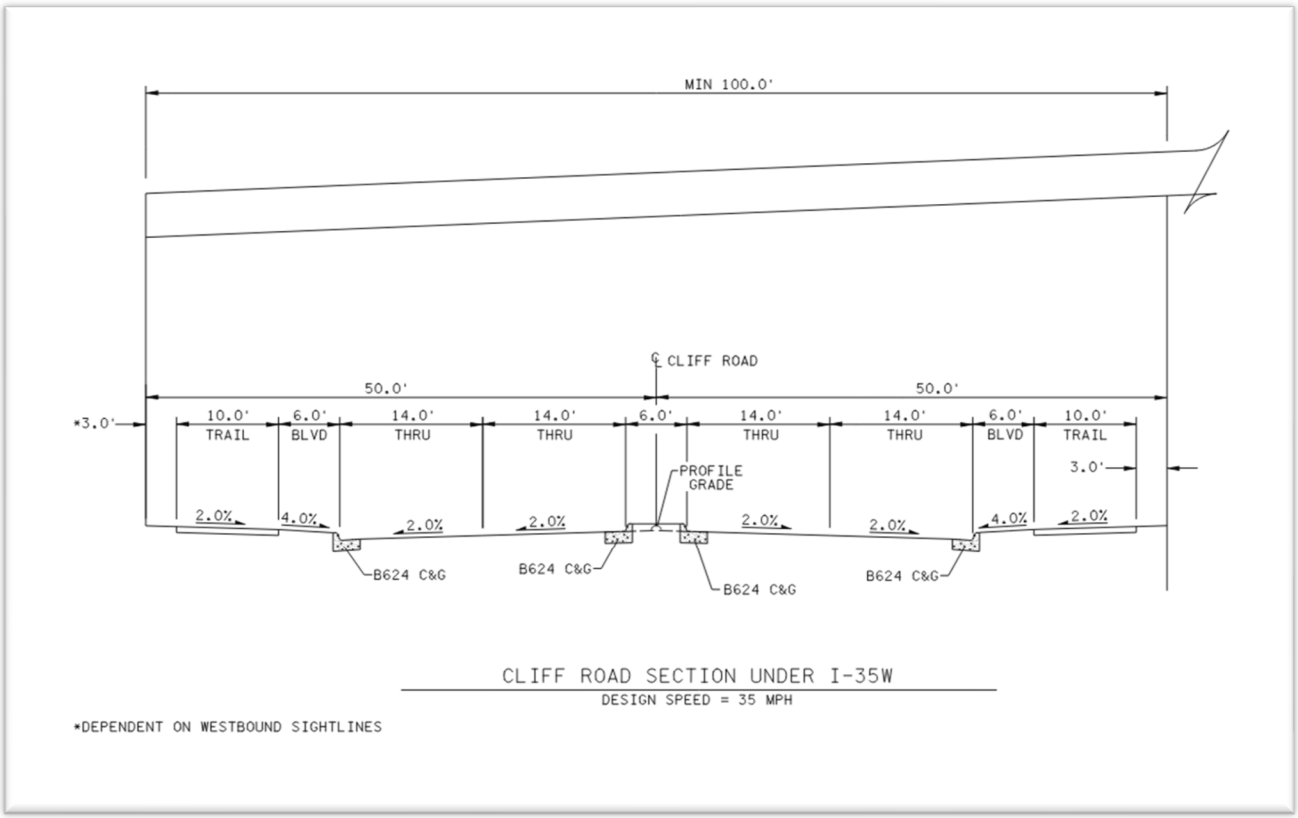
The City of Burnsville, in partnership with Dakota County, has started a project to analyze geometric alternatives for the interaction of Cliff Road, the I-35W northbound on- and off-ramps, and the frontage road connecting the two. A likely alternative is to construct a roundabout, similar to the west Cliff Road roundabout at the I-35W southbound ramps. In this scenario, a raised median running between the two roundabouts would be ideal. The potential dual-roundabout concept eliminates the need for an eastbound left-turn lane, reducing the long-term cross section width needed under I-35W while also improving safety vs. the eastbound left turn.

Conclusion

Dakota County and the City of Burnsville respectfully request MnDOT to construct a cross section that allows for a future four-lane section, including a six-foot median, six-foot boulevards and two ten-foot shared-use paths on Cliff Road under I-35W to meet the projected future traffic volumes and multimodal goals. This preferred typical section is shown below in Figure 1. It is crucial that the I-35W span over Cliff Road serve the public for many generations.

[1] MnDOT Facility Design Guide, Chapter 4A.9

Figure 1. Preferred Typical Section



Appendix C

Cliff Road/I-35W Northbound On- and Off-Ramps Alternative Evaluation Report

Cliff Road (CSAH 32) Corridor Preliminary Engineering Study

Cliff Road/I-35W Northbound On- and Off- Ramps Alternative Evaluation Report

Report Version 1.0

City of Burnsville, Dakota County

Prepared by:

SRF

December 2023

SRF No. 16643

Table of Contents

H:\Projects\16000\16643\TechData\DeliverablesDocs\NB Ramps Report\CliffRd_NB Ramps_Report.docx

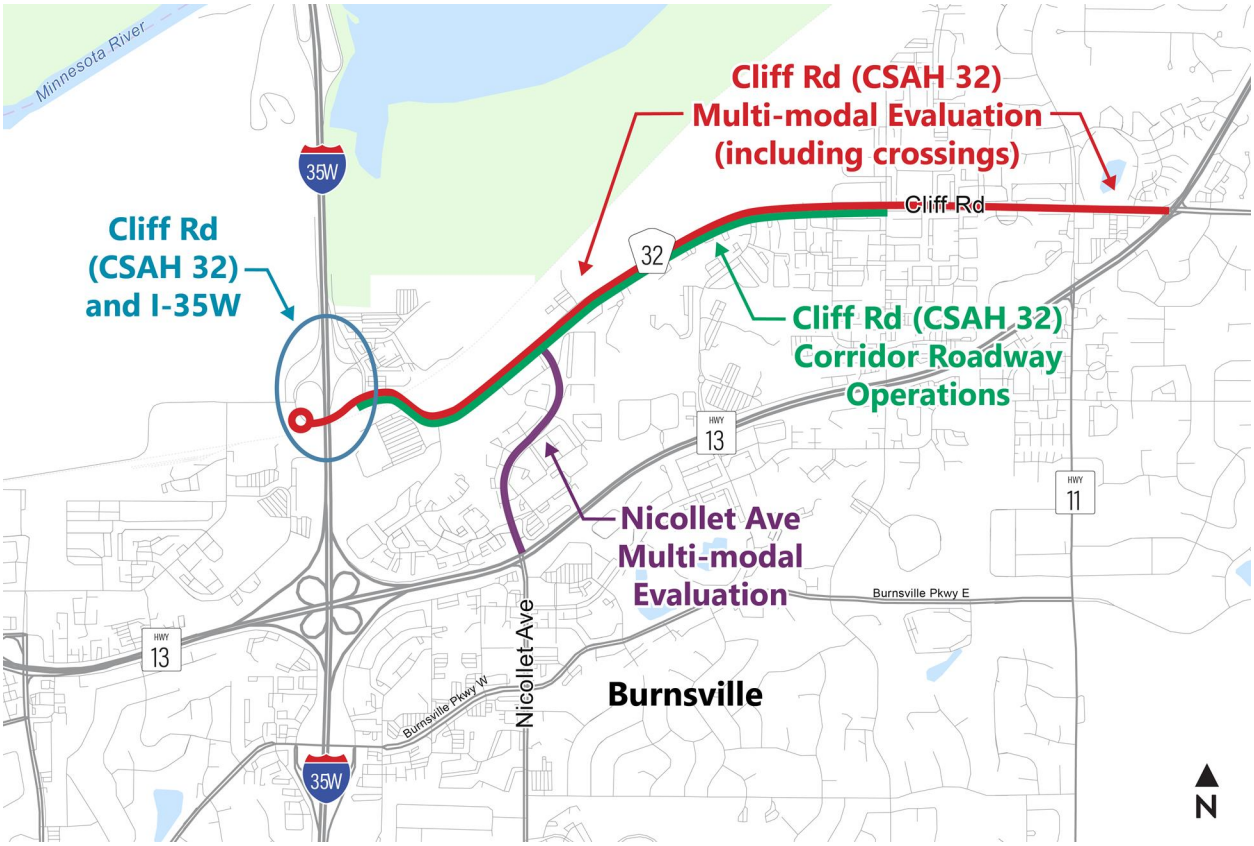
Introduction

The City of Burnsville, in partnership with Dakota County conducted a project to explore possible improvements for driving, walking and biking to Cliff Road (CSAH 32) from I-35W to Highway 13 and Nicollet Avenue from Highway 13 to Cliff Road. The project included four study components:

- An analysis and preliminary design for Cliff Road and I-35W. The Minnesota Department of Transportation (MnDOT) is developing plans to resurface I-35W from Cliff Road to I-35E, and replace bridges at Cliff Road, TH 13, and Burnsville Parkway (construction 2025-2026). As such, an analysis of Cliff Road under I-35W was conducted to determine a preferred section of roadway. An analysis and preliminary design on the I-35W northbound on- and off- ramps was also conducted.
- An analysis and preliminary design for Cliff Road from I-35W to 12th Avenue South. A traffic analysis was conducted to review capacity and safety issues and develop alternatives for roadway sections, intersection improvements, and access spacing.
- A multimodal evaluation of Cliff Road between I-35W and Highway 13. This evaluation determined infrastructure improvements to accommodate pedestrians and bikers along Cliff Road.
- A multimodal evaluation of Nicollet Avenue between Highway 13 and Cliff Road. This evaluation determined infrastructure improvements to address the incomplete multimodal facilities on Nicollet Avenue.

The purpose of this report is to document the identification of a recommended alternative in the Cliff Road/ I-35W northbound on- and off- ramps area. The northbound I-35W on- and off-ramps are unconventional in this area, and MnDOT is now designing spot-mobility updates which focus on improving freeway operations, to be constructed in 2025-2026. The City of Burnsville and Dakota County wished to complete an analysis of these ramps to determine if a better alternative should be proposed to MnDOT for potential inclusion into the current I-35W Burnsville Project, or if such improvements can be scoped now for development in a later separate interchange-area improvement project.

NOTE: This *Draft* report summarizes local intersection alternatives and recommendations for the east side of the interchange at Cliff Road (CSAH 32) and I-35W. The review of this area was important to finish before MnDOT's 2024 completion of final design for the 2025-2026 I-35W project. This document will remain a draft into 2024 pending additional coordination, reviews, and engineering design inputs for the complete Cliff Road corridor to the west and east.


Minnesota River
35W
Cliff Rd (CSAH 32)
and I-35W
Cliff Rd (CSAH 32)
Multi-modal Evaluation
(including crossings)
Cliff Rd
32
Cliff Rd (CSAH 32)
Corridor Roadway
Operations
HWY
13
HWY
11
Nicollet Ave
Multi-modal
Evaluation
Burnsville Pkwy E
Nicollet Ave
Burnsville Pkwy W
Burnsville
HWY
13
35W
N

Cliff Rd and I-35W Analysis and Preliminary Design

Background

The current configuration provides access to and from NB I-35W via an intersection on the frontage road with a separate high occupancy vehicle on-ramp to the north of this intersection and the intersection of the Frontage Road and Cliff Road is to the south of this intersection. Businesses have access via the Frontage Road and Cliff Road. A trail and sidewalk network exists, with the trail going behind the businesses along the frontage road. Recently, a new roundabout was constructed at the intersection of Cliff Road and the I-35W South Ramps.

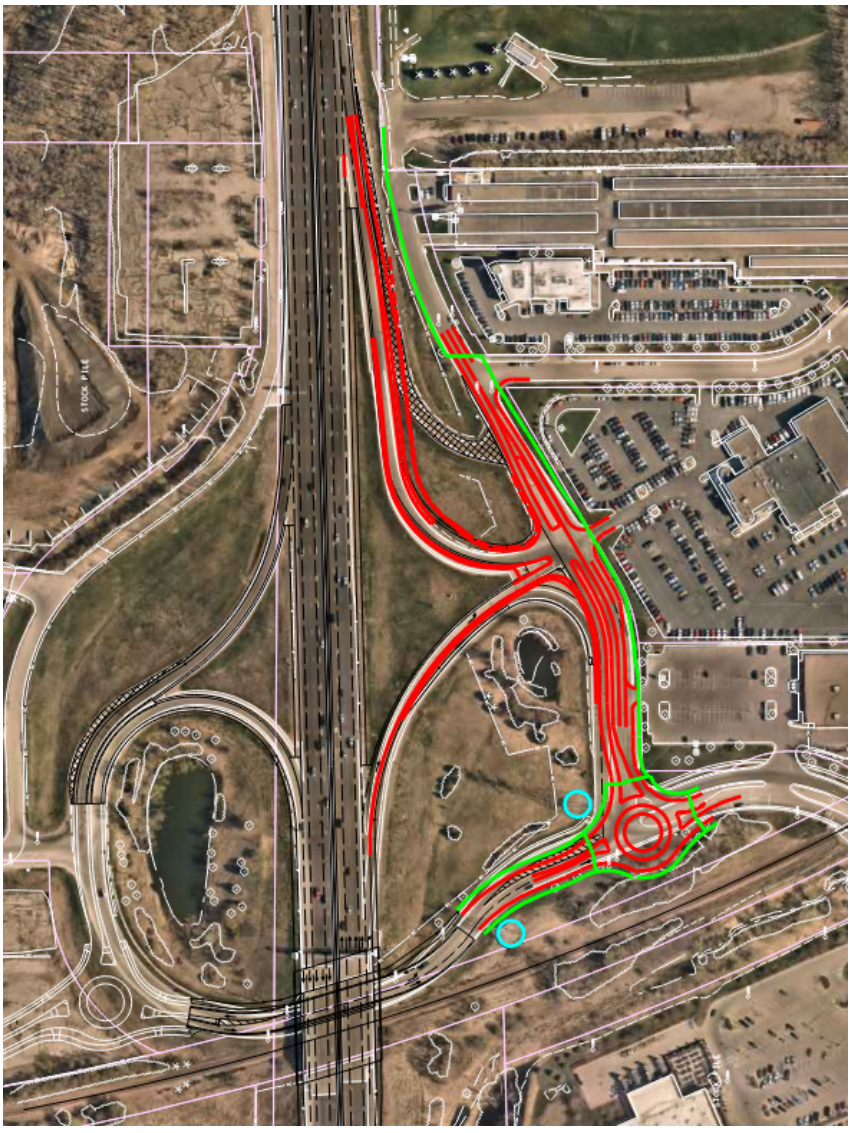
Alternative Development and Evaluation

Geometric alternatives were developed in the Cliff Road/ I-35W northbound on- and off- ramps area with the following considerations:

- Ramps and Frontage Road Location and Interaction Considerations
- Pedestrian access – trail locations
- Business access – local road connections
- Intersection traffic control

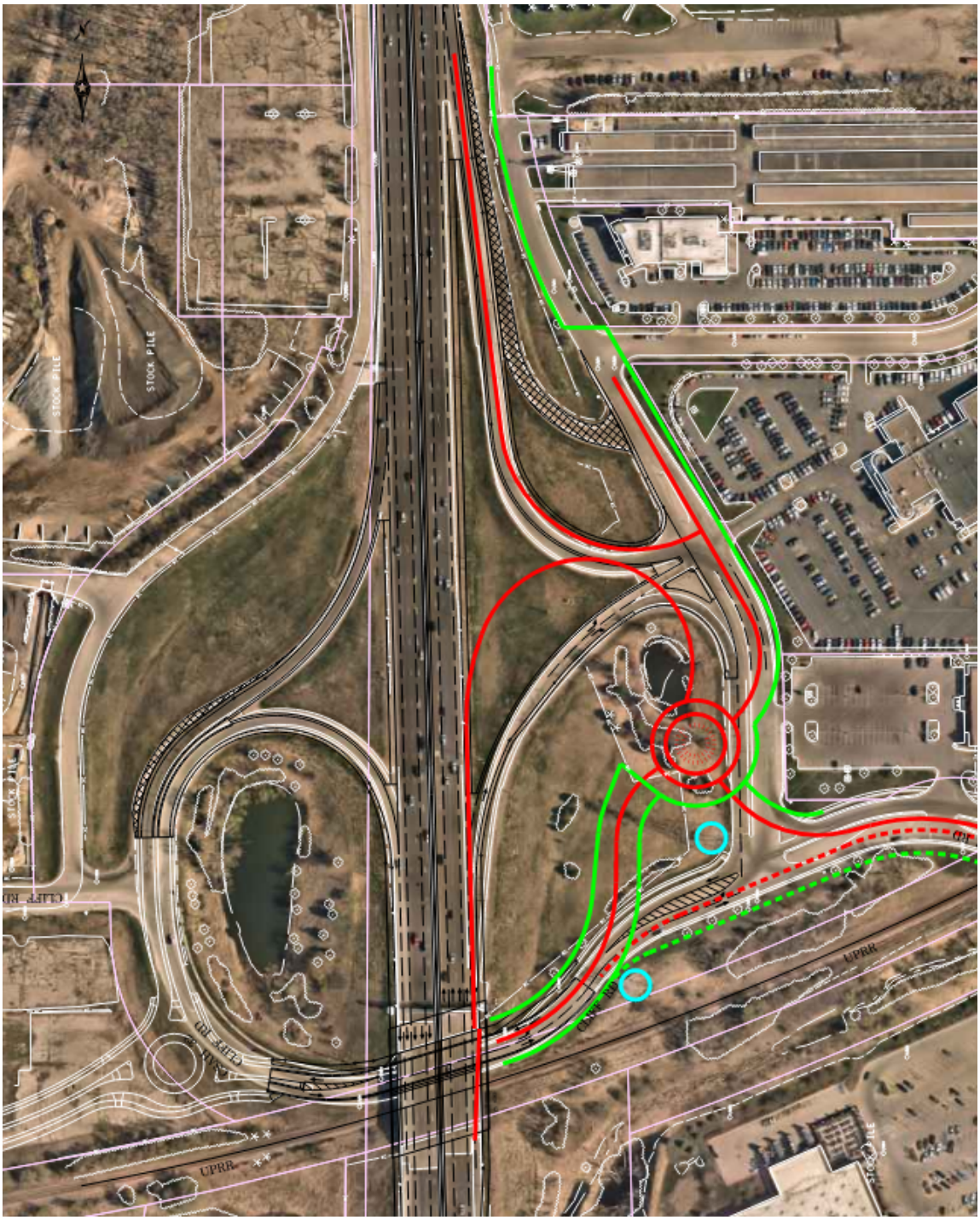
Cliff Road and I-35W Alternative 1

The NB I-35W off-ramp remains on its current alignment, but with the free right movement to frontage road removed. The NB I-35W on-ramp remains on its current alignment and is combined with the NB high occupancy vehicles (HOV) ramp. The Cliff Road/Frontage Road intersection would be a roundabout. A trail would be added along the east side of the Frontage Road.



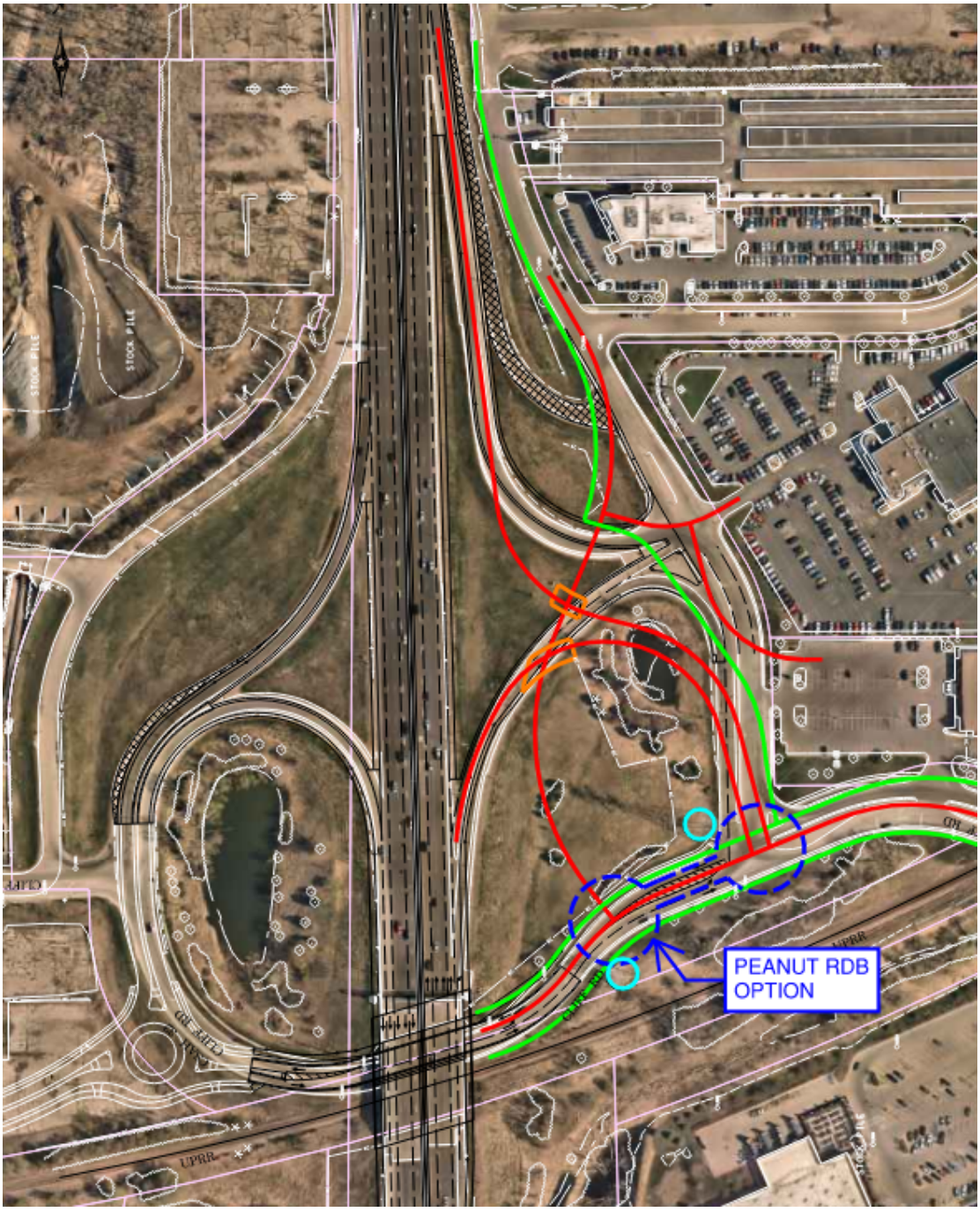
Cliff Road and I-35W Alternative 2

The NB I-35W off-ramp connects directly into a relocated Cliff Road/ Frontage Road roundabout intersection. The NB I-35W on-ramp intersects with the Frontage Road and is combined with the NB HOV ramp. A trail would be added along the east side of the Frontage Road. A possible eastbound Cliff Rd thru and trail bypass could be along the existing roadbed.



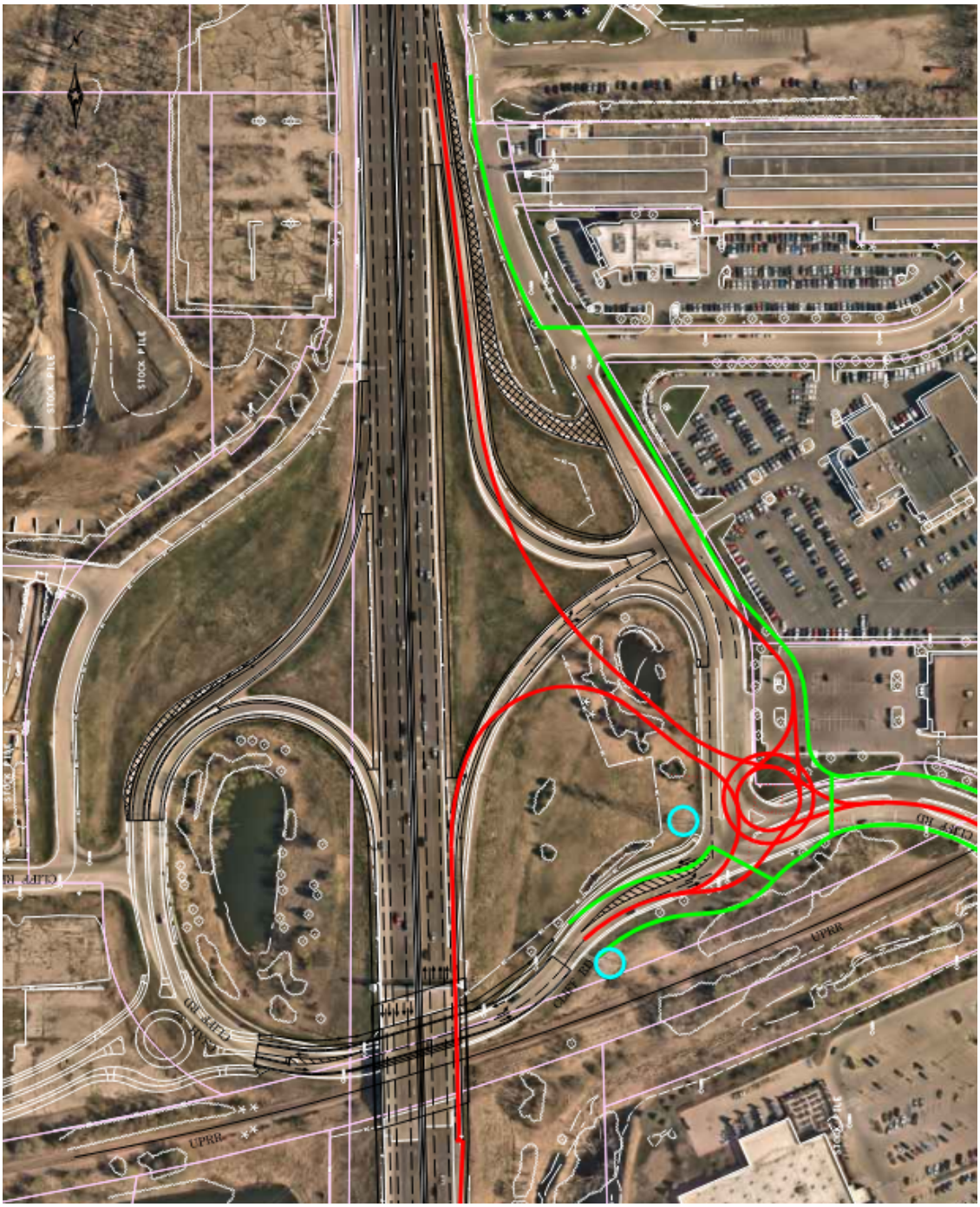
Cliff Road and I-35W Alternative 3

Both NB I-35W on and off ramps connect directly to Cliff Road. The Frontage Rd traverses under NB off and on ramp via bridges. A peanut roundabout between the new Cliff Road intersections could be an option to help traffic operations. Business access is maintained on the Frontage Road, with a trail along the west side of the Frontage Road.



Cliff Road and I-35W Alternative 4

The NB I-35W off and on-ramps connect directly into a relocated Cliff Road/ Frontage Road roundabout intersection, combining all the movements into one intersection. A trail would be added along the east side of the Frontage Road.



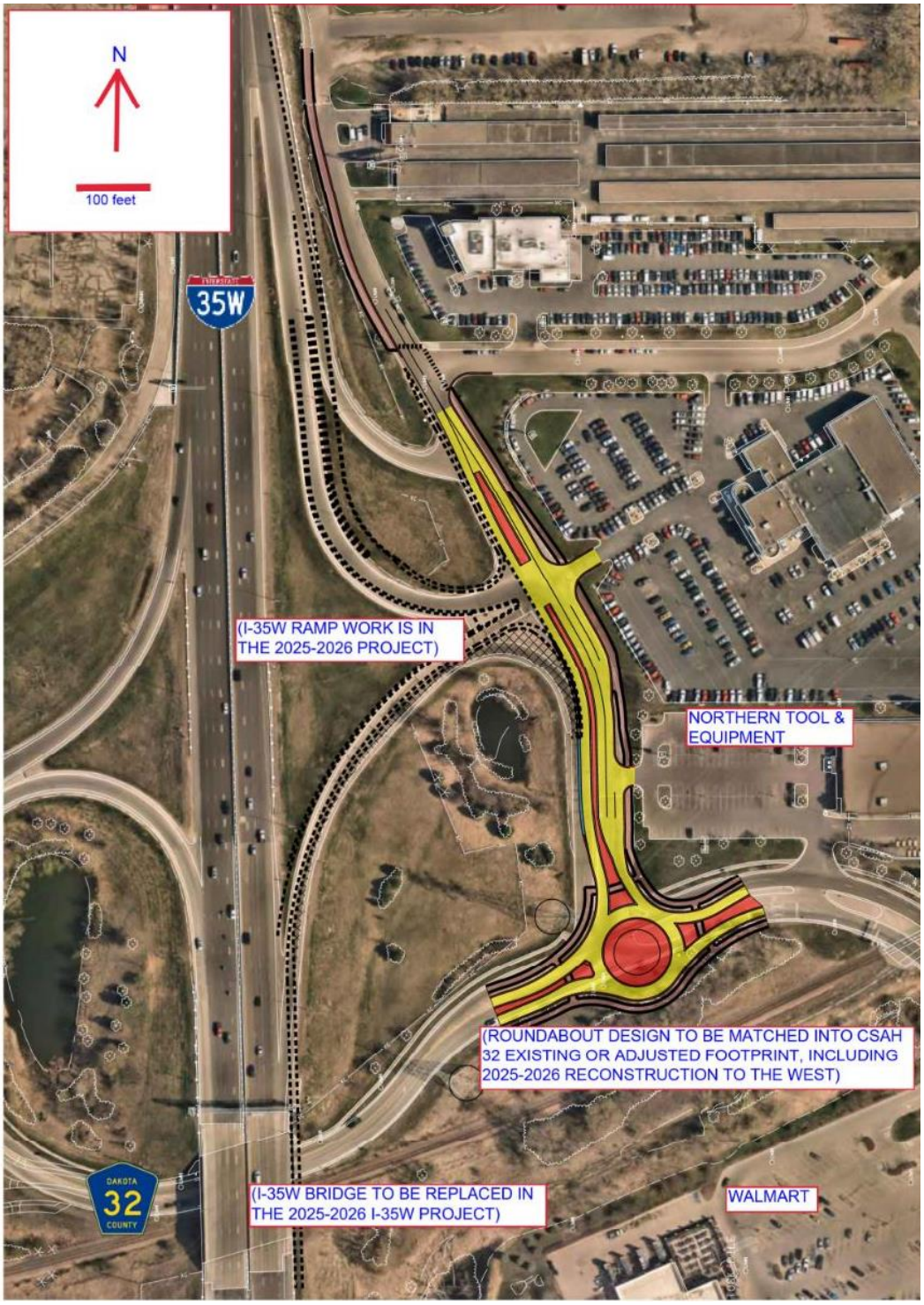
The alternatives were generally evaluated against each of other the alternatives using the following criteria:

- Travel Time/Roadway Continuity
- Trail/Ped Improvements
- Business Access Impacts
- Property Impacts
- Drainage Impacts
- Cost

	Alternative 1 **Recommended alternative**	Alternative 2	Alternative 3	Alternative 4
Travel Time and Operations/ Roadway Continuity	Ramps maintain access to Frontage Road, separate intersection with Cliff Road, Wayfinding the same.	NB off-ramp has direct access to Cliff Road, NB on-ramp has separate access to Frontage Road.	Ramps have direct access to Cliff Road. Wayfinding may be difficult.	Ramps have direct access to Cliff Road.
Trail/Pedestrian Improvements	Trails and crossings provided	Trails and crossings provided	Trails and crossings provided	Trails and crossings provided
Business Access Impacts	Business access maintained	Business access impacts	Business access maintained	Business and access impacts
Property Impacts	Low Property Impacts	Low Property Impacts	Low Property Impacts	High Property impacts
Drainage Impacts	Drainage area maintained	Drainage area impacts	Drainage area impacts, excavation impacts	Drainage area impacts
Construction Cost	Low Construction Costs	Medium Construction Costs	High Construction Costs	Medium Construction Costs

Recommended Alternative

Cliff Road and I-35W Alternative 1 is the recommended alternative because it maintains travel time and operations, provides trails and crossings, maintains business access, has low property and drainage impacts, and has low comparative construction cost.



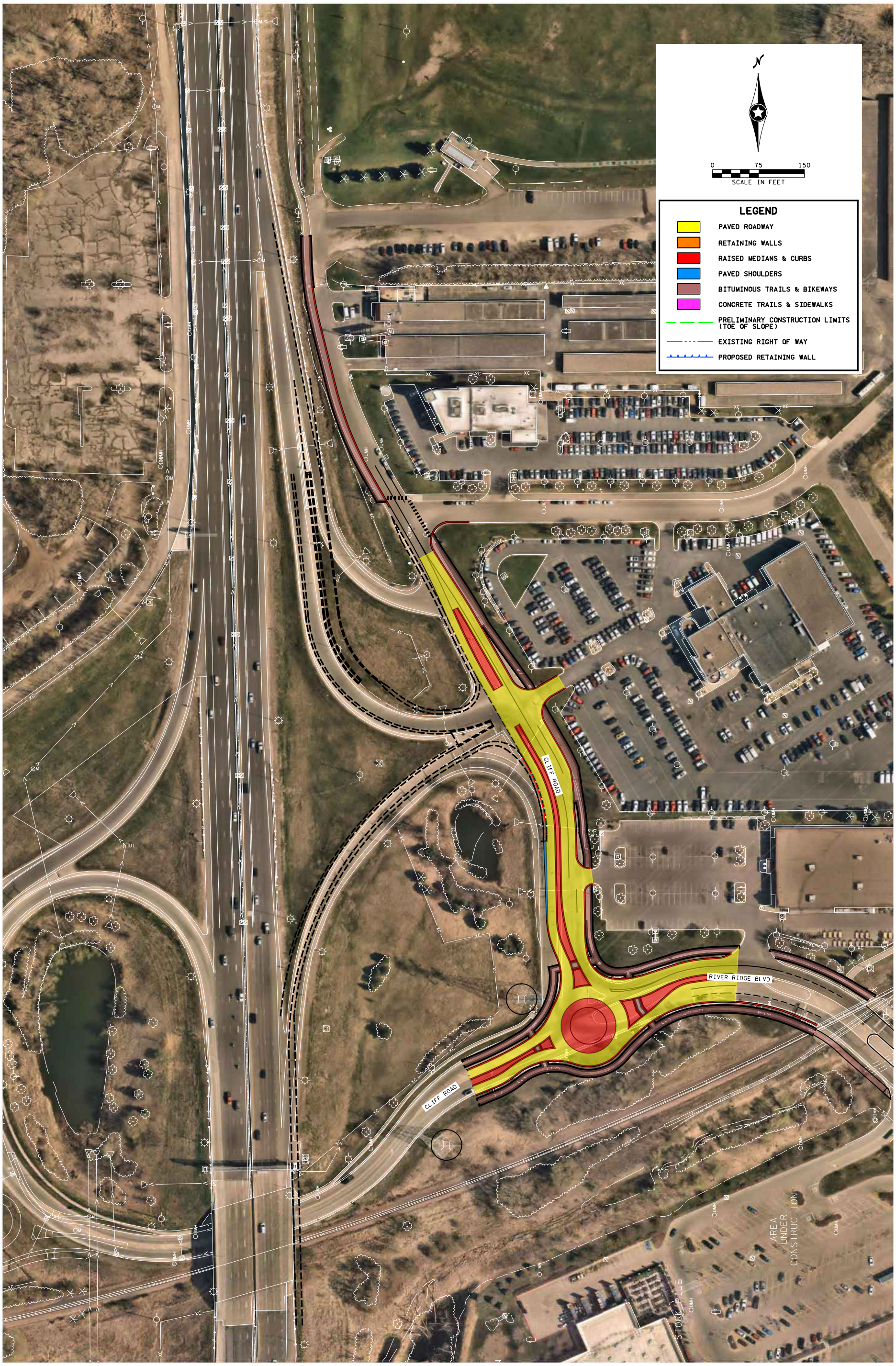
The Frontage Road & I-35W NB Ramps/Dealership intersection will maintain current traffic control (Stop control on all legs except NB Frontage Road), and will provide acceptable traffic operation with current and future traffic volumes.

The Cliff Road and Frontage Road roundabout will improve operations and safety with current and future traffic volumes. The roundabout's proximity to the railroad tracks will be evaluated further, the roundabout can be designed to accommodate an additional lane or turn bypasses to allow for storage space and movement during a train event. Additionally, Cliff Road can retain the existing four through lanes of capacity for queueing at the railroad.

Next Steps/Implementation

MnDOT will incorporate the NB I-35W ramp recommendations into the I-35W Burnsville Project. The NB I-35W off-ramp will have free right movement to frontage road removed. The NB I-35W on-ramp will be combined with the NB HOV ramp.

The City of Burnsville and Dakota County have completed this report to identify a recommended alternative for the Cliff Road (CSAH 32) intersection with the I-35W east frontage road. Additional coordination, reviews, and engineering design inputs will be incorporated based on the longer Cliff Road corridor to the west and east. Based on the intersection recommendation, Dakota County and the City of Burnsville will pursue funding to construct the proposed roundabout as a capital project. When funding and scheduling are confirmed, the County and City will begin development of the project, including further MnDOT coordination.



H:\Projects\16000\16643\TechData\CADDesign\Graphics\16643_gr0-Cliff 3 lane conversion.dgn

SRF

Job 16643
1/24/2024

CLIFF ROAD ROUNDABOUT COLOR CONCEPT

CLIFF ROAD ROUNDABOUT
BURNSVILLE

FIGURE 1

Appendix D

Cliff Road and Nicollet Avenue – Water Resources Technical Memorandum

Memorandum

SRF No. 16643

To: Logan Vlasaty, PE, City Engineer
City of Burnsville

From: Bob Leba, PE, Project Director – Civil Design

Date: June 6, 2024

Subject: Cliff Road And Nicollet Avenue – Water Resources Technical Memorandum

Project Overview

The City of Burnsville, in partnership with Dakota County, conducted a project to explore possible transportation and multimodal improvements to Cliff Road (CSAH 32) from I-35W to Highway 13 and Nicollet Avenue from Highway 13 to Cliff Road. The project included identifying a preferred section of Cliff Road, traffic and operations analysis of Cliff Road, and multimodal evaluation of both Cliff Road and Nicollet Avenue. Details of these studies can be found in the report *Cliff Road (CSAH 32) Corridor, Preliminary Engineering Study*.

This memorandum summarizes the study of water resources components related to future improvements.

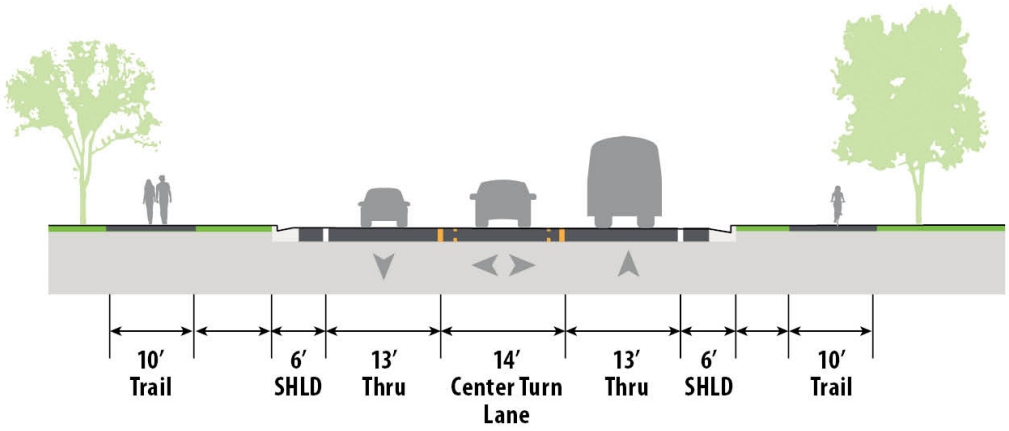
Typical Section Alternatives

Cliff Road

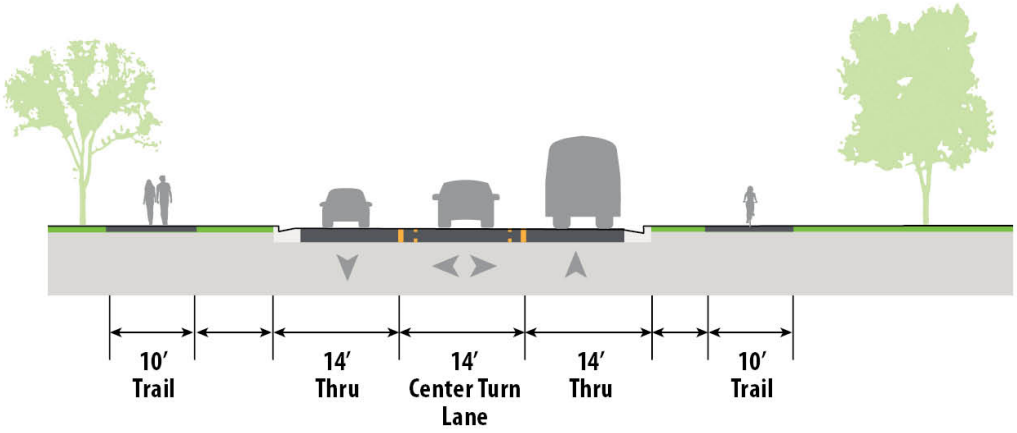
Existing Cliff Road is a four-lane section with variable center medians and turn lanes and road width ranging from approximately 52 ft. to 66 ft wide. The segment of Cliff Rd. between I-35W and 12th Ave. has a trail on the north side. East of 12th Ave. the trail is on the south side of Cliff Rd. with a sidewalk on the north side.

The design team reviewed several typical section alternatives for Cliff Road between River Ridge Blvd. to 12th Ave. S. and from 12th Ave. S. to Hwy 13, with varying lane and trail configurations. During the alternatives evaluation several typical sections were developed and reviewed by the Project Management Team (PMT). After the alternatives were screened the following alternatives remain viable:

River Ridge Blvd. to 12th Ave., Cliff Road Alternative 2 – Construct trail on south side, re-stripe Cliff Rd. to a 3-lane section within the existing curb lines, 6 ft. outside shoulders (see below). 52 ft wide curb to curb.



River Ridge Blvd. to 12th Ave., Cliff Road Alternative 3 – Reconstruct Cliff Road to a 3-lane section with trail on the south side (see below). 42 ft wide curb to curb.



Alternatives for the segment of Cliff Rd. from 12th Ave. S. to Hwy 13 maintained the existing roadway geometrics and focused on fixing trail gaps on the north side of Cliff Rd.

The impacts of each alternative were reviewed from a stormwater management perspective and summarized below:

Cliff Road Alternatives Summary

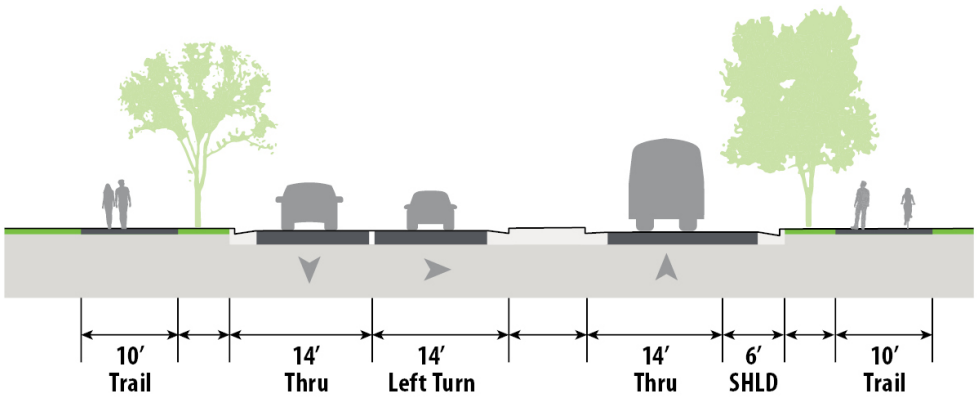
- Alternative 2 – Maintains the existing road width curb to curb and rehabilitates the existing paved surface. New impervious is created with an additional trail on the south side.
- Alternative 3 – Reduces the existing road width and rehabilitates the existing paved surface. No shoulders. Similar to Alternative 2, new impervious is created with the additional trail.
- 12th Ave. S. to Hwy 13 – new impervious created with additional trail.

Nicollet Avenue

Existing Nicollet Ave. from Highway 13 to Cliff Rd. is a four-lane divided minor arterial roadway. A 5' sidewalk runs along the west side of Nicollet Ave. through the entirety of the study section. The roadway is approximately 76 ft. wide.

Evaluation of alternatives by the PMT for Nicollet Ave. resulted in one alternative to be carried forward:

Nicollet Avenue Alternative 1 – Construct trails on east and west sides, re-stripe Nicollet Ave. to a 3-lane section within the existing curb lines.



The impact of the alternative was reviewed from a stormwater management perspective and summarized below:

Nicollet Avenue Alternative Summary

- The proposed roadway width decreases and a trail is added within the existing roadway footprint on the south side of the road. The existing sidewalk on the north is converted to a wider trail section. These improvements result in a minor decrease in impervious.

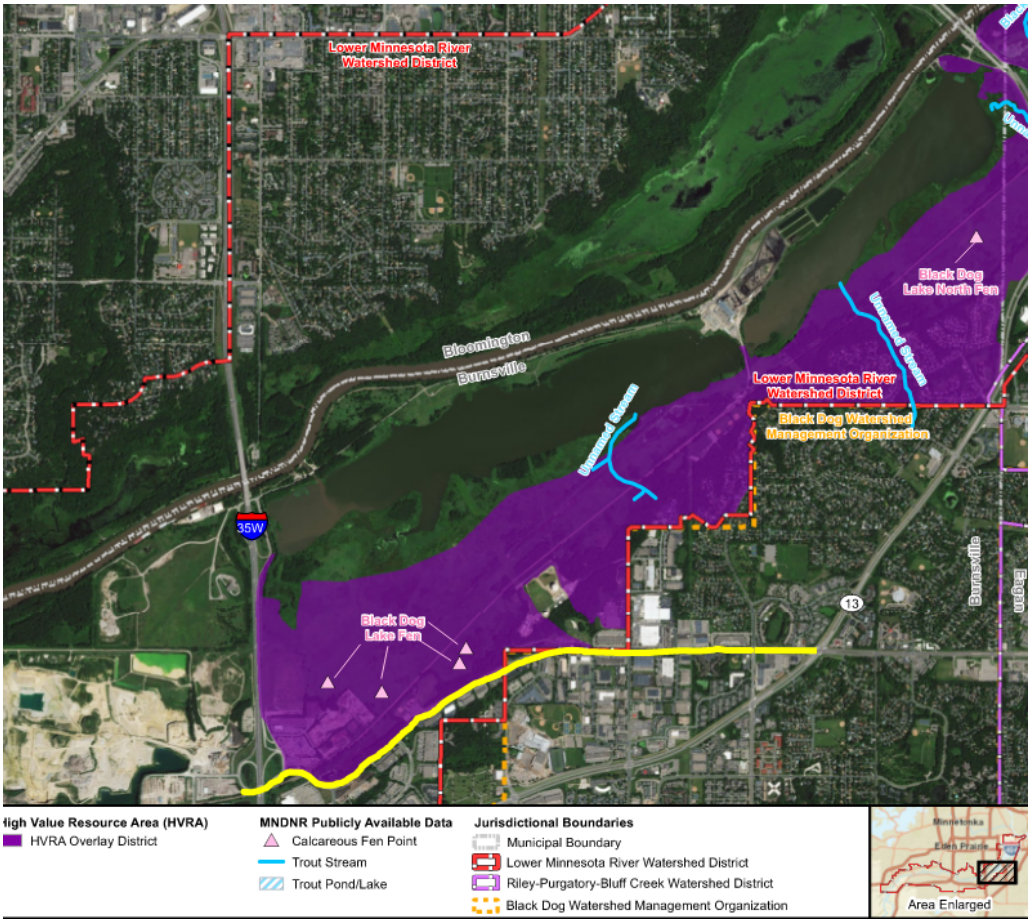
Cliff Road – River Ridge Boulevard Intersection Alternatives

Intersection improvements at Cliff Road and River Ridge Boulevard were also reviewed. A traditional intersection with raised medians and a roundabout were evaluated. The amounts of new impervious surface and reconstructed areas were similar and do not have different impacts on Stormwater Management.

Regulatory Environment

There are multiple regulatory agencies that have jurisdiction over stormwater management within the project limits. The project is entirely within the City of Burnsville and will need to follow the City Ordinances. The portion of the project west of Portland Ave. lies within the Lower Minnesota River Watershed District (LMRWD). East of Portland Ave., the project is within the Black Dog Watershed Management Organization (BDWMO). Refer to the figure below showing the boundary between the Watersheds.

Figure 1. Watershed Boundaries



Source: Lower Minnesota River Watershed District

Lastly, the project will need to comply with the State of Minnesota's MS4 and NPDES permits.

The table below summarizes the stormwater management thresholds for each agency.

Table 1. Regulatory Summary

Agency	Treatment Threshold
Black Dog WMO/City of Burnsville (1)	New Impervious 5,000 sf Reconstructed Impervious 1 acre
Lower Minnesota River WD	New Impervious 10,000 sf (2)(3) Reconstructed 10,000 sf (2)
Minnesota Pollution Control Agency (NPDES)	New Impervious 1 acre
Minnesota Pollution Control Agency (MS4)	Reconstructed Impervious 1 acre

(1) The Black Dog WMO defers to member city's stormwater requirements.

(2) Project located within a High Value Resource Area (HVRA).

(3) LMRWD has an exemption for sidewalks and trails that do not exceed 10 ft. in width and are bordered down gradient by a pervious area at least half the sidewalk/trail width.

Sources: Lower Minnesota River WD Rule D, 10/19/2022
Black Dog WMO, Watershed Management Plan, 11/16/2022
City of Burnsville Development Standards, Appendix C, 1/22/204 (download date)

The amount of new impervious surface as well as the amount of reconstructed impervious on a project dictate if stormwater treatment is required. Reconstructed impervious is defined as existing impervious areas that are removed down to the underlying soils and replaced with new impervious area. It is assumed that the existing roadway surfaces will be rehabilitated and not fully reconstructed. Therefore, the amount of new impervious created or reduced with each alternative was computed.

Table 2. Impervious Summary

Alternative	New Impervious (1) (ac)
Cliff Rd. Alt. 2	1.5
Cliff Rd. Alt. 3	0.4
Cliff Rd. 12th Ave. to Hwy 13	0.5
Cliff and River Ridge RAB	0.2
Nicollet Ave Alt 1	-0.2

(1) Includes trail impervious which is exempt from the LMRWD stormwater management requirements but not for MPCA's NPDES requirements.

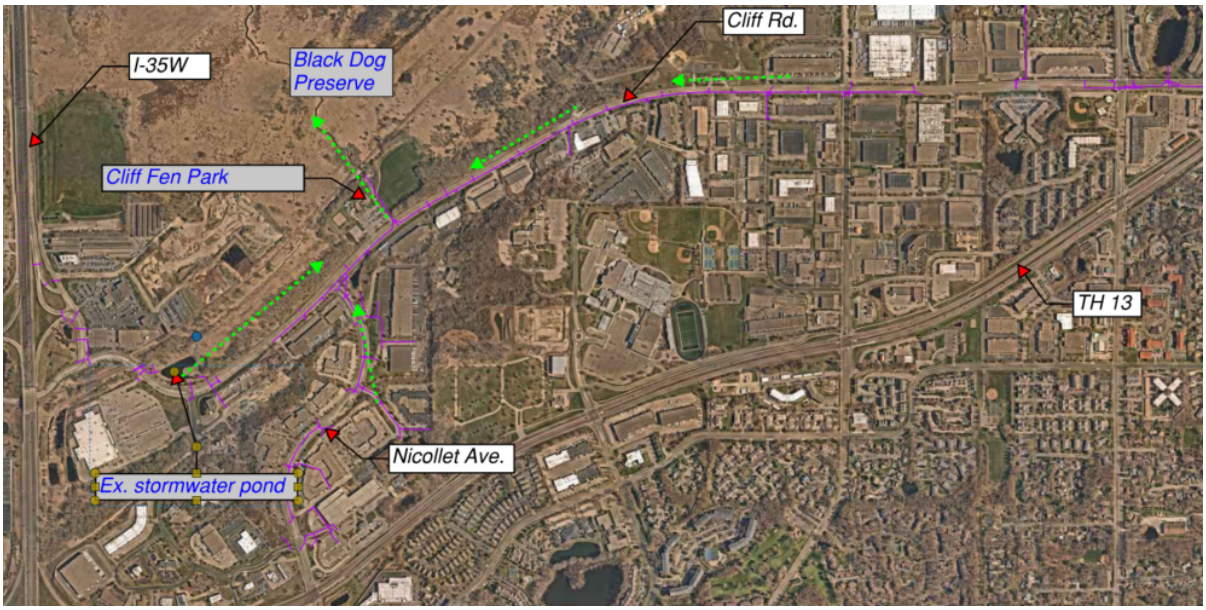
Existing Drainage

Cliff Rd. and Nicollet Ave. are both urban roadways which convey stormwater runoff in curb and gutters, catch basins, and storm sewer. Storm sewer trunklines along Cliff Rd. and Nicollet Ave. collect convey water to an outfall located in Cliff Fen Park, which ultimately drains under the railroad track and into a channel through the Black Dog Preserve. Black Dog Preserve Scenic and Natural Area (SNA) is classified as an Outstanding Resource Value Waterbody by the Minnesota Pollution Control Agency (MPCA).

There is one existing stormwater pond located on the west end of the project, on the north side of Cliff Rd. across from River Ridge Blvd. The wet pond treats a small portion of the roadway and most of the runoff from the project has no formal stormwater treatment.

The City of Burnsville reviewed the condition of the existing storm sewer trunklines and found that only a few segments of storm sewer are in poor condition. Investigation was performed in January and February of 2024.

Figure 2. Existing Drainage Patterns



Proposed Drainage

Stormwater treatment was used in the evaluation matrix of the alternatives. All of the alternatives will require stormwater treatment because the amount of reconstructed impervious exceeds the regulatory threshold. When comparing the two remaining Cliff Rd. alternatives, Alternative 2 would require half the amount of treatment than Alternative 3.

Locations for proposed stormwater treatment are limited by environmentally sensitive areas along the north side of Cliff Rd. and most of the property has been developed along the corridor. Areas for potential treatment were conceptually reviewed. One option is to construct a BMP near Cliff Fen Park, which is near the storm sewer discharge point. There may be area between the park and the railroad ditch to construct a BMP and divert low flows from the storm sewer if elevations allow. Another option is to construct an underground treatment system beneath the soccer fields east of the park or beneath the parking lot in the park. Lastly, there may be limited space to expand the existing wet pond near River Ridge Blvd.

Infiltration type BMPs are prohibited because the project is within a high or very high vulnerability drinking water supply management area (DWSMA)

Next Steps

Next steps for future project development may include:

- Selecting an alternative and re-evaluating the amount of impervious changes.
- Investigate the pipes identified as poor condition and propose options for replacing or repairing.
- Develop proposed stormwater treatment options.