METRO RAILROAD NEEDS STUDY

METROCOG

FARGO-MOORHEAD METROPOLITAN COUNCIL OF GOVERNMENTS

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LIST OF ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
AADT	Annual Average Daily Traffic
AREMA	American Railway Engineering and Maintenance-of-Way Association
BCA	Benefit-Cost Analysis
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FMCOG	Fargo-Moorhead Metropolitan Council of Governments
FRA	Federal Railroad Administration
IPaC	Information for Planning and Consultation
MAE	Multiple Account Evaluation
MUTCD	Manual on Uniform Traffic Control Devices
MNSHPO	Minnesota State Historical Preservation Office
NEPA	National Environmental Policy Act
NDSHPO	North Dakota State Historical Preservation Office
NFHL	National Flood Hazard Layer
NLCD	National Land Cover Dataset
NPS	National Park Service
NRHP	National Registry of Historic Places
NRHPA	National Historic Preservation Act
NWI	National Wetland Inventory
PROWAG	Public Right-of-Way Accessibility Guidelines
SRC	Study Review Committee
U.S. DOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Services
USGS	United States Geologic Survey

1 EXECUTIVE SUMMARY

The Fargo-Moorhead Metropolitan Council of Governments (Metro COG) initiated the Metro Railroad Crossing Improvements Needs Study in June 2024 to address growing safety, mobility, and infrastructure concerns at key railroad crossings throughout the Fargo-Moorhead metropolitan area. Prompted by discussions with BNSF Railway and local jurisdictions, the study evaluates 15 locations.

Study Objectives

The primary goals of the study include assessing existing conditions at railroad crossings, identifying and evaluating infrastructure improvement alternatives, enhancing safety, reducing delays, improving multimodal connectivity, and supporting long-term transportation planning and investment decisions.

Methodology

The study employed a comprehensive, data-driven approach. Field assessments included site visits and documenting existing conditions. Technical analysis involved desktop reviews using Federal Rail Administration (FRA) Crossing Inventory data, available traffic data, and utilizing and referencing engineering standards (AASHTO, MUTCD, PROWAG, FRA regulations). Alternatives development included conceptual layouts for grade separations, closures, realignments, and safety upgrades. Environmental review consisted of desktop analysis of wetlands, floodplains, historic sites, and other environmental constraints. A Multiple Account Evaluation (MAE) used a weighted scoring system incorporating benefits, costs, emergency access, railroad support, traffic factors, funding potential, multimodal considerations, and community impacts. A Benefit-Cost Analysis (BCA) provided high-level economic assessments of alternatives using U.S. DOT guidance.

Stakeholder and Public Engagement

The study was guided by a Study Review Committee representing local governments and transportation agencies and a Stakeholder Committee primarily representing emergency services, school districts, and community organizations. Public input was gathered through pop-up events at community gatherings, four public meetings across the metro area, and an online survey conducted from winter through summer 2025.

Key Findings and Recommendations

Each of the 15 study locations was evaluated for safety, operational efficiency, and community impact. Preferred alternatives were identified based on technical feasibility, stakeholder input, and cost-effectiveness.

40th Avenue N & 93rd Street N (Cass County): Option 1 is preferred, which closes the 93rd Street crossing and realigns the north leg of 93rd Street to intersect with 40th Ave to the east of the current intersection.

26th Street NW (West Fargo): Option 2, a six-lane overpass, is preferred to support future traffic growth and a planned I-94 interchange.

15th Street NW (West Fargo): Option 1, a new overpass, is preferred to improve connectivity in an area with anticipated industrial development.

9th Street NW (West Fargo): Option 2, a roadway overpass, is preferred to eliminate vertical clearance issues and enhance multimodal access. Railroad preference generally favors overpass configurations when compared to underpass configurations. An overpass also removes the need for a stormwater lift to remove water from the depressed roadway. An overpass would be more expensive to construct than Option 1. Both options are rated closely in MAE scoring, and if cost is a driving factor, Option 1 may be preferred.

Center Street (West Fargo): Option 2, a roadway overpass, is preferred to eliminate vertical clearance issues and enhance multimodal access. Railroad preference generally favors overpass configurations when compared to underpass configurations. An overpass would be more expensive to construct than Option 1. Both options are rated closely in MAE scoring, and if cost is a driving factor, Option 1 may be preferred.

18th Street Pedestrian Crossing (Fargo): Option 1, a pedestrian bridge with a spiral ramp, is preferred for its compact footprint and ease of winter maintenance.

7th Avenue North (Fargo): Option 2, implementing quiet zone improvements, is preferred to enhance safety and reduce noise impacts with minimal disruption.

University Drive Near 7th Avenue N (Fargo): Option 1, replacing the rail bridge and regrading the underpass, is preferred to address aging infrastructure and improve vertical clearance.

10th Street N Near 7th Avenue N (Fargo): Option 1, replacing the rail bridge and regrading the underpass, is preferred to address aging infrastructure, improve vertical clearance, and support multimodal access and safety.

19th Avenue N (Fargo): Option 1B, constructing a shared-use path on the south side, is preferred for its safer and more direct pedestrian and bicycle connection.

34th Street (Moorhead & Dilworth): Option 1, constructing a new backage road beneath the existing overpass, is preferred to restore lost connectivity and improve local circulation.

Main Street & 14th Street Grade Separation (Dilworth): Option 1, closing the Main Street crossing and constructing a 14th Street overpass, is preferred to eliminate a frequently blocked crossing and support multimodal connectivity.

40th Avenue S (Moorhead): Option 1B improves the visibility of the railroad crossing and adds crossing mechanisms to help physically separate vehicular traffic from crossing trains. The potential to designate the crossing as a quiet zone would also eliminate train horn noise for the surrounding neighborhoods.

50th Avenue S (Moorhead): Option 2, replacing the grade crossing with an overpass is preferred.

60th Avenue S (Moorhead): Option 2A, replacing the grade crossing with an overpass is preferred.

Funding Considerations

While many alternatives offer significant safety and mobility benefits, most do not meet the benefit-cost thresholds required for competitive federal grants such as BUILD or INFRA. However, several projects are well-positioned for programs like the FRA's Railroad Crossing Elimination and CRISI grants, as well as state-level funding opportunities.

Conclusion

The Metro Railroad Needs Study provides a strategic framework for prioritizing investments in rail crossing infrastructure. By aligning technical analysis with stakeholder and public input, the study offers actionable recommendations to enhance safety, mobility, and connectivity across the Fargo-Moorhead metropolitan area. These findings will support Metro COG and its partners in seeking funding and advancing transportation improvements.

2 Project Background

In June 2024, the Fargo–Moorhead Metropolitan Council of Governments (Metro COG) formally issued a Request for Proposals (RFP) for the Metro Railroad Needs Study. The study is designed to address safety and mobility concerns posed by the region's railroad crossings. Key objectives include evaluating existing conditions, assessing potential improvements, and recommending infrastructure enhancements such as grade separations (overpasses or underpasses), closure of less critical grade crossings, or upgrades to remaining crossings.

The study was initiated following discussions in early 2023 at the request of BNSF Railway between Metro COG and Fargo–Moorhead metro area representatives. These discussions centered around the growing need to evaluate the impacts of the existing railroad infrastructure on urban mobility, safety, and long-term planning within the metro area. Recognizing the significance of rail operations and their crossings, the parties identified the need for a comprehensive study that would assess current conditions and explore future improvements. Local roadway jurisdictions identified specific railroad crossing locations for inclusion in the study. These locations are shown in **Figure 2-1.**

To achieve these goals, Metro COG selected HDR Engineering Inc., to lead the development of the Fargo–Moorhead Metro Railroad Needs Study. The team organized the project and split into two sub-teams working in parallel, responsible for:

- **Collecting data on existing conditions** through extensive site visits to key railroad crossings.
- **Developing and evaluating alternatives** for each site, ranging from upgrades at existing grade crossings to potential grade separations (such as overpasses or underpasses).
- **Conducting cost-benefit analyses** to weigh the feasibility, impacts, and long-term benefits of each alternative.

Together, these efforts aim to inform both local jurisdictions and railroad stakeholders of the most effective alternative to improve safety, reduce delays, and better integrate rail infrastructure into the region's evolving transportation network.

The report serves as a critical step toward building a comprehensive understanding of how rail corridors interact with the urban environment and will provide local jurisdictions, transportation agencies, and rail stakeholders with the tools necessary to guide future infrastructure investments.

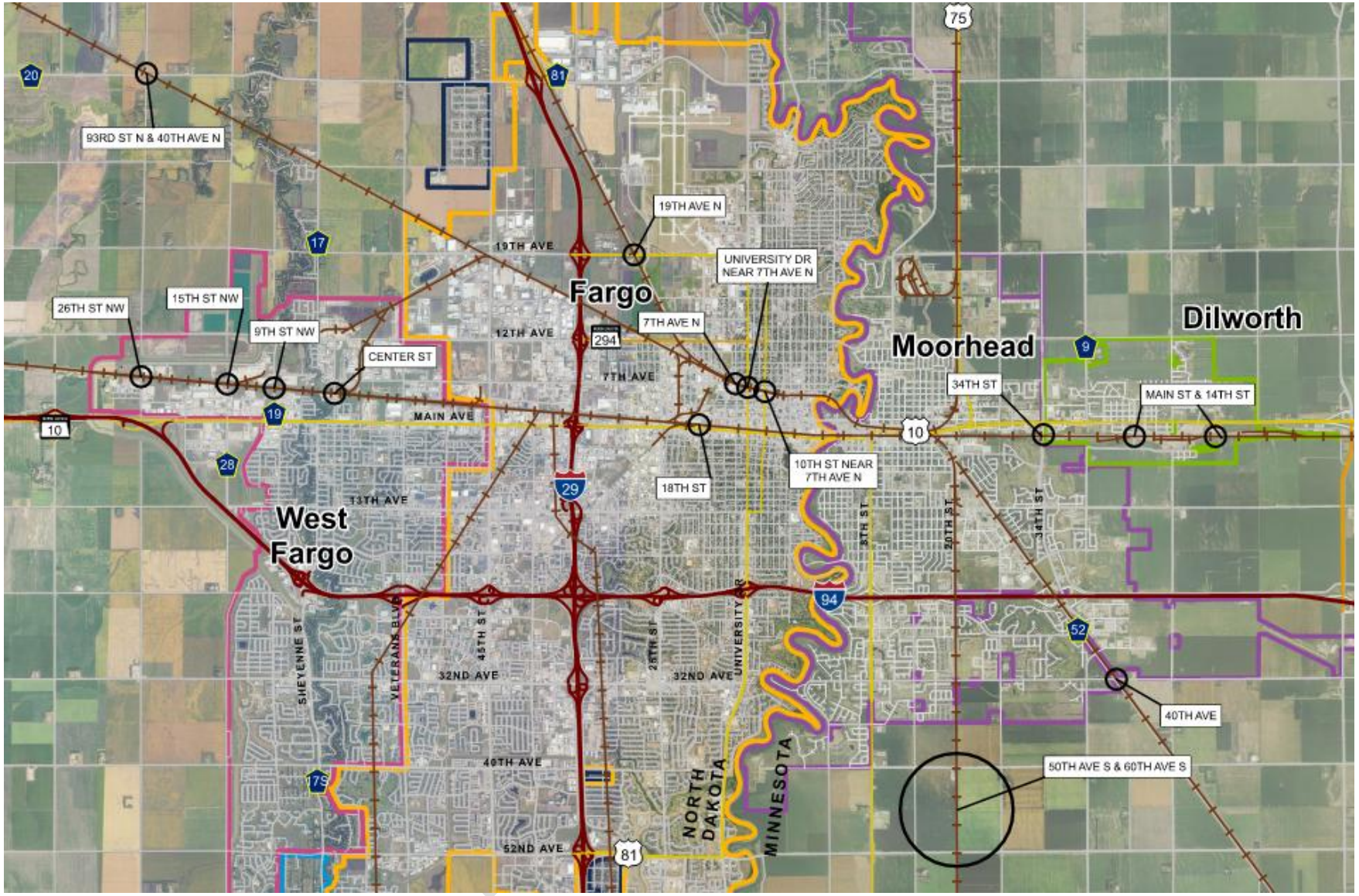

Figure 2-1: Study Locations Overview

3 Methodology

Data Collection

Site Visit Photo Documentation

At each site identified in the scope, a team documented photographically the layout of the existing conditions. The photos included elements such as railroad crossing warning devices, advanced warning signing and striping, near-crossing obstructions and properties, current conditions of structures and infrastructure, crossing types, lighting, lane configurations, pedestrian facilities, and other general considerations for determining best courses of action at each location. All photos were pulled together into a GIS database to geolocate the position taken and any other information observed by the field staff. Photos of existing crossings are included in **Appendix A.**

Reference Document Data Analysis

Where information could not be gathered in the field, a desktop evaluation of each site was used to find information needed to properly assess each crossing. Data was pulled from FRA Crossing Inventory data, traffic count information, bridge and structural as-builts and state reference databases, and Google Earth measurements. This data was used to help determine frequency of trains, AADT, height restrictions, age of infrastructure, current crossing signage, striping and protection, lane geometry, and many other pieces of information useful to developing alternatives.

Local DOT guidance, AREMA, MUTCD, AASHTO, and FRA Quiet Zone guidelines were used to guide alternative development as well.

Alternatives Analysis

Development of Alternatives

One or more alternatives were developed for each crossing location or in locations where a crossing alternative affected another crossing, as a group of crossings. Sub-alternatives were developed for each crossing as needed. Sub-alternatives did not change the primary method used for crossing the tracks in the primary alternative (e.g. grade separation, closed crossing).

Alternatives development was done using MicroStation and InRoads software. Exhibits were developed on plan sheets with annotations calling out adjustments to existing conditions, information gathered during the existing conditions task, construction limits, and any other annotations deemed necessary for describing the work included in the alternative. No survey was collected as part of this project, so exhibits were limited to fitting layouts to aerial imagery, and detailed vertical profile work was limited due to lack of ground surface information. Alternatives are defined by crossing location name and an alphanumeric indicator of alternative/sub-alternative.

Each alternative involved analyzing existing conditions and exploring options that would improve visibility of the crossing, the angle of the crossing, quiet zone compatibility in areas

with potential noise impacts, improved overall geometrics, remove crossings, reduce maintenance costs, replace aging infrastructure, and provide dedicated bike and pedestrian access. Options of varying levels of cost were analyzed where feasible.

Alternative Layout Criteria

Each option was laid out following the guidelines laid out in:

- AASHTO (American Association of State Highway and Transportation Officials) A Policy on Geometric Design of Highways and Streets, 2018, 7th Edition.
- AASHTO (American Association of State Highway and Transportation Officials) Roadside Design Guide, 2011, 4th Edition.
- Federal Highway Administration, MUTCD (Manual of Uniform Traffic Control Devices) for Streets and Highways, 2023, 11th Edition.
- The Access Board, PROWAG (Public Right-of-Way Accessibility Guidelines).
- Federal Regulations, Title 49 – Subtitle B – Chapter II Part 213, Track Safety Standards.
- Federal Regulations, Title 49 – Subtitle B – Chapter II Part 222, Use of Locomotive at Public Highway-Rail Grade Crossings.
- Union Pacific Railroad (UPRR) - BNSF Railway, Guidelines for Railroad Grade Separation Projects.
- MN MUTCD, Minnesota Manual on Uniform Traffic Control Device, August 2024.
- Minnesota Department of Transportation, Facility Design Guide, June 2023.
- Minnesota Department of Transportation, ADA (The Americans with Disabilities Acts) Standards, January 2018.

Feedback Solicitation

After initial options were developed, they were refined through meetings and events to solicit feedback from the key stakeholders and residents most likely to be impacted by the crossing construction. The study team held meetings with Metro COG staff, municipal representatives from government, public works and public safety for the communities included in the study, railroad representatives for the impacted railroads and at larger community events to collect feedback on the options as they were developed. This approach is discussed in more detail in Section 3.

The information collected allowed the study team to refine options, add new options based on suggestions and remove options that proved undesirable or not feasible based on factors not immediately obvious from the data collected.

Once there was a general consensus that options were viable and would provide the positive outcomes sought by the stakeholders and study team, they were moved into the Environmental Review and Multiple Account Evaluation processes.

Assumptions

Overpass Structure: Assume, based on UPRR-BNSF Guidelines for Railroad Grade Separation Projects, that the minimum permanent vertical clearance under the structure should be 23'-6" measured from the top of the highest rail to the lowest obstruction.

Underpass Structure: Assume, based on UPRR-BNSF Guidelines for Railroad Grade Separation Projects, that the minimum permanent vertical clearance of 16'-6" shall be provided over the entire roadway width for all new or reconstructed structures.

Overhead Pedestrian Crossing Bridge: Assume, based on UPRR-BNSF Guidelines for Railroad Grade Separation Projects, that the minimum permanent vertical clearance under the structure should be 23'-6" measured from the top of the highest rail to the lowest obstruction.

Terminology: "Alternative and "Option" may be used interchangeably in this report.

Environmental Review

A high-level desktop review of environmental resources was completed for each crossing to evaluate potential impacts and to identify measures for avoidance and minimization of potential adverse impacts. The desktop review was completed within a 1,000-foot buffer of the center point for each crossing location and used data from several online resources:

- USFWS – National Wetland Inventory (NWI)
- USFWS – Information for Planning and Consultation (IPaC)
- FEMA – National Flood Hazard Layer (NFHL)
- USGS – National Land Cover Dataset (NLCD)
- NPS – National Registry of Historic Places (NRHP)
- EPA – NEPAssist Tool

A Class I file search was completed at the North Dakota State Historical Preservation Office (NDSHPO) and cultural resource files for crossing locations in Minnesota were obtained from the Office of the State Archaeologist Portal through the Minnesota State Historic Preservation Office (MNSHPO).

Only environmental resources that were present within each crossing are discussed in the *Existing Conditions* for each study location. Potential impacts and required permits are discussed in *Environmental Permitting* for each study location.

Please refer to **Appendix B** for a summary table that includes identified environmental resources for each crossing location.

Draft Purpose and Need Framework

A Purpose and Need Statement articulates the underlying transportation problem and the objectives the proposed project seeks to achieve. The "need" identifies the specific issues or deficiencies, such as potential safety concerns, congestion, or infrastructure limitations. The "purpose" outlines the intended outcomes or improvements that address those issues.

The study team developed a draft Purpose and Need framework for each of the study locations. Identifying draft components of the Purpose and Need Statement(s) in the planning process is important because it helps guide the development and evaluation of potential alternatives, aids in achieving alignment among stakeholders, and supports compliance with environmental review requirements.

Multiple Account Evaluation

Multiple Account Evaluation Framework

The Multiple Account Evaluation (MAE) framework establishes a structure that highlights the key criteria or factors in grading the alternatives. In particular, this framework was adopted as it was the most flexible in scoring alternatives based on both quantitative and qualitative factors.

As part of the MAE framework, a key step is to develop the evaluation criteria against which the alternatives would be assessed. These criteria were developed based not only on various quantitative and qualitative benefits of an alternative, but also on other factors such as public and private support for the alternative, as well as the alternative's competitiveness for public funding. These criteria were developed with MetroCOG's support and approval.

The following are the selected criteria and their corresponding definition.

Magnitude of Project Benefits: This evaluation criterion is based on the magnitude of quantified socio-economic benefits (e.g. reduced crashes, travel time savings, avoided idling time) associated with the project alternative. Project alternatives estimated to generate the largest number of benefits to society will score higher in this category.

Magnitude of Project Costs: This evaluation criterion is based on the expected total project capital costs associated with the project alternative. Project alternatives with lower capital costs will score higher in this category.

Emergency Service Access: This evaluation category assesses the expected impact a project alternative has on emergency service vehicle access. Project alternatives will be scored on whether or not they will improve emergency service access, and if so, the magnitude of each improvement.

Railroad Support Potential: This category provides an overview of the potential level of support that regional railroad providers could display for each project alternative. Improvements such as grade crossing eliminations and

crossing improvements improve the regional efficiency of rail operations and thus have a cascading impact on regional and state supply chain efficiency.

Train Traffic: This criterion is based on the level of freight and passenger train traffic moving through each project area. Project improvements in areas with higher levels of train activity typically yield larger benefits to both society by reducing roadway-rail interaction, reducing travel times for both trains and roadway users, as well as the potential for collisions.

Discretionary Funding Potential: This evaluation criterion is based on how competitive each project alternative is for various federal discretionary grant funding opportunities. Factors influencing project competitiveness include, but are not limited to: project readiness (how quickly construction could start following receipt of funds), committed local and non-federal funding match amounts, challenges that the project aims to address, workforce development and training information, trespassing injury and fatality prevention and reduction, effects on system and service performance, effects on safety, competitiveness, reliability, trip or transit time, etc.

Multimodal Mobility & Active Transportation: This criterion is dedicated to assessing the ability of the project alternative to improve or integrate active transportation facilities into the project area, promoting regional multimodal transportation options.

Community Impacts: The category is dedicated to assessing the impacts that a project alternative has on the surrounding community. Examples of factors influencing this category include community involvement and support, reduction of train noise (quiet zones), connectivity to local businesses and residential areas, and the surrounding population density.

School Bus Traffic: This criterion is evaluated based on the level of school bus activity in each project area. Project alternatives seeking to reduce railroad-school bus interaction promote safety outcomes.

Criteria Weighting Methodology and Results

Following the selection of the criteria, one key aspect is to determine the relative weighting of each criterion. This helps indicate the relative importance of the categories and helps determine the overall scoring of each alternative. To ensure the criteria weights were determined in quantified approach that incorporates the overarching views of the Study Review Committee and the Stakeholder Committee, a survey was conducted in which the respondents compared criteria in a pairwise analysis approach identifying which criteria is more important. In particular, the responses were aggregated to reflect the head-to-head scoring between the criteria, which

were then used to determine to relative weights amongst the criteria.

The survey was sent out on April 17th, 2025, and May 16th, 2025, was the last date in which responses were collected. In total, 20 of the 30 respondents provided a response to the survey, which translates to a 66.7 percent response rate. Everyone who was contacted was either from the Study Review Committee or the Stakeholder Committee. **Table 3-1** highlights the total score by criterion and their respective weights used.

Table 3-1: Multiple Account Evaluation Criteria and Weights

Criteria	Weight
Magnitude of Project Benefits	16.7%
Emergency Service Access	16.1%
Community Impacts	13.3%
Magnitude of Project Costs	12.6%
Discretionary Funding Potential	10.1%
Multimodal Mobility & Active Transportation	8.8%
School Bus Traffic	7.8%
Train Traffic	7.5%
Railroad Support	7.1%

Benefit-Cost Analysis

Benefit-Cost Analysis Framework

In addition to the MAE analysis, a benefit-cost analysis (BCA) was conducted for each of the alternatives to measure the quantifiable benefits of an alternative relative to their costs, while aligning to the methodologies from the U.S. Department of Transportation's (U.S. DOT's) *Benefit-Cost Analysis Guidance for Discretionary Grant Programs*.[1] In particular, a BCA provides estimates of the benefits that are expected to accrue over a specific period and compares them to the anticipated costs. Costs include both the resources required to develop the infrastructure, while the benefits are based on the projected impacts of the alternatives valued in monetary terms.

The specific methodology employed for this study was developed using the BCA guidance developed by U.S. DOT, which involves:

- Establishing existing and future conditions under the Base Case (No-Build) and Alternative Case (Build) scenarios;
- Measuring benefits in dollar terms, whenever possible, and expressing benefits and cost in a common unit of measurement; and,
- Discounting future benefits and costs with the real discount rates recommended by U.S. DOT.

[1] U.S. Department of Transportation. *Benefit-Cost Analysis for Discretionary Grant Programs.* May 2025.

While a BCA was conducted for majority of alternatives, there are some limitations to the analyses that were done. In particular, as the assessed alternatives are in early developmental stages and due to data limitations, the BCAs were conducted at a high-level for general planning purposes. Additionally, BCAs were not conducted for select alternatives due to a lack of data. Finally, a more in-depth analysis and additional data should be considered as part of any public funding application. Despite this, the BCA results are still informative to highlight the general impacts generated by the respective alternatives.

General Benefit-Cost Analysis Assumptions

As the BCA measures the benefits against costs throughout a period of analysis, beginning at the start of construction, the analysis ensured that the timeframe assessed for each alternative is overall consistent, to provide a similar comparison not only between alternatives within a project location, but all the alternatives assessed. That is, for all alternatives, the period of analysis starts in 2026 and ends in 2050.

The monetized benefits and costs are estimated in 2023 dollars, with future dollars discounted in complained with U.S. DOT guidance.[2]

The methodology makes several important assumptions and seeks to avoid overestimation of benefits and underestimation of costs. Specifically:

- Input prices are expressed in 2023 dollars;
- The period of analysis begins in 2025 and ends in 2050, with most alternatives constructed by 2030 or 2031; and
- A constant 7.0 percent real discount rate is applied to all impacts.

Beyond the key assumptions above, the analysis considered additional regional assumptions that were applicable to majority of the alternatives assessed within the BCA framework, all of which are presented in the **Table 3-2**.

[2] U.S. Department of Transportation. *Benefit-Cost Analysis for Discretionary Grant Programs.*

Table 3-2: Regional Assumptions used in the Benefit-Cost Analysis

Variable Name	Unit	Value	Source
Discount Rate	%	7%	U.S. DOT BCA Guidance. May 2025.
Annualization Factor	days	365	
Base Year of Analysis	year	2023	
Years of Benefits	years	20	
First Year of Study Period	year	2025	Current Year.
Fargo Population Growth Rate	%	1.2%	North Dakota State Data Center Population Projections. February 2024.
Freight Train Growth Rate	%	1.8%	Freight Analysis Framework. Combined Origin/destination rail freight for North Dakota.

Benefits

This section describes the measurement approach used for each benefit or impact category assessed in the BCA. Specifically, it provides an overview of the associated methodology and general assumptions. Location or alternative specific assumptions are presented with in the respective discussion of the location or alternative.

As the benefits and impacts vary by the project location and alternative, **Table 3-3** highlights which benefit categories were assessed for each alternative.

Table 3-3: Benefits Matrix

Alternatives	Transportation Safety	Travel Time Savings	Vehicle Operating Cost Savings	Environmental Benefits	O&M Cost Savings	Active Transportation Benefits	Residual Value of Assets
40th Ave and 93rd Street - Option 1	●	●	●	●			●
40th Ave and 93rd Street - Option 2	●	●	●	●			●
26th Street NW - Option 1	●	●	●	●			●
26th Street NW - Option 2	●	●	●	●			●
15th Street - Option 1		●					●
9th Street NW - Option 1	●				●	●	●
9th Street NW - Option 2	●				●	●	●
Center Street - Option 1	●				●		●
Center Street - Option 2	●				●		●
18th Street Pedestrian Crossing - Option 1		●					●
18th Street Pedestrian Crossing - Option 2		●					●
18th Street Pedestrian Crossing - Option 3		●					●
7th Ave - Option 1	●	●	●	●			●
7th Ave - Option 2	●	●	●	●			
University Bridge - Option 1	●				●		●
10th Bridge - Option 1	●				●		●
19th Ave - Option 1A						●	●
19th Ave - Option 1B						●	●
34th Street - Option 1							●
14th Street - Option 1	●	●	●	●			●
40th Ave S - Option 1A							●
40th Ave S - Option 1B	●						●
40th Ave S - Option 2A	●	●	●	●			
50th Ave - Option 1	●						●
50th Ave - Option 2	●	●	●	●			●
60th Ave - Option 1	●						●
60th Ave - Option 2A	●	●	●	●			●
60th Ave - Option 2B	●	●	●	●			●

Transportation Safety

Accident costs and impacts on life, limb, and property are a significant component of transportation user costs. Transportation safety is a key economic factor when it comes to planning, as well as an important indicator of efficiency and notable subject of public concern. The alternatives are expected to impact transportation safety for trains and roadway users in various ways.

One way in which transportation safety was assessed was for alternatives proposing to grade separate existing grade crossings. The removal of grade crossings is generally associated with the elimination of highway-rail incidents at the grade crossing. This approach leverages the Federal Railroad Administration's (FRA's) new accident prediction and severity model (APS20) methodology to estimate the number of vehicle-train crashes at the grade crossing, by severity, based on the following factors:

- Annual average vehicle traffic at the crossing
- Number of the trains traveling through the crossing, split by thru and switching trains;
- The maximum timetable speed;
- Whether the crossing is in an urban or rural area;
- The crossing's existing safety equipment;
- The crossing's surface material; and
- The number of accidents at the crossing in the past 5 years.

If the alternative considers improvements to the existing crossing's safety equipment, the analysis assesses the impacts to transportations safety based on the predicted number of vehicle-train accidents at the crossing based on the APS20 methodology, as well as the effectiveness of the new safety equipment relative to the existing equipment. In particular, the safety effectiveness factor, obtained from FRA's GradeDEC tool, considers the number of trains per day at the crossing, as well as the number of tracks at the crossing.

Finally, for alternatives that impact the additional distance that vehicles are expected to travel, the analysis estimates the safety impacts based on the change in vehicle-miles traveled and the per-vehicle-mile accident rates, by severity.

The three approaches outlined above will estimate transportation safety impacts through the change in fatalities, injuries, and property-damage-only (PDO) events. The accidents, by severity, are then monetized using the respective monetization factors provided within the U.S. DOT BCA guidance.

The general assumptions used in the estimation of transportation safety are presented in **Table 3-4**.

Table 3-4: General Assumptions used in the Estimation of Transportation Safety

Variable Name	Unit	Value	Source
Rail Safety Assumptions			
Implement Flashing Lights and Gates	factor	0.90	Federal Railroad Administration. GradeDEC. 2025.
Implement 4 Quadrant Gate System	factor	0.77	
Roadway Safety Assumptions			
Fatality Rate	fatalities/ 100m VMT	1.07	North Dakota Highway Safety Improvement Program, 2024 Annual Report.
Serious Injury	injuries/ 100m VMT	4.54	
Monetization Factors			
Fatal Crashes	2023$/crash	$14,806,000	Benefit-Cost Analysis Guidance for Discretionary Grant Programs. U.S. DOT. May 2025.
Injury Crashes	2023$/crash	$329,500	
PDO Crashes	2023$/crash	$9,500	
Fatality Cost	2023$/fatality	$13,200,000	
Injury Cost	2023$/injury	$1,254,700	

Travel Time Savings

For alternatives seeking to improve the flow of traffic by primarily reducing vehicle idling time, this is expected to translate into travel time savings to roadway users. Specifically, by grade separating a crossing, it is expected to eliminate instances in which vehicles are idling waiting for a train to clear the crossing. These impacts, at a high level, are estimated based on the vehicle and train traffic at the crossing, the length of the train, and the average train speed.

Additionally, as some alternatives are expected to impact roadway configurations or introduce new roadway connections, this is expected to result in a change in travel times. These impacts were also factored within the BCA, where possible.

The total change in vehicle travel time is then split by passenger vehicles and trucks based on the share of truck traffic through the crossing and converted to person-hours of travel time savings based on average vehicle occupancy by vehicle type. Finally, the travel time savings benefit is estimated based on the person-hours of travel time savings, by vehicle type, and the corresponding value of time obtained from the U.S. DOT BCA guidance.

The general assumptions used in the estimation of travel time savings are presented in **Table 3-5.**

Table 3-5: General Assumptions used in the Estimation of Travel Time Savings

Variable Name	Unit	Value	Source
Delay Assumptions			
Average Length of Freight Trains	ft/train	7,500	Estimated based on average train lengths of Class I Railroads.
Average Length of Switch Trains	ft/train	500	Assumption.
Average Length of Passenger Trains	ft/train	1,000	Assumption.
Lead Lag Time	mins	0.5	Industry standard.
Average Freight Train Speed	miles/hour	Varies	N/A.
Average Vehicle Speed	miles/hour	Varies	N/A.
Passenger Vehicle Occupancy	persons/ vehicle	1.52	U.S. DOT BCA Guidance. May 2025.
Truck Occupancy	persons/ vehicle	1	Assumption.
School Bus Occupancy	persons/ vehicle	40	National Highway Traffic Safety Administration (NHTSA).
Monetization Factors			
Value of Time - Automobile	2023$/ hour	$21.10	U.S. Department of Transportation. May 2025, Table A-2: Value of Travel Time Savings.
Value of Time - Truck Driver	2023$/ hour	$35.70	
Value of Time - Bus Driver	2023$/ hour	$42.60	
Value of Time - Pedestrians and Cyclists	2023$/ hour	$38.80	

Vehicle Operating Cost Savings

By reducing vehicle idling time, alternatives are also expected to reduce vehicle operating costs in addition to reducing travel time. In particular, the analysis focuses on the avoided fuel consumption from idling vehicles. This was estimated by the annual number of hours idling by vehicle type and the idle fuel consumption rate, which is then monetized using the annual forecast of fuel prices presented in the U.S. Energy Information Administration's 2025 Annual Energy Outlook[3].

Additionally, in some scenarios there are instances where there are incremental vehicle operating costs between the Build and No Build scenarios generated from changes in roadway travel distances because of the slight aforementioned detours. In these cases, vehicle operating costs are a function of distance traveled and the per-mile rate of vehicle operating costs, which accounts for fuel, maintenance costs, tires and vehicle depreciation.

The general assumptions used in the estimation of vehicle operating cost savings are presented in **Table 3-6** and **Table 3-7**.

Table 3-6: General Assumptions used in the Estimation of Vehicle Operating Cost Savings

Variable Name	Unit	Value	Source
Gasoline Burned at Idle - Autos	gallons/hour	0.44	US DOE: Alternative Fuels Data Center and Argonne National Laboratory, "Idle Reduction Savings Worksheet" (2018)
Diesel Fuel Burned at Idle - Trucks	gallons/hour	0.9	
Vehicle Operating Costs - Autos	2023$/mile	$0.56	U.S. DOT BCA Guidance. May 2025.
Vehicle Operating Costs - Trucks	2023$/mile	$1.27	
Vehicle Operating Costs - School Bus	2023$/mile	$1.36	

[3] U.S. Energy Information Administration. *Annual Energy Outlook 2025*. April 2025. Accessed: May 2025.

Table 3-7: Fuel Cost Assumptions, 2023 Dollars

Year	Fuel Prices (2023$/gallon)		Source
	Gasoline	Diesel Fuel	
2024	$2.50	$2.54	EIA's Annual Energy Outlook 2025. Table 57: Components of Selected Petroleum Product Prices. Fuel prices are net of state and federal taxes. Converted to 2023$ using GDP Deflators.
2025	$2.32	$2.31	
2026	$2.13	$2.23	
2027	$2.08	$2.24	
2028	$2.05	$2.27	
2029	$2.02	$2.31	
2030	$2.03	$2.35	
2031	$2.04	$2.37	
2032	$2.02	$2.35	
2033	$2.01	$2.40	
2034	$2.02	$2.43	
2035	$2.00	$2.47	
2036	$2.01	$2.49	
2037	$2.00	$2.52	
2038	$1.96	$2.53	
2039	$1.95	$2.56	
2040	$1.94	$2.59	
2041	$1.90	$2.62	
2042	$1.87	$2.64	
2043	$1.88	$2.69	
2044	$1.76	$2.72	
2045	$1.77	$2.74	
2046	$1.73	$2.77	
2047	$1.77	$2.86	
2048	$1.78	$2.87	
2049	$1.79	$2.87	
2050	$1.81	$2.88	
2051	$1.79	$2.89	

Environmental Benefits

Environmental costs are increasingly considered an essential component in evaluating transportation projects. In particular, the alternatives will look to generate environmental benefits based on eliminating vehicle idling time at grade crossings through grade separation. This impact is estimated based on the vehicle delay time, by vehicle type, and the corresponding idling emission factors from the U.S. Environmental Protection Agency's (EPA's) Motor Vehicle Emissions Simulator module (MOVES)[4] for select pollutants. In certain scenarios where an alternative route is considered, emissions are estimated based on travel distances and emission factors on a per mile basis for each pollutant. Finally, the environmental benefits were estimated based on the total avoided metric tons of pollutants (CO_2, NO_X, VOC, $PM_{2.5}$, and SO_2) and monetize them based on their respective monetary value (per metric ton) from the U.S. DOT BCA Guidance.

Table 3-8 highlights the assumptions used in monetizing the environmental benefits, while the emission factors by vehicle type are presented in the **Supplemental Tables** section.

[4] U.S. Environmental Protection Agency. MOVESS and Mobile Source Emissions Research. Accessed: March 2025.

Table 3-8: Social Cost of Emissions, 2023 Dollars

Year	Emissions Value (2023$/metric ton)			Source
	NO_X	$PM_{2.5}$	SO_2	
2024	$18,800	$912,200	$50,900	Technical Support Document: Estimating the Benefit per Ton of Reducing $PM_{2.5}$ Precursors from 17 Sectors (February 2018)" https://www.epa.gov/sites/default/files/2018-02/documents/sourceapportionmentbpttsd_2018.pdf NO_X, SO_X, and $PM_{2.5}$ values are inflated from 2015 to 2023 dollars using the GDP deflator. **Note:** Fuel saved (gasoline, diesel, natural gas, etc.) can be converted into metric tons of emissions using EPA guidelines available at https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references Values beyond 2051 are constant
2025	$19,000	$928,000	$51,900	
2026	$19,400	$942,700	$52,900	
2027	$19,800	$957,700	$53,800	
2028	$20,100	$972,900	$54,800	
2029	$20,500	$988,400	$55,800	
2030	$20,900	$1,004,100	$56,800	
2031	$20,900	$1,004,100	$56,800	
2032	$20,900	$1,004,100	$56,800	
2033	$20,900	$1,004,100	$56,800	
2034	$20,900	$1,004,100	$56,800	
2035	$20,900	$1,004,100	$56,800	
2036	$20,900	$1,004,100	$56,800	
2037	$20,900	$1,004,100	$56,800	
2038	$20,900	$1,004,100	$56,800	
2039	$20,900	$1,004,100	$56,800	
2040	$20,900	$1,004,100	$56,800	
2041	$20,900	$1,004,100	$56,800	
2042	$20,900	$1,004,100	$56,800	
2043	$20,900	$1,004,100	$56,800	
2044	$20,900	$1,004,100	$56,800	
2045	$20,900	$1,004,100	$56,800	
2046	$20,900	$1,004,100	$56,800	
2047	$20,900	$1,004,100	$56,800	
2048	$20,900	$1,004,100	$56,800	
2049	$20,900	$1,004,100	$56,800	
2050	$20,900	$1,004,100	$56,800	
2051	$20,900	$1,004,100	$56,800	

Operations & Maintenance Cost Savings

Some alternatives assessed within the BCA look to replace aging infrastructure that are nearing the end of their useful life. These alternatives would otherwise have incurred some repair costs to extend the useful life of the respective asset, which are otherwise avoidable with a new infrastructure. Based on high level analysis conducted by civil engineers at HDR, it was deemed that a one-time cost of $2 million would be appropriate to use for the purpose of the benefit-cost analysis. While various alternatives are expected to generate additional changes to the O&M for transportation infrastructure, these impacts were excluded due to data limitations and the likelihood that the outcomes are negligible in relative magnitude that would not change the overall findings from the BCA.

Active Transportation Benefits

Some alternatives assessed within the BCA include the construction, or expansion of shared-use paths, or other infrastructure improvements supporting safe and effective transportation for pedestrians and cyclists. These improvements will enhance mobility and strengthen community connectivity for non-motorized travelers by improving the quality of journeys made by active transportation.

A number of the alternatives seek to not only improve travel times for pedestrians and cyclists through enhanced connectivity, but also to ensure greater safety, thereby reducing the implicit cost of travel for pedestrians and cyclists. Improvements monetized for some alternatives in this analysis include sidewalk widening, the extension of shared-use paths, and reduced mortality risks by inducing additional local residents to travel via active transportation. The assumptions used to estimate active transportation benefits are presented in **Table 3-9**.

Table 3-9: General Assumptions used in the Estimation of Active Transportation Benefits

Variable Name	Unit	Value	Source
Additional Induced Cyclist Activity due to SUP	%	23.0%	A systematic review of the effect of infrastructural interventions to promote cycling: strengthening causal inference from observational data.
Additional Induced Walking Activity due to SUP	%	10.0%	Assumption.
Cycling Path with no Grade Crossings	2023$/mile	$2.13	U.S. DOT BCA Guidance. May 2025.
Expand Sidewalk (per foot of added width)	2023$/mile	$0.11	
Mortality Reduction from Induced Walking Trips	2023$/trip	$8.06	
Mortality Reduction from Induced Biking Trips	2023$/trip	$7.18	

Residual Value of Capital Assets

The residual value is estimated to quantify the benefits associated with new infrastructure with a useful life beyond the study period. Alternatives considering bridge structures are expected to have a useful life of 50 years, which extends beyond the 20-year study period. As such, due to the time period considered for the analysis, the remaining (or residual) value of the new infrastructure asset is not fully captured. The bridge related project components are considered to have useful life beyond the study period, and their estimated lifespan was deducted from the analysis benefit period to obtain the remainder of the service life outside the study period. The remaining life as a factor of the estimated asset service life was multiplied by the project capital costs to derive the estimate. Additionally, for any right-of-way land acquisition as part of the project, the residual value of that component is expected to equal the initial value of the land.

4 Engagement

Study Review Committee

Throughout the study, the team was guided by input from the Study Review Committee (SRC). The primary roles and responsibilities of the SRC were as follows:

- Review scope and project schedule.
- Identify and manage project risks.
- Help inform/debrief applicable stakeholders/policymakers.
- Provide feedback on project deliverables.
- Review results, findings, and recommendations.

Three SRC meetings were held throughout the course of the study. The first meeting focused on introducing the SRC to the study locations, reviewing the scope of the study, discussing and gathering any additional information on existing conditions, and sharing initial, alternative development. The second meeting shared current and upcoming community engagement, reviewed revised alternative development, and gathered feedback from the SRC on alternatives. The third SRC meeting reviewed final alternatives and report content, including benefit-cost analysis and multiple account evaluation, as well as a summary of study engagement efforts and input gathered.

Table 4-1: Study Review Committee Members

Name	Entity	Position
Alex Fiorini [1]	BNSF	BNSF Liaison
Alexis Jones [2]	BNSF	Manager Public Projects
Greg Poepping	OTVR	OTVR Liaison / OTVR AGM
Justin Sorum	Clay County	County Engineer
Peyton Mastera	City of Dilworth	City Administrator
Don Lorsung*	City of Dilworth	Community Development Director
Jonathan Atkins	City of Moorhead	Traffic Engineer
Jeremy Gorden	City of Fargo	Traffic Engineer
Daniel Hanson	City of West Fargo	City Engineer
Cole Hansen	Cass County	County Planner
Tom Soucy*	Cass County	Assistant County Engineer
Stewart Milakovic	NDDOT	Transportation Planner
Jim Styron*	NDDOT	Highway/Rail Crossing Safety Manager
Chad Nieman	MnDOT	Rail & Freight Project Manager
Mary Safgren*	MnDOT	District 4 Planning Director
Jason Gottfried*	MnDOT Office of System Transportation Management	MPO Coordinator
Dan Farnsworth	FM Metro COG	Transportation Planner
Ben Griffith	FM Metro COG	Executive Director

[1] Left position during study
[2] Started position during study
* Alternate

Stakeholder Committee

Throughout the study, the team was informed by input and feedback from a Stakeholder Committee. The primary roles and responsibilities of the Stakeholder committee were as follows:

- Help inform the study team.
- Provide feedback on project deliverables.

Two Stakeholder Committee meetings were held throughout the course of the study. The first meeting focused on introducing the Stakeholder Committee to the study locations, reviewing the scope of the study, discussing and gathering any additional information on existing conditions, and sharing initial, alternative development. The second meeting focused on current and upcoming community engagement, reviewed revised alternative development, and gathered feedback on alternatives.

Table 4-2. Stakeholder Committee Members

Name	Entity	Position
Jeff Wallin	Moorhead Fire Department	Fire Chief
Thomas Clark	West Fargo Fire Department	Deputy Chief
Terry Steen	FMCOG Bicycle/Pedestrian Committee	Citizen Representative
Tony Schmitt	Fargo Park District	Park Director
Craig Nelson	Fargo Fire Department	Division Chief
Luke Grittner	MATBUS	Transit Planner
Randy Burkhartsmeier	West Fargo Police Department	Commander
Katherine Grindberg	Chamber of Commerce	Executive Vice President
Joshua Smith	Fargo Public Schools	FPS Safety and Emergency Management Coordinator
Matt Christensen	Fargo Police Department	Captain of Neighborhood Services Division
Scott Steffes	Moorhead Area Public Schools	School Board, Chair
Bradley Redmond	West Fargo Public Schools	Transportation Director

Public Engagement

Pop-up events

The study scope included two pop-up events in the community. These events generally involve setting up a table or booth at a community event that draws members of the public and creates an opportunity to meet them where they are. The study team identified multiple events throughout the metro area as possible opportunities for pop-ups and ultimately selected two of them. A summary of input and further details on pop-up events are available in the Engagement Summary, which is included as **Appendix C.**

Frostival Winter Warm Up

The first opportunity the team selected was the Frostival Winter Warm Up at the Rourke Museum in Moorhead, MN. This was part of the community Frostival series of events that span more than a week each winter in the community. The Frostival Winter Warm Up ran from 1:00 – 4:00 p.m. on Saturday, February 1, 2025.

Spring-A-Ding Fling and 67th Annual Kiwanis Pancake Karnival

The second pop-up event took place at the Fargodome on Saturday, February 8, 2025, from 9:00 a.m. to 12:00 p.m. The Spring-A-Ding Fling is a craft and vendor show featuring local artists, and the Annual Kiwanis Pancake Karnival drew over 6,000 visitors to the Fargodome. These events allowed the team to engage with the significant foot traffic in the Fargodome lobby.

Table Setup

The team set up booth materials that provided a variety of opportunities for input and starting conversations with project staff. Activities included:

- A dot map where attendees could place a sticker indicating priorities for railroad crossing improvements (safety, bicycle and pedestrian access, traffic congestion, and emergency management access).
- Railroad crossing safety coloring sheet for kids with crayons.
- Computer station where attendees could fill out an online survey.
- A floor mat with a wooden train set for kids (at the Winter Warm Up event).

In addition, a handout shared information about the study as well as included a QR code which directed the user to an online survey. At the Winter Warm Up event, a flyer was also available promoting the opportunity to speak with the project team at the Fargodome at the Spring-A-Ding Fling and 67th Annual Pancake Karnival events. Comment forms were also available.

Figure 4-1. Pop-up event at Kiwanis Pancake Karnival

Public Meetings

The second phase of engagement focused on sharing alternatives development for public feedback with key jurisdictions.

Four public meetings were held, one in each key jurisdiction, from 5 to 7 p.m. The schedule was as follows: July 1, 2025, at the Rustad Recreation Center in West Fargo; July 8, 2025, at the Fargo Public Library; July 10, 2025, at the Hjemkomst Center in Moorhead; and July 14, 2025, at the Dilworth Depot Building.

Public meetings were promoted through postcards which were sent to owners of properties near study locations, publication in *The Forum*, flyers, and press releases.

Attendees had the opportunity to review alternatives to improve the identified railroad crossings, learn about the proposed assessment criteria of these alternatives, and get more information about the project timeline and its next steps. General comments, both verbal and written, were also encouraged and recorded. Members of the project team were available for the duration of each public meeting to interact with area residents and other stakeholders.

For a full summary of public meeting outreach efforts, specific event details, and comments received, please see the Engagement Summary, which is included as **Appendix C**.

Figure 4-2. Public Meeting at the Dilworth Depot Building

Online Survey

An online survey was available for the public to participate in from winter through the late summer of 2025. The survey was promoted through social media and in person at all pop-up events and public meetings. For full survey results, please see the Engagement Summary, which is included as **Appendix C**.

Study Locations

5 40th Avenue N & 93rd Street N

Crossing Numbers 092956M & 092957U

Cass County, ND

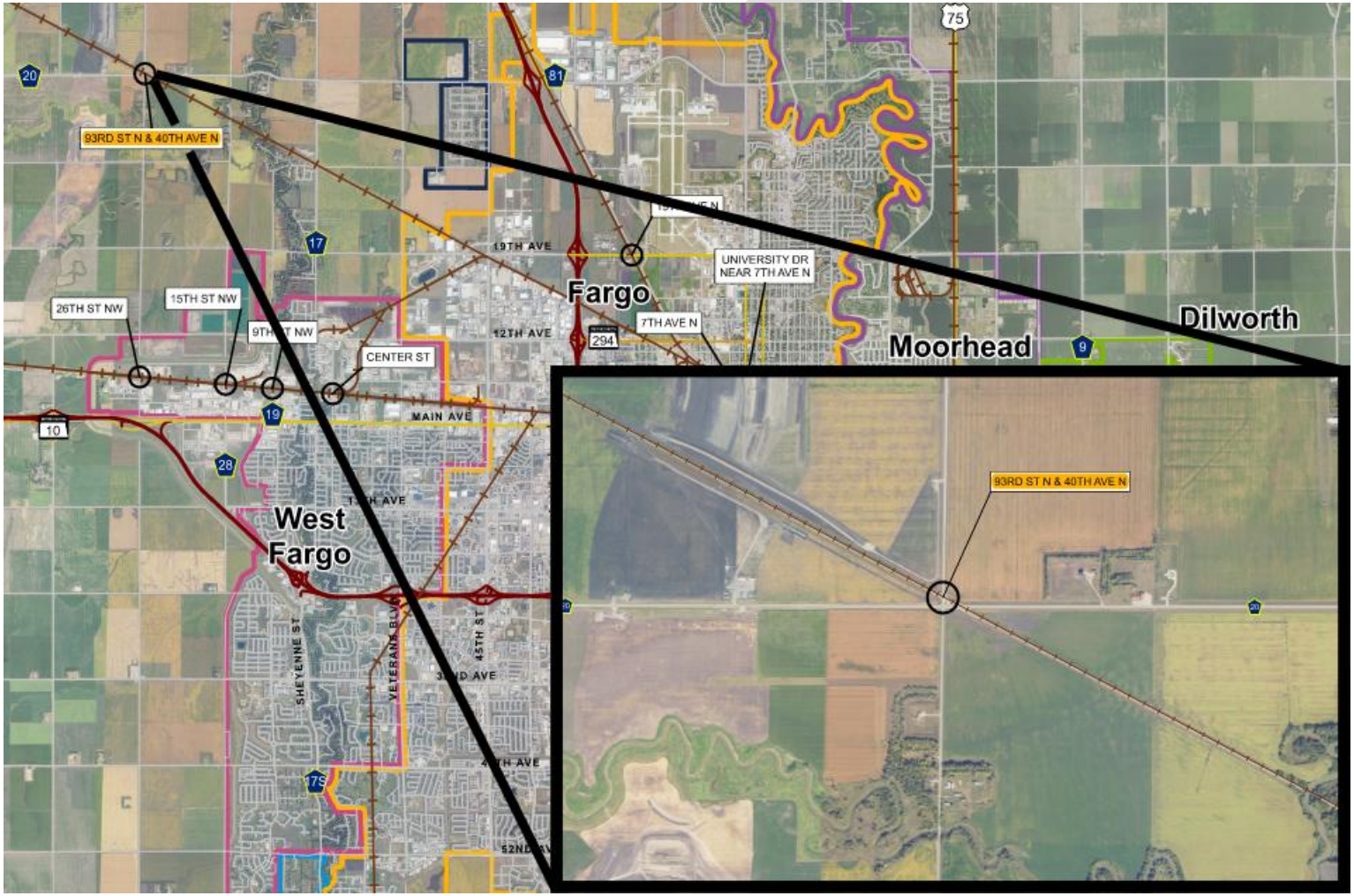

Figure 5-1. 40th Avenue N & 93rd Street N Study Location

Existing Conditions

Table 5-1: Crossing Summary – 40th Avenue N

Existing Warning Device	2 Quad crossing gates with flashing lights and mounted crossbucks
Railroad	BNSF
Trains per Day/ Timetable Speed	1/ 40 mph
AADT/Posted Speed Limit	755 (2024) / 55 mph
Crash History	N/A
Existing Roadway Surface	Paved

Table 5-2: Crossing Summary – 93rd Street N

Existing Warning Device	2 Quad crossing gates with flashing lights and mounted crossbucks
Railroad	BNSF
Trains per Day/ Timetable Speed	1 / 40 mph
AADT/Posted Speed Limit	150 (1988) / 55 mph
Crash History	N/A
Existing Roadway Surface	Unpaved

40th Avenue N is a two-lane paved roadway intersecting perpendicularly with 93rd Street N and 26th Street NW. West of grade crossing 092956M, 40th Avenue N consists of approximately 350 feet of paved surface before transitioning to an unpaved roadway. The surrounding area is predominantly agricultural farmland.

Based on 2024 traffic data, the Annual Average Daily Traffic (AADT) for 40th Avenue N is 755 vehicles per day, with 16% classified as trucks. For 93rd Street N, the 1988 AADT was 150 vehicles per day, also with 16% truck traffic. The posted speed limit on all adjacent roadways is 55 mph. There are no pedestrian or bicycle facilities present in the vicinity.

The grade crossing is owned and maintained by BNSF Railway and consists of a single track used for freight service. Train frequency averages one train per week, operating at a maximum timetable speed of 40 mph. The track is part of the S. Moorhead–Nolan branch under the Twin Cities–Prosper subdivision.

The existing rail alignment intersects 40th Avenue N and 93rd Street N at skewed angles of approximately 30 degrees and 65 degrees, respectively. These two grade crossings are situated just 145 feet apart. The close proximity and acute crossing angles result in limited vehicle storage space, especially for semi-trucks being between the two crossings and contribute to restricted sight distance for approaching vehicles.

Although both crossings are equipped with active warning devices consisting of two-quadrant gates with flashing lights, there is still a lack of advanced warning signs to adequately inform motorists of the rail crossings ahead and to allow sufficient time for safe response and stopping.

The environmental review identified two NWI wetland areas within the 1,000-foot buffer of the crossing. The crossing is also located within the 100-year flood zone (Zone AE [EL897]).

Figure 5-2. 40th Avenue and 93rd Street N Existing Conditions

Proposed Mitigation

Option 1 – Close Crossing at 93rd Street N and Realign 93rd Street N to 40th Ave N at 90-Degree Angle

This option proposes the closure of the grade crossing at 93rd Street N (DOT No. 092957U) and the realignment of 93rd Street N to intersect with 40th Avenue N at a 90-degree angle.

This alternative includes removing over 500 feet of roadway, which would be restored to turf, along with the full removal of the existing railroad crossing infrastructure—including gates, signage, poles, crossing panels, and associated components.

The realigned 93rd Street N would connect to 40th Avenue N approximately 275 feet east of the existing crossing location, forming a standard 90-degree intersection. The proposed realignment would require approximately 2.7 acres of new right-of-way. Crossing 092956M on 40th Avenue N would remain unchanged; however, pavement striping along 40th Avenue N would be updated to accommodate the new intersection geometry.

This alternative improves overall intersection and crossing safety by eliminating a skewed-angle crossing, which presents site distance challenges. It also addresses concerns regarding limited vehicle storage space and restricted sight distances—particularly for vehicles traveling from the north attempting to access 40th Avenue N.

Table 5-3: 40th Avenue N & 93rd Street N Estimated Costs - Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$250,000
Railroad Items	$200,000
Right-of-Way	$170,000
Survey, Design, Admin, etc.	$160,000
ROUNDED TOTAL COST	**$800,000**

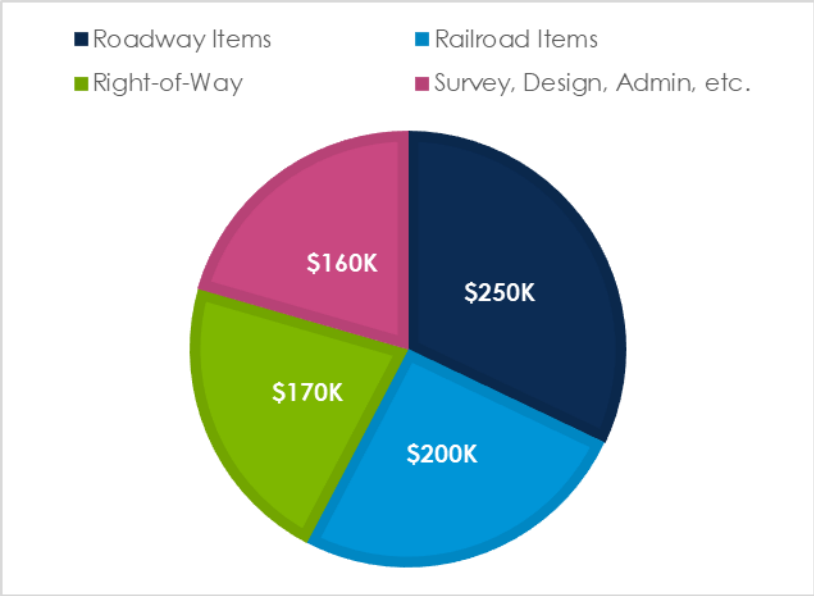

Figure 5-3. 40th Avenue N & 93rd Street N Cost Distribution - Option 1

Figure 5-4. 40th Avenue and 93rd Street N Option 1

Option 2 – Full Realignments with Single 90-Degree Crossing at 40th Avenue NW

This option involves removing just over 3,000 feet of existing paved roadway along 40th Avenue NW and constructing 3,450 feet of new two-lane paved roadway. The new alignment would incorporate horizontal curves to achieve a 90-degree rail crossing and facilitate smoother traffic flow with as little impact as possible to surrounding land.

Crossing 092957U would be closed, and just under 2,200 feet of unpaved roadway along 93rd Street N and 26th Street NW would be removed and returned to turf. In addition, just over 1,900 feet of new unpaved roadway would be constructed to connect 93rd Street N and 26th Street NW to the newly realigned 40th Avenue NW corridor. The new roadway configuration would require approximately 22.76 acres of right-of-way acquisition.

At crossing 092956M, new crossing panels, gates, and flashing light assemblies would be installed. All associated pavement striping and roadway signage would be updated to reflect the new traffic configuration.

By removing both skewed crossings and replacing them with a single 90-degree crossing, this alternative significantly improves sight distance and visibility for approaching vehicles. Furthermore, the revised intersection layout alleviates the issue of inadequate vehicle storage space on 40th Avenue NW by distributing intersection points away from the railroad crossing.

Table 5-4. 40th Avenue N & 93rd Street N Estimated Costs - Option 2

CATEGORY	COST (2024 USD)
Roadway Items	$2,100,000
Railroad Items	$280,000
Right-of-Way	$1,370,000
Survey, Design, Admin, etc.	$940,000
ROUNDED TOTAL COST	**$4,700,000**

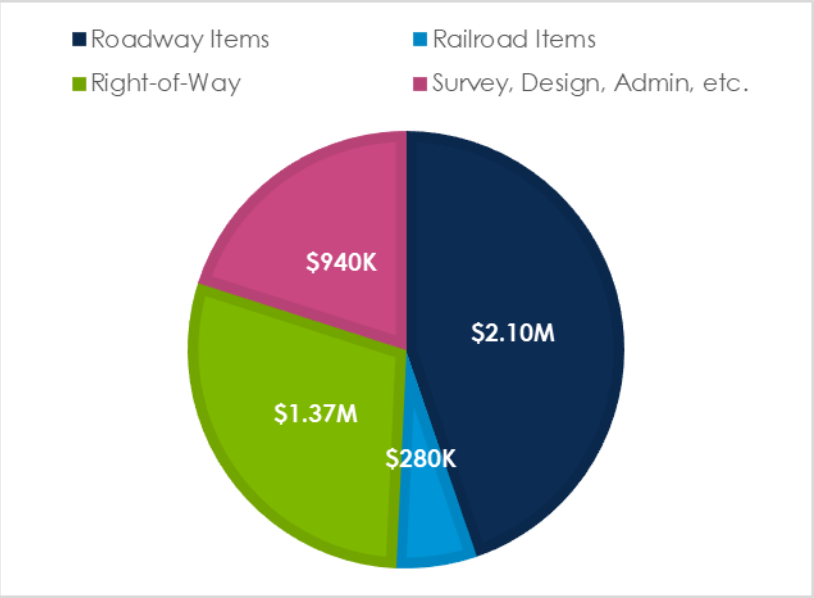

Figure 5-5: 40th Avenue N & 93rd Street N Cost Distribution - Option 2

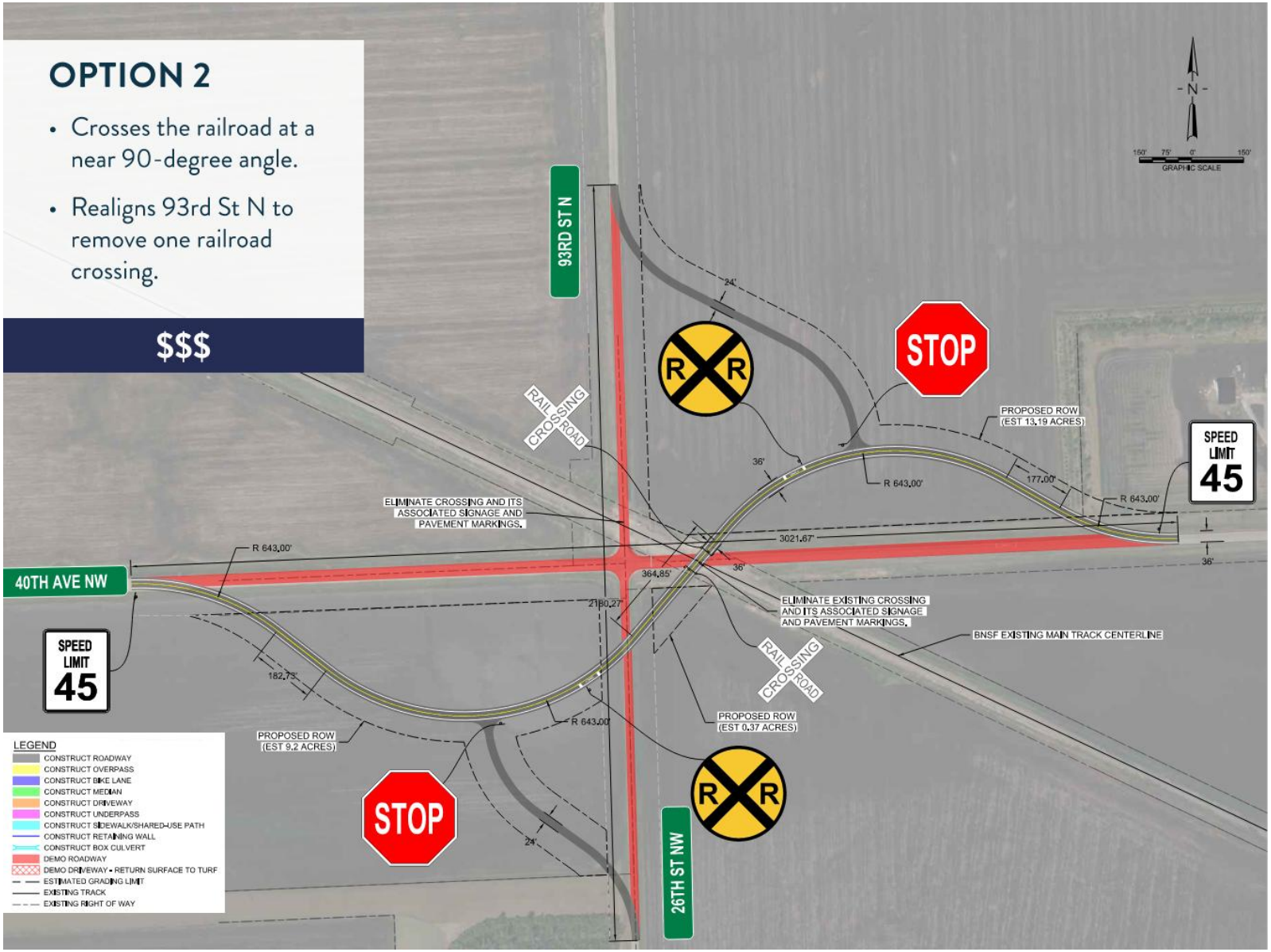

Figure 5-6. 40th Avenue and 93rd Street N Option 2

Benefit-Cost Analysis

Table 5-5 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that was used for the BCA.

Table 5-5: 93rd Street and 40th Ave Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID - 40th	factor	092956M	FRA Grade Crossing Inventory.
Grade Crossing ID - 93rd	factor	092957U	
Rail Assumptions			
Freight Trains per Day	trains/day	0.3	FRA Grade Crossing Inventory.
Passenger Trains per Day	trains/day	0.0	
Switching Trains per Day	trains/day	0.0	
Maximum Timetable Speed	miles/hour	40	
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type	factor	Gates	
Crossing Surface Material - 40th	factor	Concrete	
Crossing Surface Material - 93rd	factor	Timber	
Roadway Assumptions			
AADT - 40th	vehicles/day	755	FRA Grade Crossing Inventory. MetroCOG 2024 Traffic Count Maps.
AADT - 93rd	vehicles/day	150	
Truck Share of Traffic - 40th	%	16%	
Truck Share of Traffic - 93rd	%	16%	
School Buses per Day	buses/day	0	
Traffic Year - 40th	year	2024	
Traffic Year - 93rd	year	1988	

Option 1

As Option 1 proposes to realign the roadway configuration, it is expected to reduce the number of grade crossings around the 40th Ave N and 93rd Street N intersection. However, some of the traffic would be diverted from the 93rd Street crossing to the 40th Ave crossing. Overall, this option is expected to generate some safety benefits and benefits related to a slight reduction in vehicle idling time. **Table 5-6** presents the assumptions specific to Option 1.

Table 5-6: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$800,000	
Residual Value	2024$	$132,500	
Useful Life of Asset	years	20	Reasoned Assumption
Existing Speed Limit	miles/hour	55	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	55	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate just over $23,000 in discounted benefits while costing over $486,000 (discounted). This translates to a net present value (NPV) of almost -$463,000 and a benefit-cost ratio of 0.05.

Option 2

Option 2 is expected to do generate a similar benefit by reducing the number of crossings at the 40th Ave N and 93rd Street N intersection, with additional adjustments on 40th Ave to improve the line of sight on the approach to the crossing. Overall, this option is expected to generate some safety benefits and benefits related to a slight reduction in vehicle idling time. **Table 5-7** presents the assumptions specific to Option 2.

Table 5-7: Option 2 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$4,700,000	
Residual Value	2024$	$1,138,000	
Useful Life of Asset	years	20	Reasoned Assumption
Existing Speed Limit	miles/hour	55	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	45	

Based on the assumptions and a 7 percent discount rate for all future impacts, the $2.86 million (discounted) investment for Option 2 is expected to generate just over $51,000 in discounted disbenefits, mainly driven by the change in speeds over 40th Ave following the realignment of the roadway. This translates to a net present value (NPV) of over -$2.91 million and a benefit-cost ratio of -0.02.

Environmental Permitting

An aquatic resource delineation and permitting under Section 404 of the Clean Water Act (CWA) may be required.

Development within the 100-year flood zone would require a Floodplain Development Permit, including elevation certificate and compliance with local floodplain management regulations.

Draft Purpose & Need Discussion

Purpose

The purpose of the proposed project is to improve safety and operational efficiency at the grade crossings located at 40th Avenue North (Crossing No. 092956M) and 93rd Street North (Crossing No. 092957U). The project aims to reduce the risk of vehicle-train conflicts, enhance roadway functionality, and support future transportation needs.

Need

The need for the project is based on the following transportation-related deficiencies:

- **Skewed Crossing Geometry**: The crossings intersect the BNSF rail line at angles of approximately 30 and 65 degrees, resulting in poor sight lines and increasing the risk of vehicle-train collisions.
- **Insufficient Vehicle Storage Between Crossings**: The proximity of the two crossings (145 feet) does not provide adequate space for vehicles, especially semi-trucks, to safely queue, increasing potential for blockage and collision risk.
- **Inadequate Advance Warning Signage**: While both crossings are equipped with quad gates and flashers, the lack of sufficient advance warning signage reduces driver awareness and preparedness.
- **Proximity**: The two crossings are very near each other. A revised configuration would use this proximity as an advantage, to combine them into a single grade crossing, thus eliminating a grade crossing.

Preferred Option

For 40th Avenue North and 93rd Street North, Option 1 is preferred. It provides a simpler and more cost-effective solution that requires less right-of-way than Option 2.

6 26th Street NW

Crossing Number 071084S

West Fargo, ND

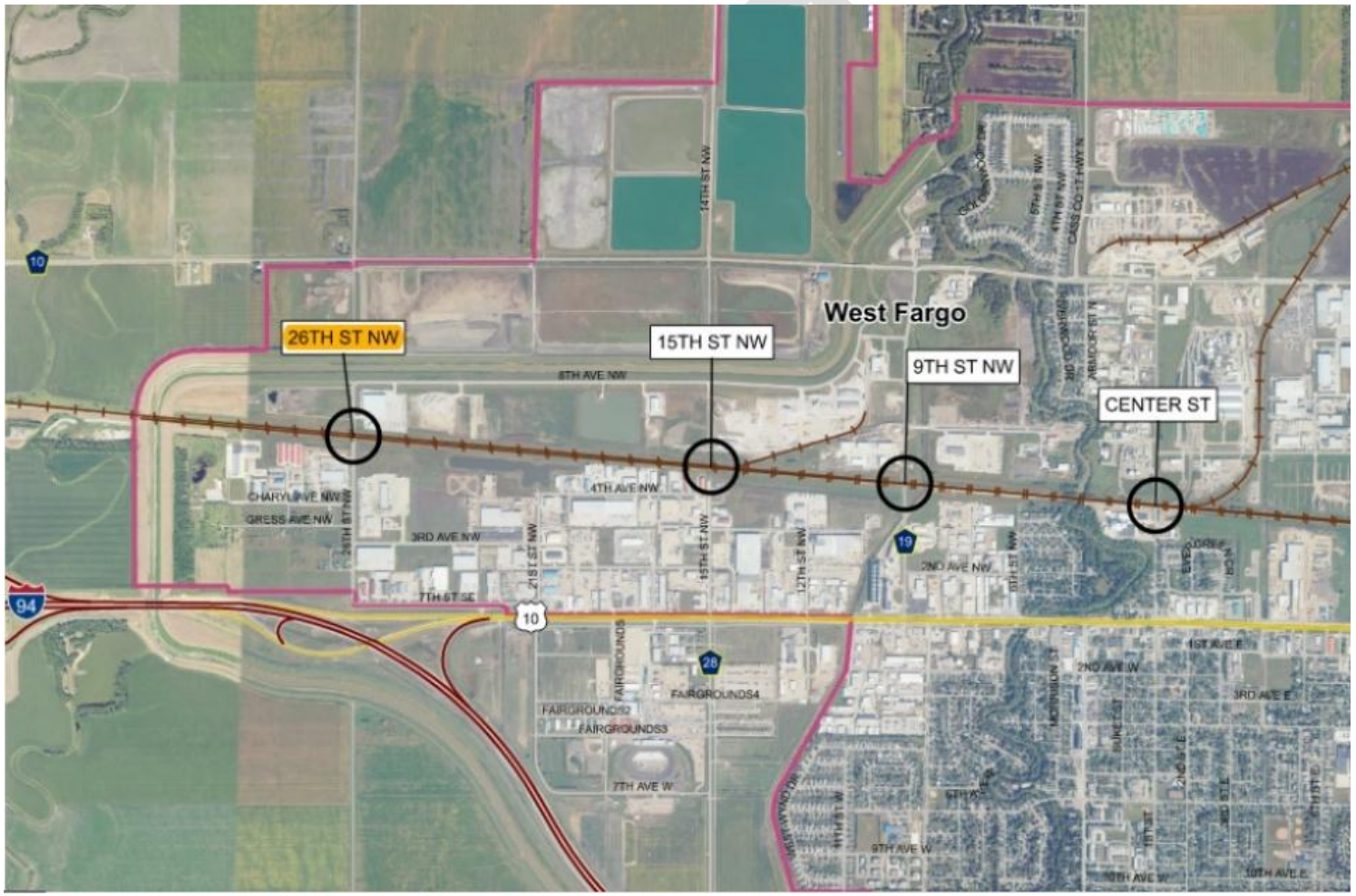

Figure 6-1: 26th Street NW Study Location

Table 6-1: Crossing Summary – 26th Street NW

Existing Warning Device	2 cantilever gates / flashers
Railroad	BNSF
Trains per Day/ Timetable Speed	30/ 60 mph
AADT/Posted Speed Limit	70 (1988) / 25 mph
Crash History	1 accident since 1995
Existing Roadway Surface	Paved

Existing Conditions

26th Street NW is a two-lane paved north-south roadway. The existing grade crossing intersects the roadway at an angle of approximately 85 degrees. The crossing is in a mixed-use area, surrounded by two commercial businesses and open land. Within 300 feet of the crossing, there are three driveways providing direct access to these businesses.

The posted speed limit is 25 mph. There are no dedicated pedestrian or bicycle facilities along this corridor.

The grade crossing is owned and maintained by BNSF Railway and is part of the E. Dilworth–Minot branch under the Twin Cities KO subdivision. It includes two mainline tracks used for freight service. An estimated 30 trains pass through the crossing daily—15 during daytime hours and 15 at night—operating at a maximum timetable speed of 60 mph.

The existing crossing is equipped with active warning devices, including two-quadrant cantilever gates with flashing lights and light masks.

Given the frequency of train movements, the high percentage of truck traffic, and the presence of nearby developments, including an ongoing I-94 interchange design, the current crossing configuration presents operational and safety challenges. These include potential traffic delays, limited capacity to accommodate heavy vehicle volumes, and increased risk for conflicts between roadway and rail traffic.

The environmental review identified one NWI wetland (Sheyenne Diversion) within the 1,000-foot buffer of the crossing. The crossing is located within an area of reduced flood risk due to the levee (Zone X).

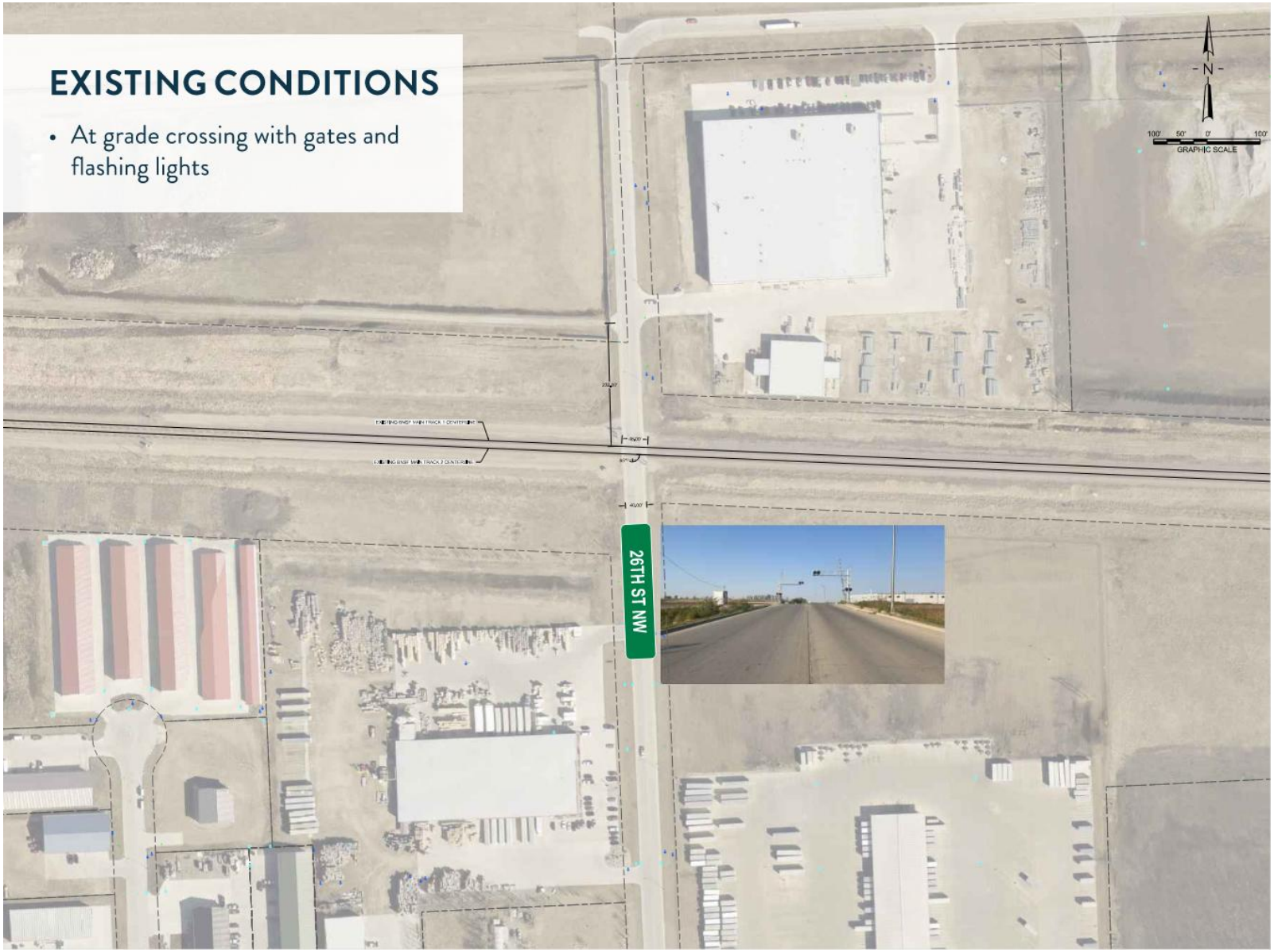

Figure 6-2: 26th Street NW Existing Conditions

Proposed Mitigation

Option 1 – Two-Lane Overpass

This option proposes the removal of just under 1,100 feet of existing paved roadway, along with the full removal of the current grade crossing infrastructure, including gates, crossing panels, and signage.

A new 400-foot bridge would be constructed, and the roadway would be regraded with a 6% uphill grade to the south and a 4.5% downhill slope to the north, connecting to the existing 8th Avenue NW. The structure would consist of a three-span bridge over the existing mainline tracks, with a minimum vertical clearance of 23 feet 6 inches from the top of the rail to the bottom of the bridge superstructure.

Retaining walls would be installed along the sides of the overpass adjacent to the existing businesses to minimize impacts to the developed area. The opposite side of the roadway would be graded to tie in with the existing ground elevation. Approximately 2.14 acres of new right-of-way would be required to accommodate the proposed alignment and associated construction.

The construction of the retaining wall would necessitate the removal of three existing driveways. Alternative access solutions would be developed to maintain functional access to all affected businesses.

By grade-separating vehicular traffic from rail operations, this overpass eliminates the safety risks associated with the current grade crossing. Additionally, it removes the potential for traffic delays due to train activity, significantly improving traffic flow and long-term operational efficiency in the area.

Figure 6-3: Cross Section – 26th Street NW Two Lane Overpass

Table 6-2. 26th Street NW Estimated Costs - Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$2,510,000
Railroad Items	$360,000
Right-of-Way	$640,000
Structural Items	$13,650,000
Survey, Design, Admin, etc.	$4,290,000
ROUNDED TOTAL COST	**$22,000,000**

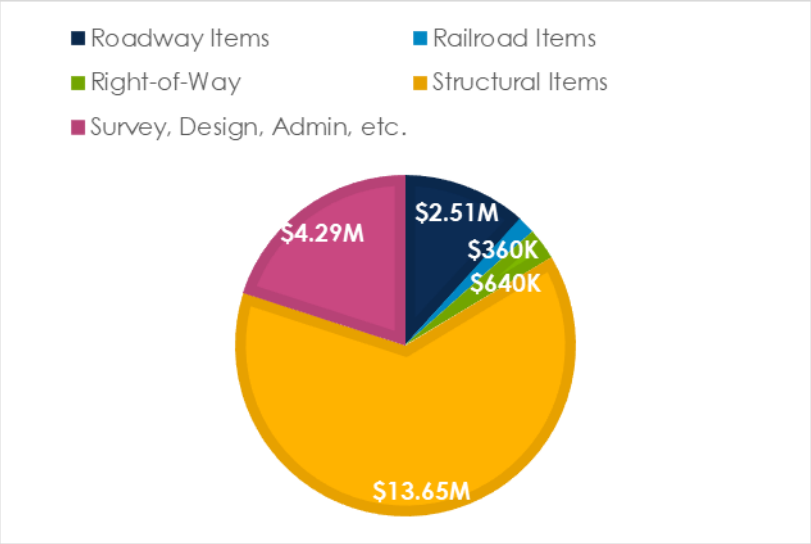

Figure 6-4. 26th Street NW Cost Distribution - Option 1

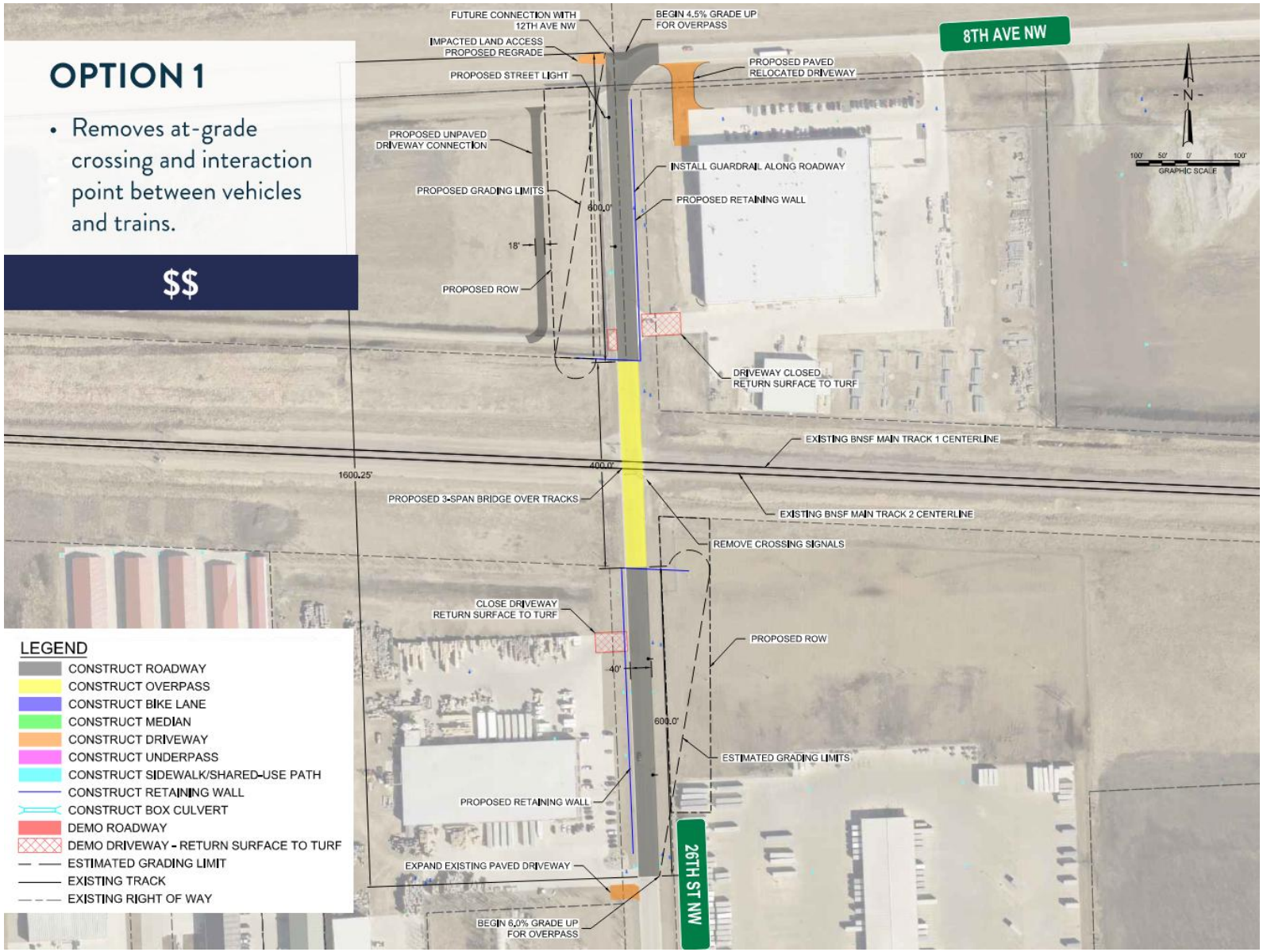

Figure 6-5: 26th Street NW Option 1

Option 2 – Six-Lane Overpass

This alternative accommodates future roadway expansion and directly connects to the planned I-94 interchange by incorporating a six-lane roadway configuration.

Approximately 1,360 feet of existing paved roadway and all existing crossing infrastructure including gates, panels, and signage would be removed. A new 1,360-foot, six-lane paved roadway would be constructed with a 6% approach grade to the south and a 4.5% downgrade to the north, tying into the existing 8th Avenue NW. It is important to note that if a new interchange with Interstate 94 were to be implemented at 26th Street NW, assumed grades and elevations would change, likely resulting in a less steep grade to the south.

A three-span bridge would be constructed over the existing mainline tracks, providing a minimum vertical clearance of 23 feet 6 inches from the top of rail to the bottom of the bridge superstructure, in compliance with minimum vertical clearance requirements. Retaining walls would be constructed along the side of the overpass adjacent to existing businesses, while the opposite side would be graded to match existing ground elevations.

The proposed grading limits would require approximately 2.14 acres of new right-of-way. Construction would impact three existing driveways: two would be relocated, and one would be expanded to maintain adequate business access. Pavement striping and signage would be updated to match the existing and proposed lane configurations.

This overpass solution allows the rail operation to remain undisturbed, minimizing impacts to existing underground utilities and reducing disruption to daily train operations during construction. The added capacity also supports future development and offers greater flexibility in accommodating evolving transportation needs and facility growths.

Figure 6-6: Cross Section – 26th Street NW Overpass

Table 6-3. 26th Street NW Estimated Costs - Option 2

CATEGORY	COST (2024 USD)
Roadway Items	$4,840,000
Railroad Items	$620,000
Right-of-Way	$180,000
Structural Items	$26,480,000
Survey, Design, Admin, etc.	$8,030,000
ROUNDED TOTAL COST	**$41,000,000**

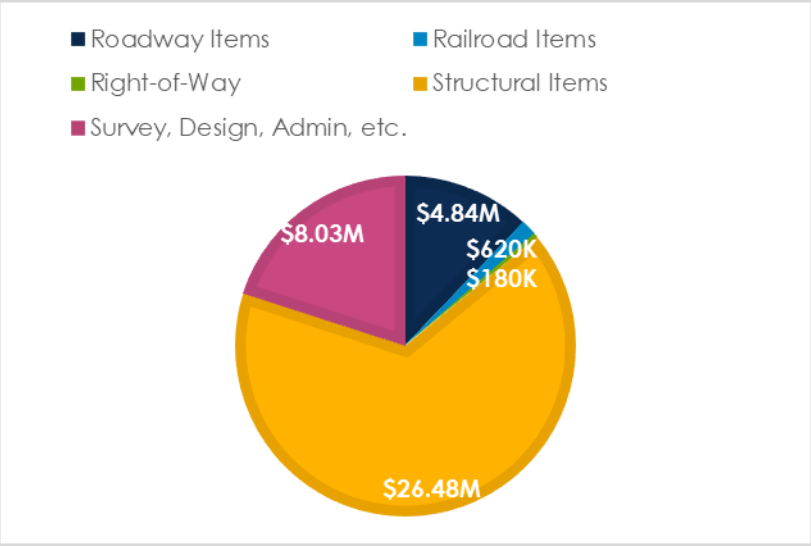

Figure 6-7. 26th Street NW Cost Distribution - Option 2

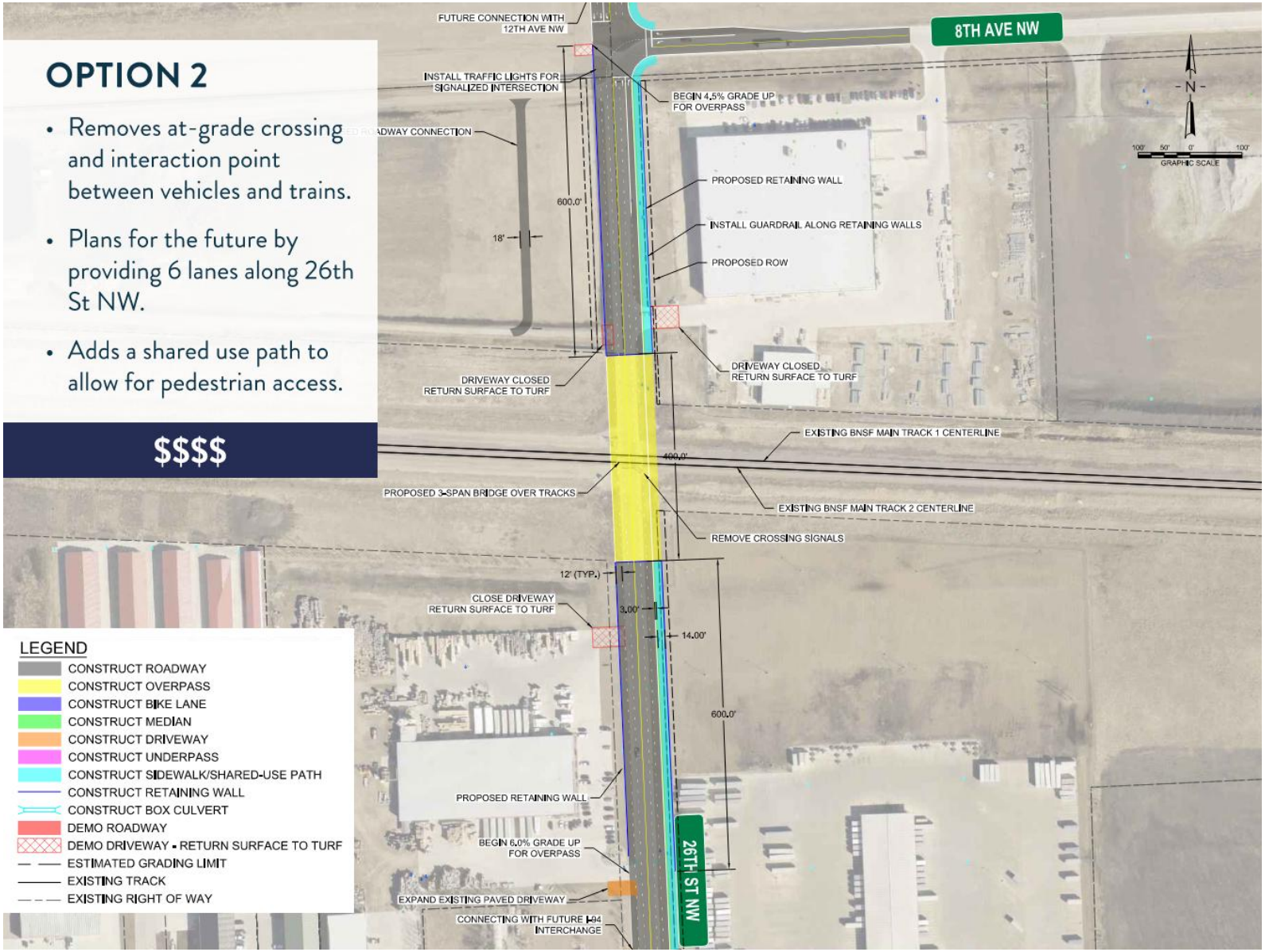

Figure 6-8: 26th Street NW Option 2

Benefit-Cost Analysis

Table 6-4 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that was used for the BCA.

Table 6-4: 26th Street NW Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID	factor	071084S	FRA Grade Crossing Inventory.
Rail Assumptions			
Freight Trains per Day	trains/day	21	FRA Grade Crossing Inventory.
Passenger Trains per Day	trains/day	0	
Switching Trains per Day	trains/day	0	
Maximum Timetable Speed	miles/hour	60	
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type	factor	Gates	
Crossing Surface Material	factor	Concrete	
Roadway Assumptions			
AADT	vehicles/day	70	FRA Grade Crossing Inventory.
Truck Share of Traffic	%	15%	
School Buses per Day	buses/day	0	
Traffic Year	year	1988	

Option 1

Option 1 proposes to implement a grade separation between the roadway and the rail tracks at the 26th Street crossing. By separating the grade crossing, the alternative is expected to eliminate the likelihood of vehicle-train crashes and vehicle idling time. This is expected to translate into improved transportation safety, as well as reduced travel time, vehicle operating costs, and emissions.

Table 6-5: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2031	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$22,000,000	
Residual Value	2024$	$11,025,892	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	25	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	25	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate $1.17 million in discounted benefits while costing $13.38 million (discounted). This translates to a net present value (NPV) of -$12.20 million and a benefit-cost ratio of 0.09.

Option 2

Option 2 proposes a grade separation in addition to widening 26th Street from a two-lane roadway to a six-lane roadway connecting to both 12th Ave in the north and I-94 in the south. This option, specifically the roadway expansion, stems from an ongoing study conducted by MetroCOG, which indicates that connecting 26th Street to I-94 would significantly increase traffic levels on 26th Street, reaching up to 32,100 vehicle trips per day. However, due to a lack of information on the potential impacts on travel patterns from additional studies or traffic simulations, it is uncertain what benefits would be generated from the roadway expansion.

Table 6-6: Option 2 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$41,000,000	
Residual Value	2024$	$20,515,129	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	25	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	25	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 2 is expected to generate $2.12 million in discounted benefits while costing $24.11 million (discounted). This translates to a net present value (NPV) of -$22.00 million and a benefit-cost ratio of 0.09.

Environmental Permitting

The crossing is unlikely to impact the Sheyenne Diversion, and no Section 404 permitting is anticipated.

A local Floodplain Development Permit would be required.

Draft Purpose & Need Discussion

Purpose

The purpose of the 26th Street NW Railroad Crossing improvement project is to enhance safety, reduce traffic delays, and improve multimodal connectivity in support of current and future transportation demand in West Fargo, North Dakota.

Need

The need for the project is based on the following transportation-related deficiencies:

- **Frequent Rail Traffic Disruptions**: Approximately 30 freight trains pass through the crossing daily, causing regular interruptions to passenger and freight vehicle movement. These delays reduce operational efficiency and increase the potential for vehicle-train conflicts.
- **Safety Risks Near the Crossing**: Although only one crash has been recorded since 1995, the presence of three commercial driveways within 300 feet of the crossing increases the likelihood of turning conflicts and congestion-related safety issues.
- **Development Pressure**: The area is experiencing commercial growth and is part of an ongoing I-94 interchange design. These changes will increase traffic volumes and require infrastructure improvements to maintain safe and efficient operations.
- **Lack of Multimodal Facilities**: The corridor lacks pedestrian and bicycle infrastructure, limiting safe access for non-motorized users.

Preferred Option

The six-lane configuration of Option 2 has the support of the study review committee. The planned Interstate 94 interchange at 26th Street NW and the traffic volume estimates in the 2025 West 94 Area Study for 26th Street NW corridor support this as the preferred option.

7 15th Street NW

West Fargo, ND

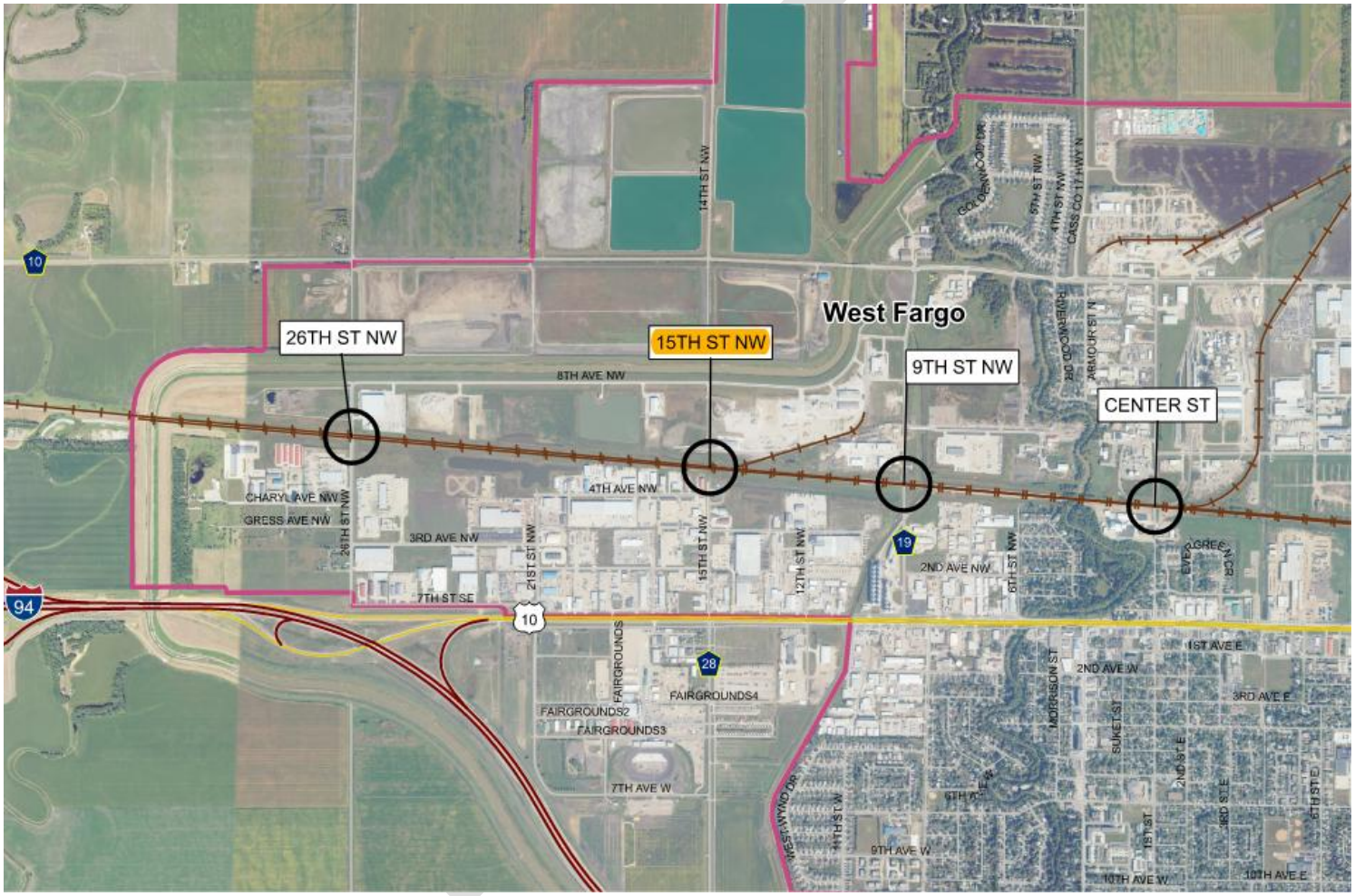

Figure 7-1: 15th Street NW Study Location

Table 7-1: Crossing Summary – 15th Street Overpass

Existing Warning Device	N/A
Railroad	BNSF
Trains per Day/ Timetable Speed	30/ 60 mph
AADT	2,185 (2024) @ Main Ave W
Crash History	N/A

Existing Conditions

There is currently no existing roadway crossing at this location. However, the surrounding road network includes planned intersection locations intended to support future development along 15th Street NW.

The rail corridor at this location consists of three active tracks and an adjacent storage yard, all aligned with the proposed roadway extension. All tracks are owned and operated by BNSF Railway and are used exclusively for freight operations. The corridor supports approximately 30 trains per day, operating at a maximum timetable speed of 60 mph.

With industrial development expected to expand on both sides of the rail corridor, new infrastructure is needed to establish connectivity, improve accessibility, and minimize the operational impact of frequent train activity on future traffic circulation.

The crossing is located within an area of reduced flood risk due to the levee (Zone X).

Figure 7-2: 15th Street NW Existing Conditions

Proposed Mitigation

Option 1 - Overpass

This option involves extending the existing 15th Street NW roadway nearly 2,400 feet to connect with 8th Avenue NW, providing a continuous, grade-separated crossing over the tracks.

The proposed roadway alignment would grade upward at a 4.5% slope north of the tracks and at a 6.0% slope south of the tracks to achieve the required vertical clearance. A four-span bridge would be constructed over the 2 mainline tracks ensuring a minimum vertical clearance of 23 feet 6 inches from the top of rail to the bottom of the bridge superstructure.

Due to adjacent business locations and limited right-of-way on the south side of the crossing, retaining walls would be constructed to minimize impacts and maintain roadway stability. The project would require the closure of seven existing driveways, all of which would be relocated to a newly constructed frontage road designed to maintain safe and efficient access to the affected properties.

This grade-separated crossing would enhance connectivity across the rail corridor, reduce conflicts between rail and vehicular traffic, and support anticipated industrial growth in the area by improving traffic flow and accessibility.

Figure 7-3: Cross Section – 15th Street Overpass

Table 7-2. 15th Street NW Estimated Costs - Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$3,140,000
Railroad Items	$130,000
Right-of-Way	$960,000
Structural Items	$17,890,000
Survey, Design, Admin, etc.	$5,530,000
ROUNDED TOTAL COST	**$28,000,000**

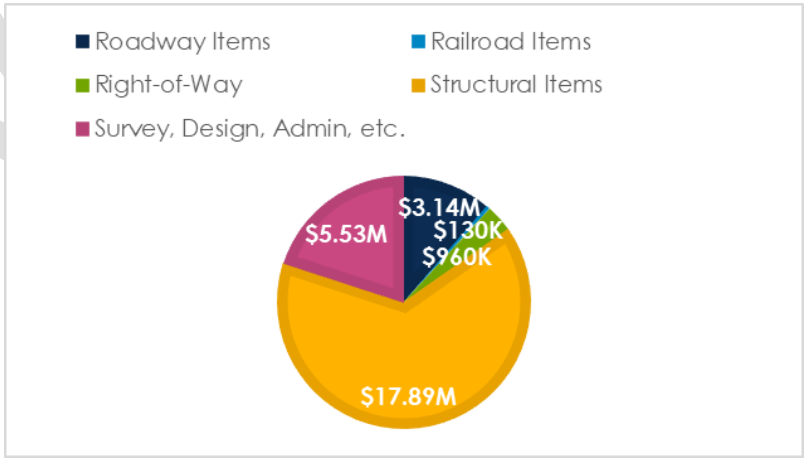

Figure 7-4. 15th Street NW Cost Distribution - Option 1

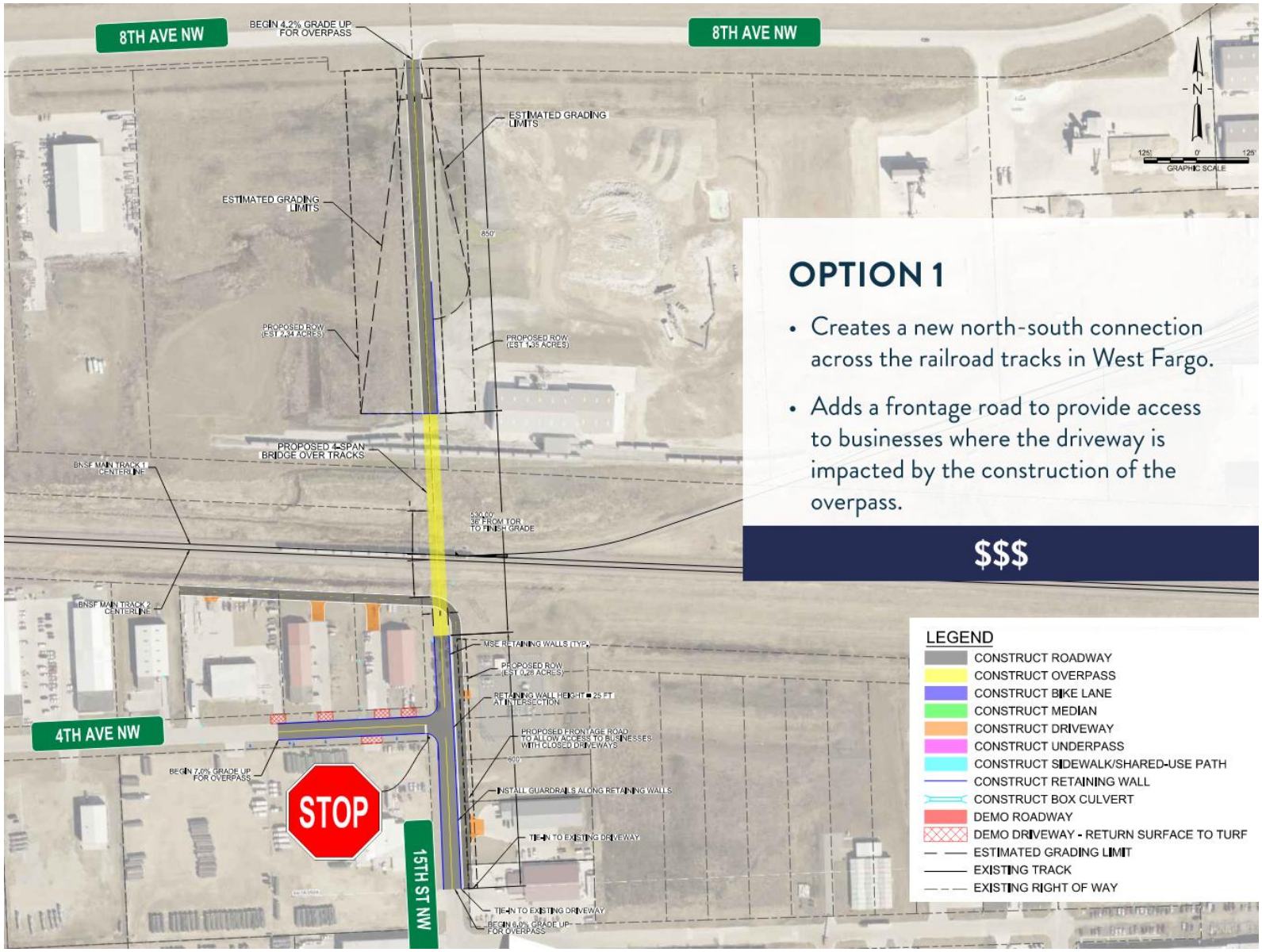

Figure 7-5: 15th Street NW Option 1

Benefit-Cost Analysis

Option 1

Option 1 proposes to extend 15th Street NW, connecting it to 8th Ave NW. The new roadway extension proposes to incorporate a roadway overpass avoiding any potential impacts between train operations and roadway vehicles. The new connection is expected to impact traffic patterns and generate some travel time savings.

Table 7-3: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$28,000,000	
Residual Value	2024$	$14,553,200	
Useful Life of Asset	years	50	Reasoned Assumption
2023 Traffic (15th Street NW)	vehicles/ day	30	Replica Data for local traffic on 15th Street.
Time Savings	mins/trip	1 – 3	Reasoned Assumption
Existing Speed Limit	miles/hour	25	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	25	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate $1.51 million in discounted benefits while costing $17.03 million (discounted). This translates to a net present value (NPV) of -$15.51 million and a benefit-cost ratio of 0.09. Despite the low result, the BCA is limited due to the lack of information on how regional travel patterns would change through connecting 15th Street to 8th Ave. The results may change with more concrete data from traffic studies or simulations.

Environmental Permitting

A Floodplain Development Permit would be required if Option 1 was carried forward.

Draft Purpose & Need Discussion

Purpose

The purpose of the 15th Street NW project is to improve north-south connectivity across the BNSF rail corridor in West Fargo, North Dakota, in a manner that enhances safety, supports freight mobility, and accommodates future transportation demand.

Need

The need for the project is based on the following transportation-related deficiencies:

- **Poor System Linkage**: The nearest north-south connections are 9th Street NW (½ mile east) and 26th Street NW (1 mile west). The 9th Street NW underpass has a posted vertical clearance of 13'-7", which restricts oversized vehicle access and poses challenges for standard semi-trucks. The 26th Street NW crossing is at-grade, increasing exposure to train-related delays and safety risks.
- **Industrial Growth and Freight Demand**: Anticipated industrial expansion in the area will increase demand for reliable infrastructure that can support higher traffic volumes and freight movement. The current network lacks sufficient capacity and resilience to accommodate this growth.
- **Safety and Operational Efficiency**: Increased reliance on the 26th Street NW grade crossing could elevate the risk of vehicle-train collisions and exacerbate traffic delays. A more efficient and safer connection is needed to support regional mobility and freight operations.

Preferred Option

For 15th Street NW, if a build scenario is opted for, Option 1 is preferred. This option adds a grade separated connection across the tracks where one currently doesn't exist.

8 9th Street NW

Crossing Number 071024H

West Fargo, ND

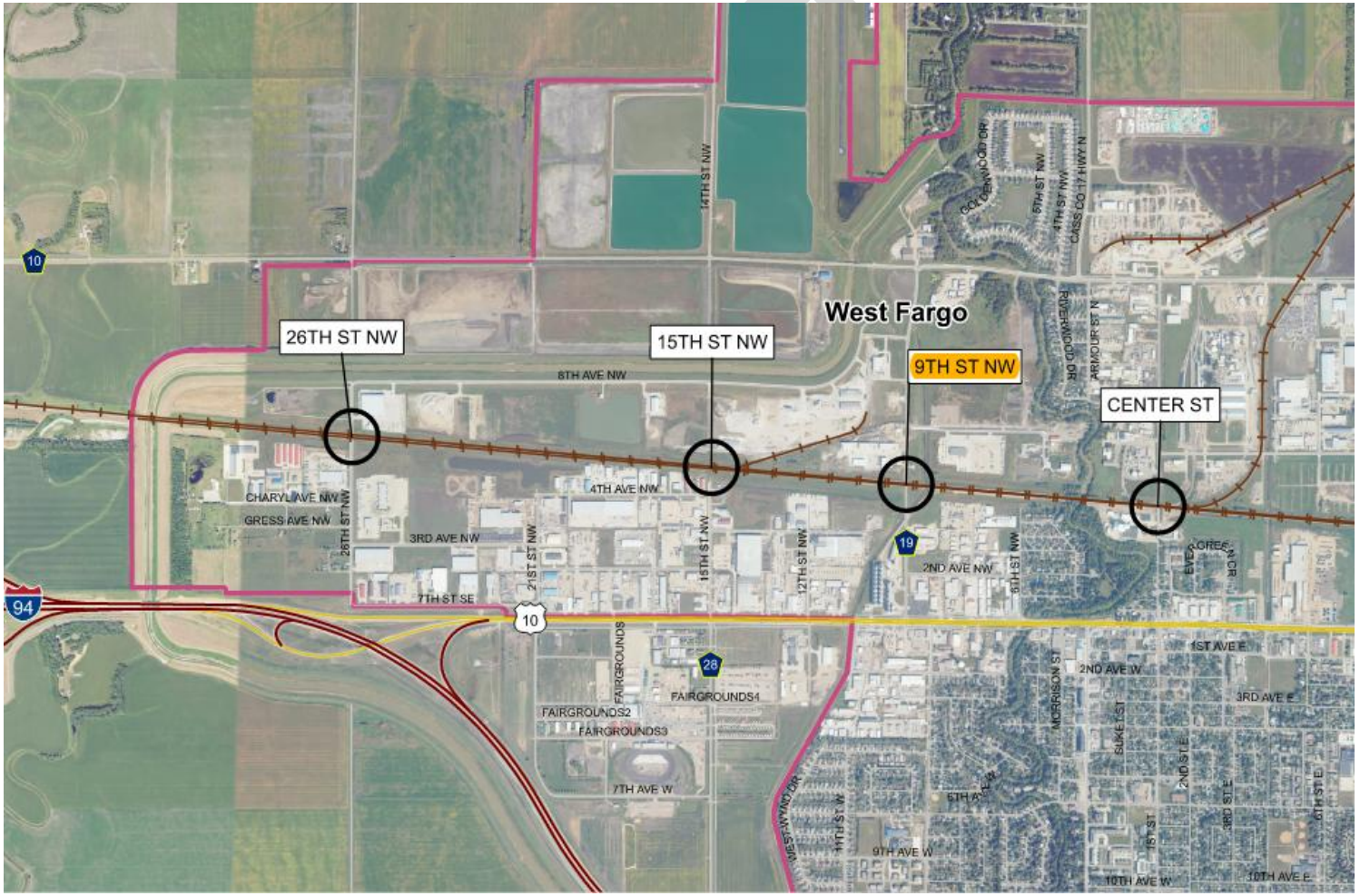

Figure 8-1: 9th Street NW Study Location

Table 8-1: Crossing Summary – 9th Street NW Underpass

Existing Warning Device	Existing Underpass
Railroad	BNSF
Trains per Day/ Timetable Speed	30/ 60 mph
AADT/Posted Speed Limit	3,528 (2024) / 30 mph
Crash History	Multiple truck impacts reported
Existing Roadway Surface	Paved

Existing Conditions

The existing railroad crossing is an elevated structure over 9th Street NW, a two-lane paved roadway that currently passes through an underpass beneath the rail bridge. While there is no existing sidewalk along 9th Street NW, the underpass includes a pedestrian tunnel designed to accommodate future sidewalk development.

The surrounding area consists of open land, industrial businesses, and a diverging BNSF siding track adjacent to the mainline. All tracks are owned and operated by BNSF Railway and are exclusively used for freight transit. Approximately 30 trains traverse this section daily, with a maximum timetable speed of 60 mph.

The posted speed limit on 9th Street NW is 30 mph. According to a 2024 traffic count, the Annual Average Daily Traffic (AADT) is approximately 3,528 vehicles, with trucks accounting for 21% of total traffic at this location.

The existing rail bridge is reported to be in poor condition. Structural plans from BNSF indicate a vertical clearance of 14 feet from the roadway surface to the bottom of the existing bridge superstructure. This clearance falls short of the preferred minimum vertical clearance of 16 feet 6 inches, which contributes to an average of three semi-truck clearance incidents annually.

The environmental review identified one NWI wetland (City Drain 1) within the 1,000-foot buffer of the crossing. The crossing is located within an area of reduced flood risk due to the levee (Zone X). The Class I file search resulted in one NRHP-listed site (32CS4463), the BNSF Railroad Bridge.

Figure 8-2: 9th Street NW Existing Conditions

Proposed Mitigation

Option 1 – Replace Existing Rail Bridge and Regrade Underpass

This option involves removing just over 900 feet of existing paved roadway, including the removal of existing clearance signage on the bridge. The roadway would be regraded at a maximum slope of 5.0% to achieve a minimum vertical clearance of 22 feet 6 inches. The new roadway would include a 3-foot median buffer and 10-foot-wide shared-use paths on both sides to enhance pedestrian and cyclist safety.

A wider replacement rail bridge would be constructed over the underpass to accommodate the improved roadway profile and provide additional capacity for future traffic demands. One driveway impacted by the project would be closed and relocated to maintain access for the affected property.

The grading limits for this improvement would require approximately 0.66 acres of new right-of-way acquisition. Pavement striping would be extended seamlessly from the existing roadway to the newly constructed section.

By regrading the roadway to increase vertical clearance, this option eliminates truck clearance issues and reduces the risk of collisions with the bridge. The wider rail bridge replacement also supports future development and traffic growth, enhancing overall corridor safety and operational efficiency.

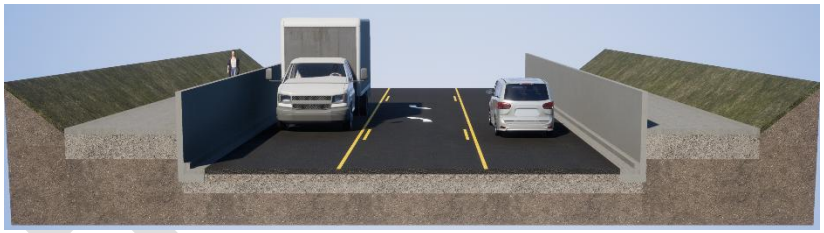

Figure 8-3: Cross Section – 9th Street NW Near Underpass

Table 8-2. 9th Street NW Estimated Costs - Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$1,870,000
Railroad Items	$3,640,000
Right-of-Way	$270,000
Structural Items	$8,660,000
Survey, Design, Admin, etc.	$3,620,000
ROUNDED TOTAL COST	**$18,100,000**

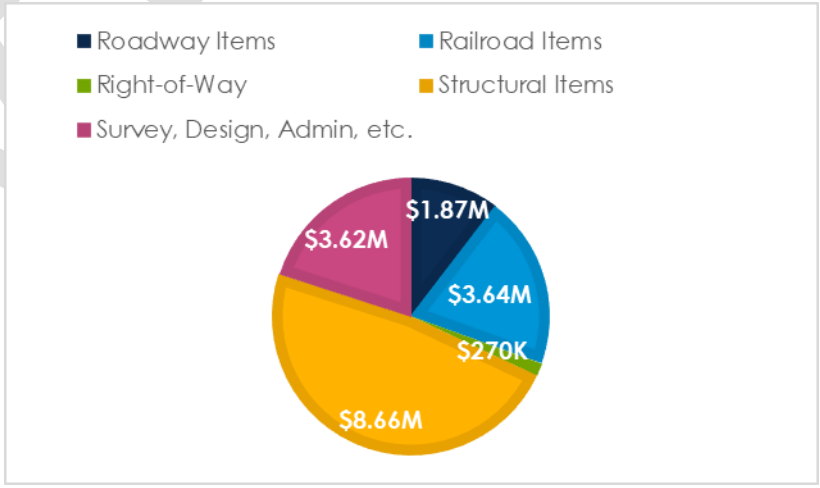

Figure 8-4. 9th Street NW Cost Distribution - Option1

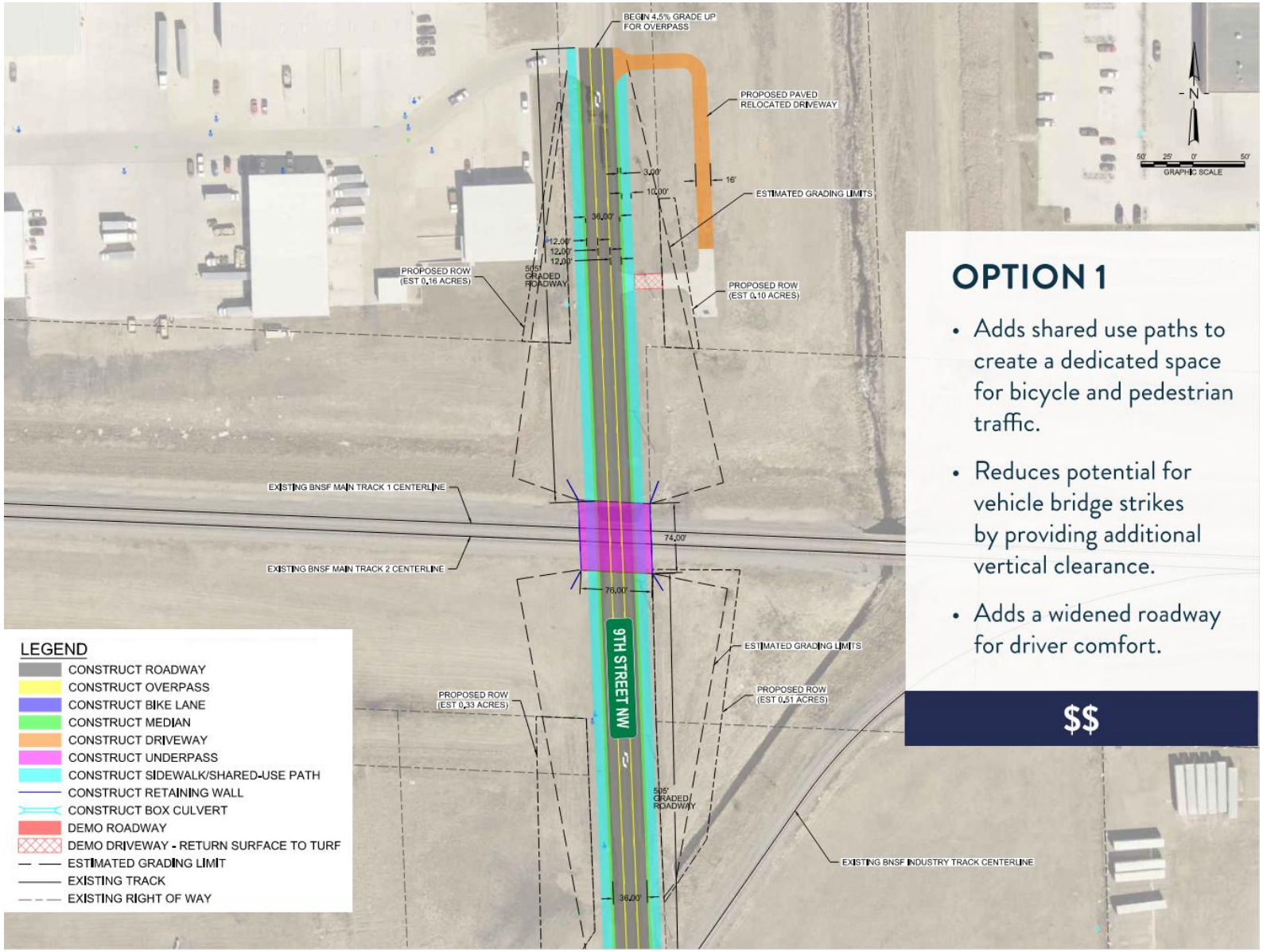

Figure 8-5: 9th Street NW Option 1

Option 2 – Construct Overpass

This option involves constructing a new overpass on 9th Street NW to improve traffic flow and rail crossing safety, removing the existing rail bridge and stabilizing the tracks at grade. This would include regrading and constructing just over 1,600 feet of paved roadway with a maximum grade of 6.0%.

A wider 400-foot structure would be built to span the existing BNSF rail tracks, maintaining a minimum vertical clearance of 23 feet 6 inches from the top of rail to the bottom of the bridge superstructure. Retaining walls totaling approximately 760 feet would be constructed to accommodate right-of-way constraints and adjacent property access needs.

The project also includes construction of a 10-foot-wide shared-use path on both sides of the roadway, providing safe pedestrian and bicycle access. Additionally, approximately 8,500 square feet of gravel driveway would be constructed to replace impacted accesses. One existing driveway would be removed and relocated.

The proposed improvements require approximately 1.28 acres of additional right-of-way acquisition to accommodate the new layout. Pavement striping and signage would be installed in accordance with MUTCD guidelines to guide traffic safely and efficiently through the new configuration.

By grade-separating vehicular traffic from rail operations, this overpass option would enhance safety, reduce traffic delays caused by train movements, and support future industrial and commercial development in the area.

Figure 8-6. Cross Section – 9th Street NW Overpass

Table 8-3. 9th Street NW Estimated Costs - Option 2

CATEGORY	COST (2024 USD)
Roadway Items	$3,470,000
Railroad Items	$520,000
Right-of-Way	$310,000
Structural Items	$15,100,000
Survey, Design, Admin, etc.	$4,850,000
ROUNDED TOTAL COST	**$25,000,000**

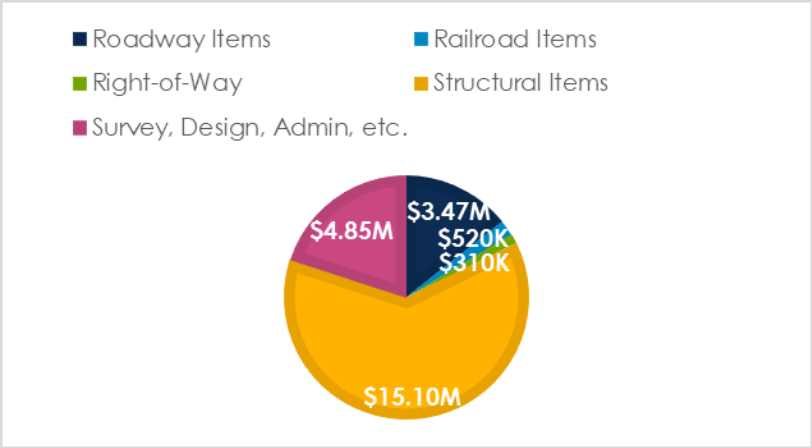

Figure 8-7. 9th Street NW Cost Distribution - Option 2

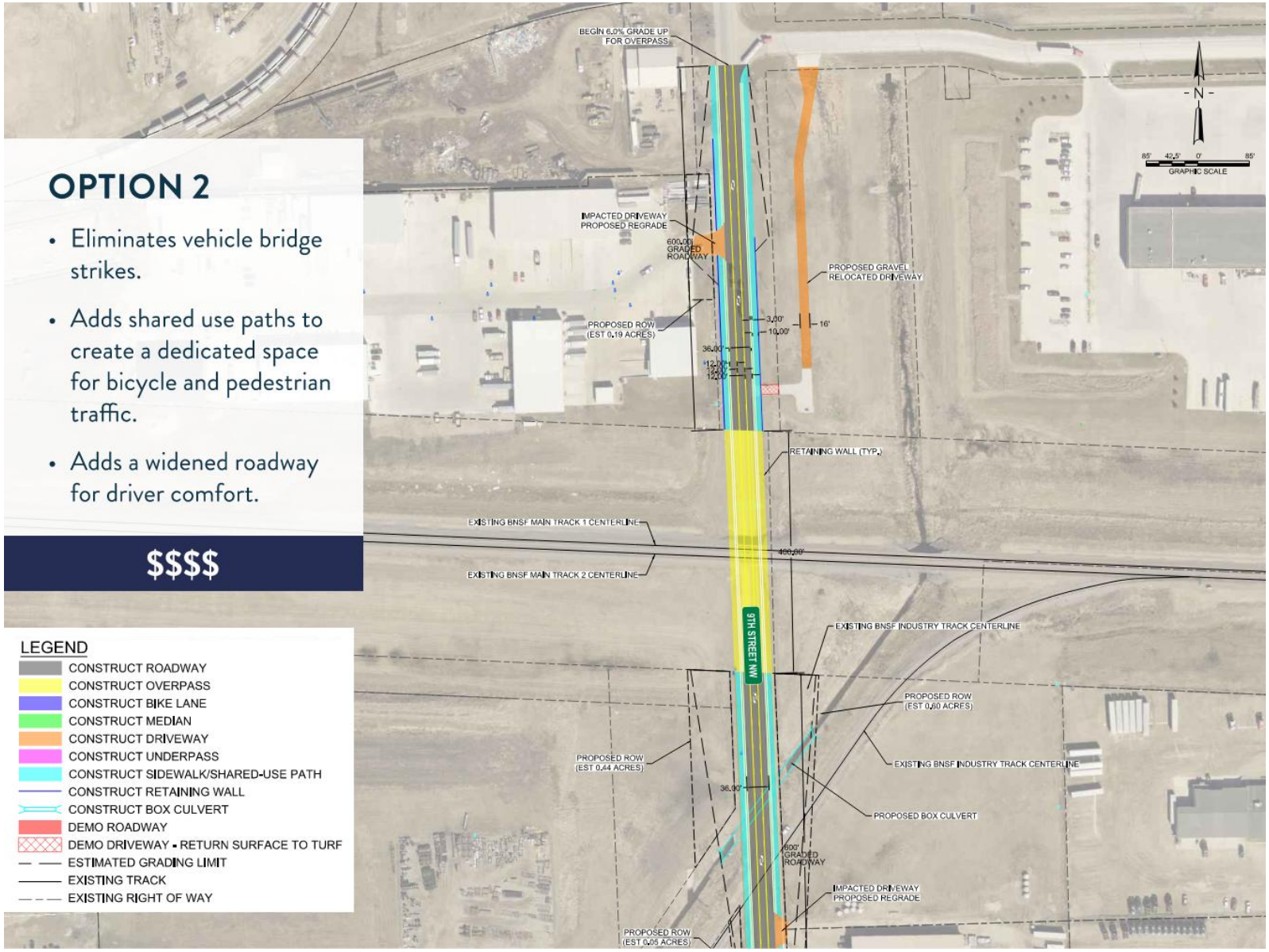

Figure 8-8: 9th Street NW Option 2

Benefit-Cost Analysis

Table 8-4 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that was used for the BCA.

Table 8-4: 9th Street NW Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID	factor	071024H	FRA Grade Crossing Inventory.
Rail Assumptions			
Freight Trains per Day	trains/day	11	FRA Grade Crossing Inventory.
Passenger Trains per Day	trains/day	0	
Switching Trains per Day	trains/day	0	
Maximum Timetable Speed	miles/hour	60	
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type	factor	Underpass	
Crossing Surface Material	factor	Concrete	
Roadway Assumptions			
AADT	vehicles/day	3,528	FRA Grade Crossing Inventory. MetroCOG 2024 Traffic Count Maps.
Truck Share of Traffic	%	21%	
School Buses per Day	buses/day	0	
Traffic Year	year	2024	
Active Transportation Assumptions			
Pedestrians per Day	pedestrians/day	10	Replica data for 9th Street NW. 2023.
Cyclists per Day	cyclists/day	7	

Option 1

Option 1 proposes to replace the existing aging overpass structure with a new structure with increased clearance. This is expected to avoid repairs due to bridge strikes as well as increasing maintenance demands from an aging infrastructure. Additionally, Option 1 proposes to implement a shared-use path generating benefits for active transportation users.

Table 8-5: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$18,100,000	
Residual Value	2024$	$8,869,354	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	30	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	30	
Bridge Major Rehabilitation Year	year	2032	HDR Engineering estimate.
Length of Existing Shared-Use Path	miles	0	Metro Railroad Needs Study. Alternative Development. April 2025.
Length of Future Shared-Use Path	miles	0.2	
Width of Future Shared-Use Path	feet	10.0	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate $2.00 million in discounted benefits while costing $11.01 million (discounted). This translates to a net present value (NPV) of -$9.01 million and a benefit-cost ratio of 0.18.

Option 2

Option 2 proposes to adjust the configuration such that the roadway travels above the railway. This is expected to avoid repairs from bridge strikes as well as increasing maintenance demands from an aging infrastructure. Additionally, the Option proposes to implement a shared-use path generating benefits for active transportation users.

Table 8-6: Option 2 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$25,000,000	
Residual Value	2024$	$11,864,415	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	30	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	30	
Bridge Major Rehabilitation Year	year	2032	HDR Engineering estimate.
Length of Existing Shared-Use Path	miles	0	Metro Railroad Needs Study. Alternative Development. April 2025.
Length of Future Shared-Use Path	miles	0.3	
Width of Future Shared-Use Path	feet	10.0	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 2 is expected to generate $2.30 million in discounted benefits while costing $15.20 million (discounted). This translates to a net present value (NPV) of -$12.91 million and a benefit-cost ratio of 0.15.

Environmental Permitting

An aquatic resource delineation and potential permitting under Section 404 of the Clean Water Act (CWA) may be required for impacts to City Drain 1.

Development within the 100-year flood zone would require a Floodplain Development Permit, including elevation certificate and compliance with local floodplain management regulations.

Consultation with NDSHPO and the lead federal agency for the crossing would be required to comply with Section 106 of the National Historic Preservation Act (NRHPA). Impacts to the NRHP-listed site would require mitigation through an MOA with NDSHPO and Metro COG.

Draft Purpose & Need Discussion

Purpose

The purpose of the 9th Street NW Underpass improvement project is to enhance safety and operational reliability for freight and vehicular traffic by addressing vertical clearance limitations and deteriorating infrastructure. The project also aims to support multimodal access and accommodate future transportation demands associated with industrial growth in the surrounding area.

Need

The need for the project is based on the following transportation-related deficiencies:

- **Vertical Clearance Deficiency**: The existing underpass has a posted vertical clearance of 13’-7”, which is below the preferred minimum of 16’-6” for freight corridors. This results in occasional truck collisions, creating safety hazards and disrupting freight and local traffic operations.
- **Deteriorating Infrastructure**: The rail bridge structure is aging and lacks the capacity to support future increases in rail traffic and associated development. Structural upgrades are needed to ensure long-term reliability and safety.

- **High Truck Volume**: Approximately 21% of the 3,528 AADT (2024) consists of truck traffic, indicating a significant freight presence. The current infrastructure does not adequately support the safe movement of large vehicles.
- **Industrial Growth**: The surrounding area includes active industrial businesses and undeveloped land slated for future industrial use. Once developed, there will be increased need for reliable and safe infrastructure.

Preferred Option

Option 2, a roadway overpass, is preferred to eliminate vertical clearance issues and enhance multimodal access. Railroad preference generally favors overpass configurations when compared to underpass configurations. An overpass also removes the need for a stormwater lift to remove water from the depressed roadway. An overpass would be more expensive to construct than Option 1. Both options are rated closely in MAE scoring, and if cost is a driving factor, Option 1 may be preferred.

9 Center Street

Crossing Number 071013V

West Fargo, ND

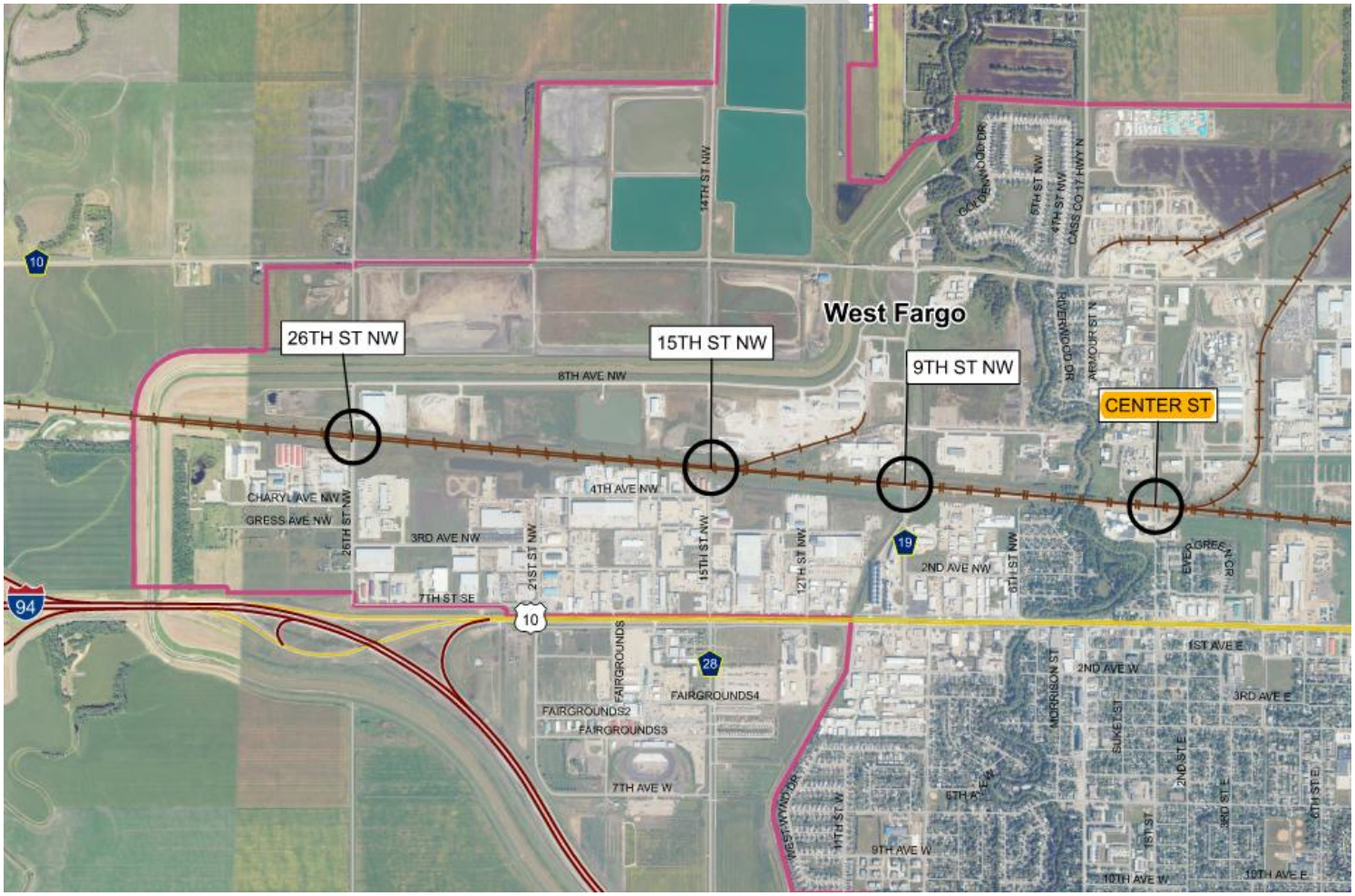

Figure 9-1: Center Street Study Location

Table 9-1: Crossing Summary – Center Street Underpass

Existing Warning Device	Underpass
Railroad	BNSF
Trains per Day/ Timetable Speed	26/ 60 mph
AADT/Posted Speed Limit	5,855 (2024) / 40 mph
Crash History	1 semi impacts a year
Existing Roadway Surface	Paved

Existing Conditions

The existing railroad crossing at Center Street is a grade-separated structure carrying BNSF Railway tracks over a two-lane paved roadway. The structure, identified as WF13, facilitates rail traffic above the roadway, while Center Street passes beneath via an underpass.

A sidewalk is located on the west side of the roadway, at the same grade as the street. The surrounding area consists primarily of commercial businesses and a diverging BNSF siding track adjacent to the mainline.

All tracks are owned and operated by BNSF Railway and are exclusively used for freight transit. Approximately 26 trains pass through this crossing daily, with a maximum timetable speed of 60 mph.

The posted speed limit on Center Street is 40 mph. With a 2024 AADT of 5,855, the roadway serves as an important local access route.

The existing underpass provides a vertical clearance of 13 feet 7 inches, which is below the preferred minimum vertical clearance of 16 feet 6 inches. This limited clearance has contributed to an average of one semi-truck clearance incident annually.

The environmental review identified two NWI wetlands, including the Sheyenne River within the 1,000-foot buffer of the crossing. The crossing is located within an area of reduced flood risk due to the levee (Zone X). There are several parks (section 4(f) properties) located in the vicinity of the crossing and one within the 1,000-foot buffer of the crossing (Armour Park).

Figure 9-2: Center Street Existing Conditions

Proposed Mitigation

Option 1 – Replace Rail Bridge and Regrade Underpass

This option includes the removal of approximately 900 feet of existing paved roadway, along with the existing sidewalk on the west side. The roadway would be regraded at a maximum slope of 5.0% to achieve a minimum vertical clearance of 16 feet 6 inches from roadway surface to the bottom of rail bridge superstructure.

The rail bridge would be replaced to accommodate the increased vertical clearance. A new sidewalk would be constructed on the west side at the same grade as the roadway to maintain pedestrian access. Four driveways affected by the regrading would be adjusted to align with the new roadway profile.

The grading limits for this improvement require approximately 0.81 acres of additional right-of-way. Pavement striping would be extended seamlessly from the existing roadway to the newly constructed section.

By increasing the vertical clearance, this option would eliminate the current semi-truck impacts, which represent the primary factor in recent crash history at this location.

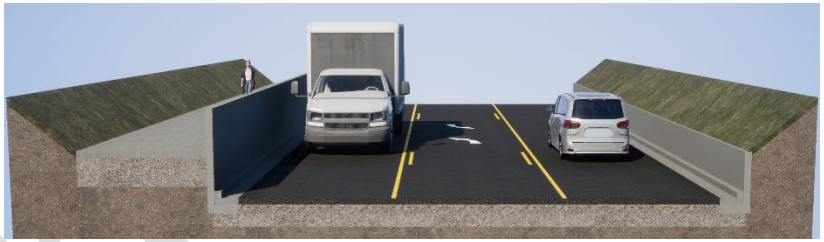

Figure 9-3. Cross Section – Center Street Near Underpass

Table 9-2. Center Street Estimated Costs - Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$2,160,000
Railroad Items	$3,640,000
Right-of-Way	$200,000
Structural Items	$8,270,000
Survey, Design, Admin, etc.	$3,570,000
ROUNDED TOTAL COST	**$17,900,000**

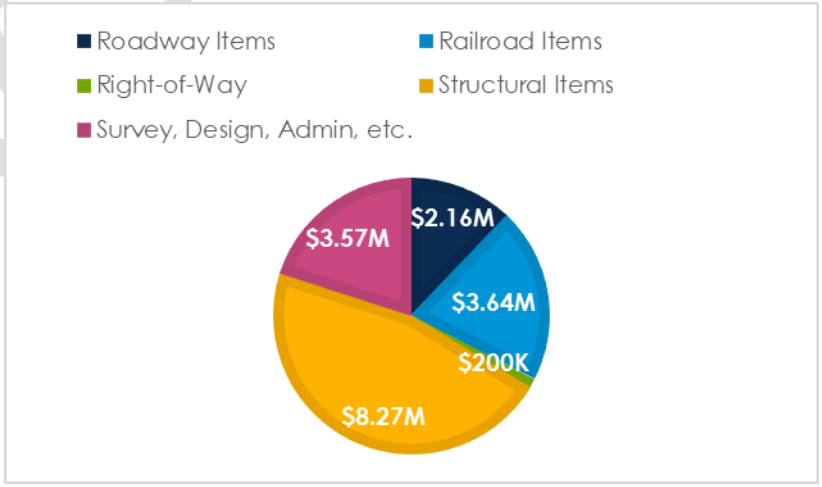

Figure 9-4. Center Street Cost Distribution - Option1

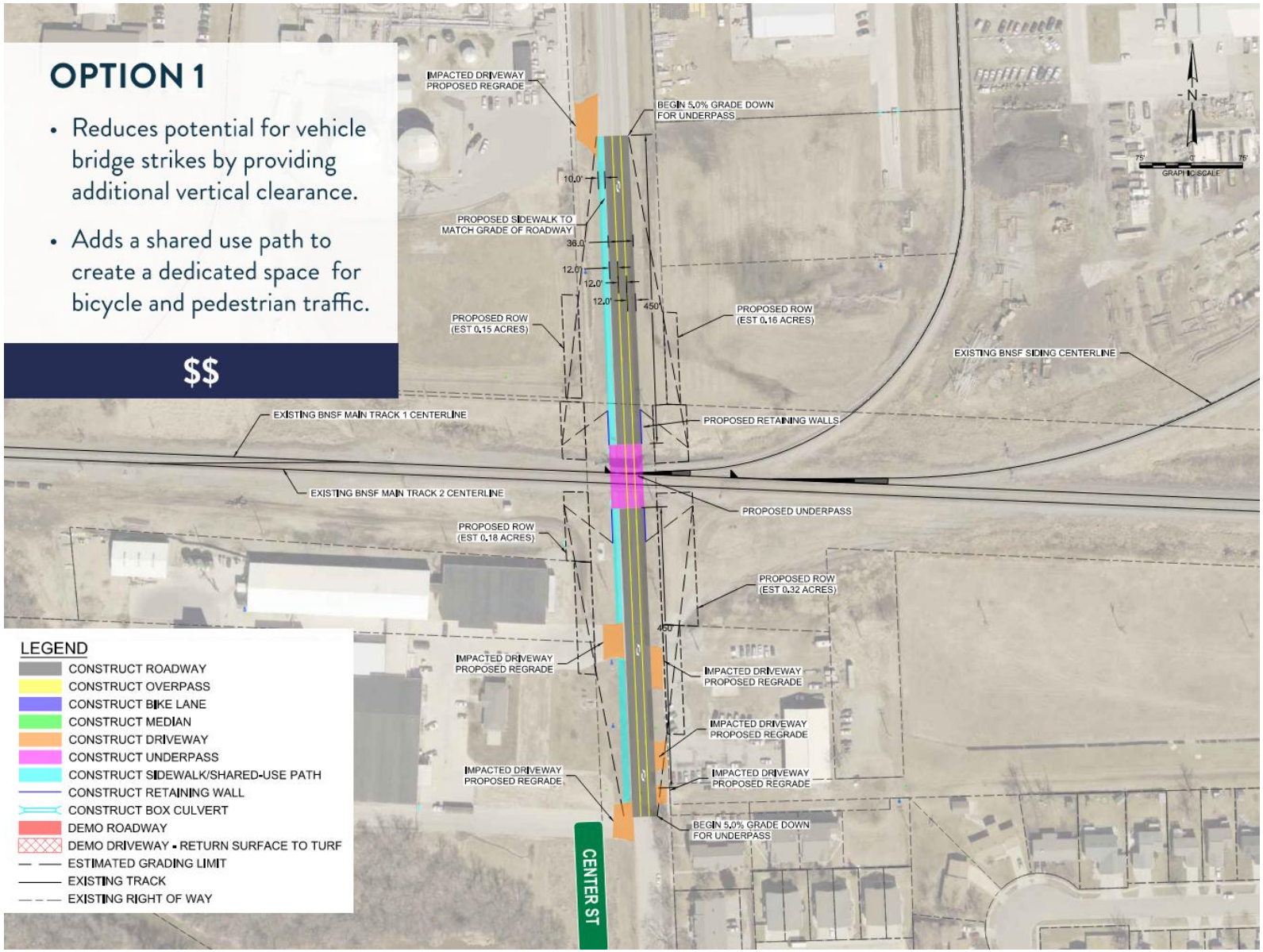

Figure 9-5: Center Street Option 1

Option 2 – Construct Overpass

This option involves the removal of approximately 1,680 feet of existing paved roadway to construct a new overpass structure over the tracks. The proposed roadway would be regraded at a maximum slope of 5.0%.

A new 242-foot-long bridge would be constructed to maintain a minimum vertical clearance of 36 feet from the top of rail to the bottom of the bridge superstructure. Retaining walls would be constructed along both sides of the roadway due to adjacent business properties and right-of-way constraints. The remaining roadway embankments would be graded to existing ground elevations.

A total of eight driveways would be impacted by the overpass construction, including two driveway closures and six driveway relocations.

This option requires approximately 0.79 acres of additional right-of-way for construction and grading. Striping and signage would be installed in accordance with the updated roadway configuration.

By elevating the roadway over the tracks, this overpass eliminates vertical clearance restrictions and associated vehicle impacts. It also improves traffic flow by separating rail and vehicle movements, enhancing safety and reducing delays caused by train movements.

Figure 9-6. Cross Section – Center Street Overpass

Table 9-3. Center Street Estimated Costs - Option 2

CATEGORY	COST (2024 USD)
Roadway Items	$3,410,000
Railroad Items	$520,000
Right-of-Way	$190,000
Structural Items	$11,560,000
Survey, Design, Admin, etc.	$3,920,000
ROUNDED TOTAL COST	**$20,000,000**

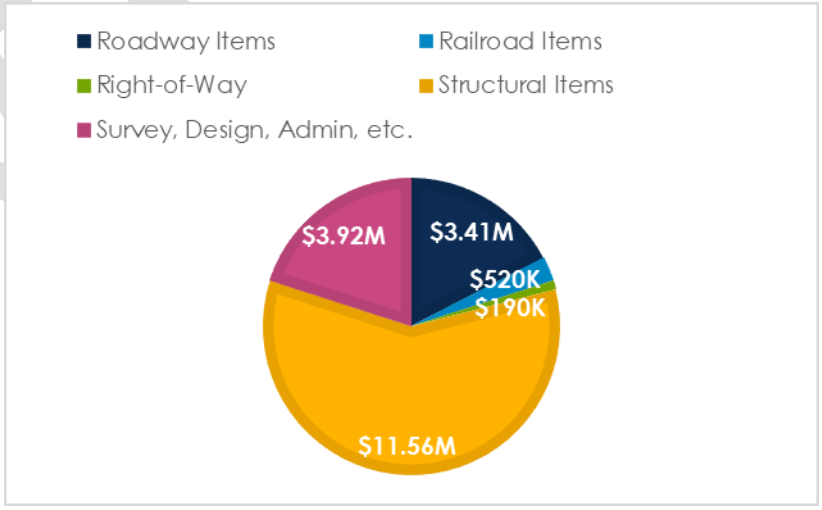

Figure 9-7. Center Street Cost Distribution - Option 2

Figure 9-8: Center Street Option 2

Benefit-Cost Analysis

Table 9-4 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that was used for the BCA.

Table 9-4: Center Street NW Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID	factor	071013V	FRA Grade Crossing Inventory.
Rail Assumptions			
Freight Trains per Day	trains/day	11	FRA Grade Crossing Inventory.
Passenger Trains per Day	trains/day	0	
Switching Trains per Day	trains/day	0	
Maximum Timetable Speed	miles/hour	60	
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type	factor	Overpass	
Crossing Surface Material	factor	Concrete	

Option 1

Option 1 proposes to replace the existing aging overpass structure with a new structure that has an increased clearance. This is expected to avoid repairs due to bridge strikes as well as increasing maintenance demands from an aging infrastructure. Additionally, the Option proposes to implement a shared-use path generating benefits for active transportation users.

Table 9-5: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$17,900,000	
Residual Value	2024$	$8,429,350	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	40	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	40	
Bridge Major Rehabilitation Year	year	2034	HDR Engineering estimate.

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate $2.08 million in discounted benefits while costing $10.88 million (discounted). This translates to a net present value (NPV) of -$8.80 million and a benefit-cost ratio of 0.19.

Option 2

Option 2 proposes to adjust the configuration such that roadway travels above the railway. This is expected to avoid repairs from bridge strikes as well as maintenance demands of aging infrastructure. The option would also implement a shared-use path, generating benefits for active transportation users.

Table 9-6: Option 2 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$20,000,000	
Residual Value	2024$	$9,045,531	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	40	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	40	
Bridge Major Rehabilitation Year	year	2034	HDR Engineering estimate.

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate $2.14 million in discounted benefits while costing $12.16 million (discounted). This translates to a net present value (NPV) of -$10.02 million and a benefit-cost ratio of 0.18.

Environmental Permitting

An aquatic resource delineation and potential permitting under Section 404 of the Clean Water Act (CWA) may be required. Current options do not impact the Sheyenne River but may impact the other NWI wetland identified.

Development within the 100-year flood zone would require a Floodplain Development Permit, including elevation certificate and compliance with local floodplain management regulations.

Currently, options being considered do not directly impact any properties that receive protection under Section 4(f) of the U.S. DOT Act of 1966.

Draft Purpose & Need Discussion

Purpose

The purpose of the Center Street Underpass improvement project is to enhance safety and operational efficiency for freight and vehicular traffic by addressing vertical clearance limitations and upgrading aging infrastructure. The project also seeks to improve multimodal access and support the long-term transportation needs of the surrounding commercial and industrial area.

Need

The need for the project is based on the following transportation-related deficiencies:

- **Vertical Clearance Deficiency**: The existing underpass has a posted vertical clearance of 12’-6”, which is significantly below the preferred minimum of 16’-6” for freight routes. This location has a history of large trucks striking the rail bridge, posing safety risks and causing disruptions to freight and local traffic operations.
- **Structural and Functional Obsolescence**: The underpass infrastructure is aging. Upgrades are needed to accommodate projected increases in freight and vehicular traffic volumes and to ensure long-term reliability.
- **Commercial and Industrial Access Needs**: The surrounding area includes commercial and industrial uses, as well as a diverging BNSF rail line. Reliable and efficient infrastructure is critical to supporting existing operations and future economic development.

Preferred Option

Option 2, a roadway overpass, is preferred to eliminate vertical clearance issues and enhance multimodal access. Railroad preference generally favors overpass configurations when compared to underpass configurations. An overpass would be more expensive to construct than Option 1. Both options are rated closely in MAE scoring, and if cost is a driving factor, Option 1 may be preferred.

10 18th Street Pedestrian Crossing

Fargo, ND

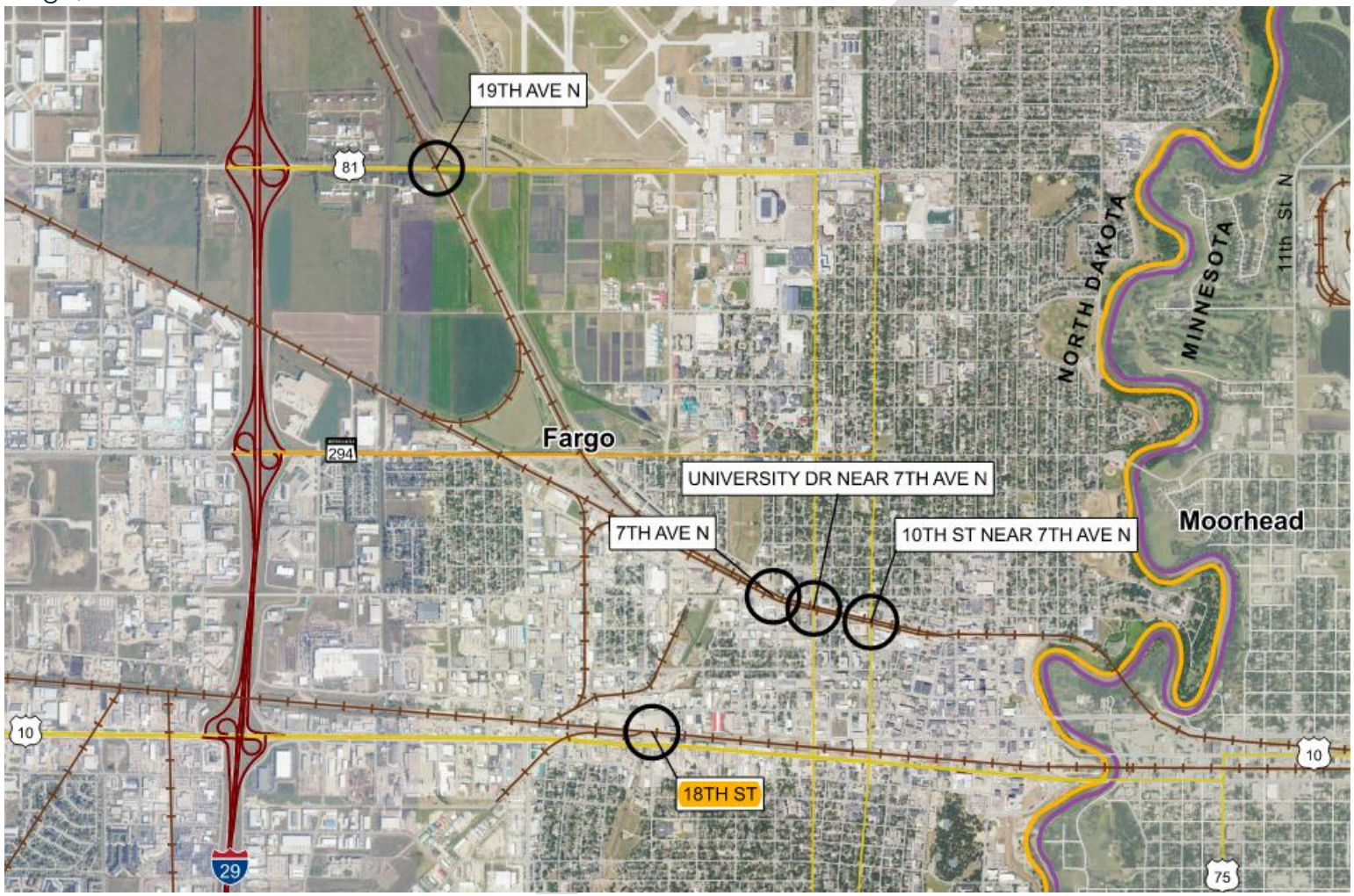

Figure 10-1: 18th Street Pedestrian Crossing Study Location

Table 10-1: 18th Street Pedestrian Crossing

Railroad	BNSF
Trains per Day/ Timetable Speed	26/ 35 mph

Existing Conditions

There is currently no existing roadway/railroad crossing at this location. The site features three active railroad tracks owned and operated by BNSF Railway, exclusively used for freight transit. An average of 26 trains traverse this corridor daily, operating at a maximum timetable speed of 35 mph.

The site includes undeveloped vacant lots owned by various businesses, with a hotel site to the east on the north side of the railroad tracks.

Access between 1st Avenue North and Main Avenue is currently limited, particularly for pedestrians. Existing intersections are spaced far apart, and pedestrian infrastructure is minimal or nonexistent, restricting safe and convenient crossing options. This gap in connectivity poses challenges for both local mobility and future development potential.

This location is within the 500-year floodplain (Zone X). There is one Section 4(f) property within the 1,000-foot buffer of the crossing (Teamsters Park).

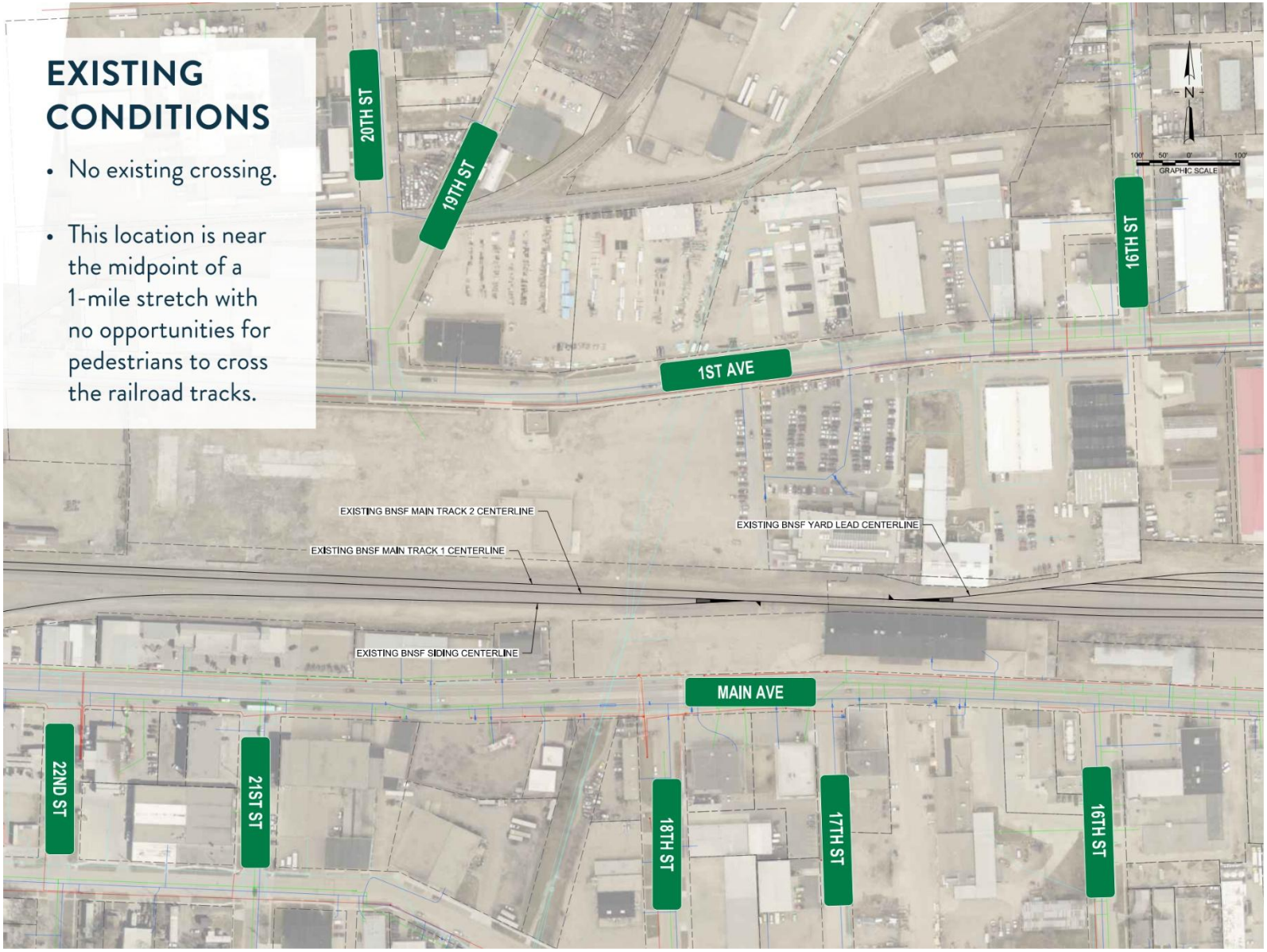

Figure 10-2: 18th Street Pedestrian Crossing Existing Conditions

Proposed Mitigation

Option 1 – Pedestrian Bridge with ADA Spiral Ramp

This option proposes a fully elevated pedestrian crossing consisting of a spiral ramp structure and a pedestrian bridge spanning over the BNSF tracks. The spiral ramp would begin on the south side of the tracks and ascend to a height of 25 feet at a maximum grade of 6.25%, meeting ADA accessibility requirements.

The proposed pedestrian bridge would be just over 210 feet in length and would maintain a minimum vertical clearance of 23 feet 6 inches from the top of rail to the bottom of the superstructure, in compliance with railroad vertical clearance requirements. On the north side, the structure would transition into an elevated ramp with a maximum grade of 7.0%, connecting to the existing 1st Avenue North. A stairway would also be provided at the south end of the structure, aligned with the existing crosswalk at Main Avenue for direct pedestrian access.

Figure 10-3. Cross Section - 18th Street Ped Bridge Option 1

The entire structure would be designed to be fully elevated to minimize impacts on existing underground utilities and to preserve the flexibility of the site for future development. This option would require approximately 0.57 acres of new right-of-way to accommodate the ramp approaches and bridge footprint.

By providing a grade-separated pedestrian route, this option significantly improves safety and connectivity between 1st Avenue North and Main Avenue, particularly in an area currently lacking accessible pedestrian crossings.

Table 10-2. 18th Ped Bridge Estimated Costs- Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$970,000
Right-of-Way	$210,000
Structural Items	$4,240,000
Survey, Design, Admin, etc.	$1,360,000
ROUNDED TOTAL COST	**$6,800,000**

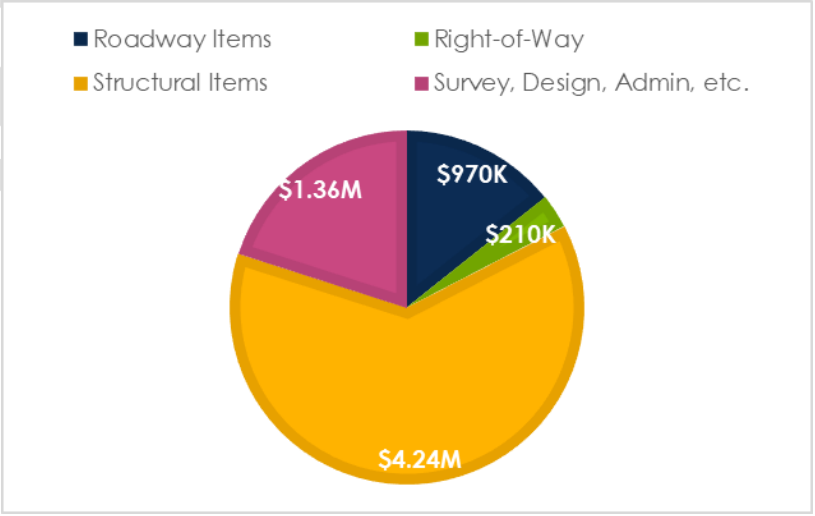

Figure 10-4. 18th Ped Bridge Cost Distribution - Option 1

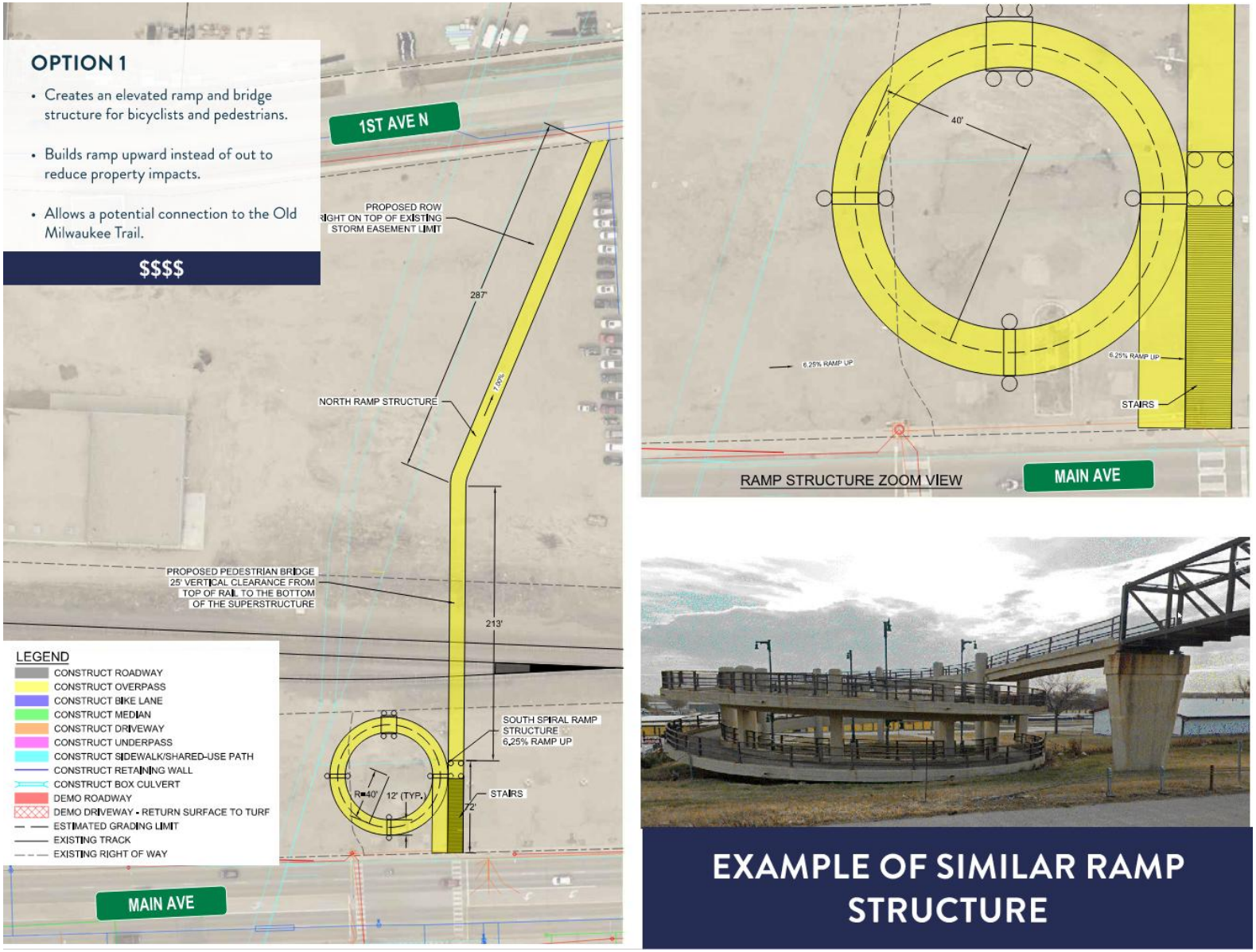

Figure 10-5: 18th Street Pedestrian Crossing Option 1

Option 2 - Pedestrian Bridge with Ramp Access

This option proposes the construction of a 12-foot-wide pedestrian bridge spanning the BNSF tracks, providing a fully accessible, grade-separated crossing. The bridge would maintain a minimum vertical clearance of 25 feet from the top of rail to the bottom of the superstructure and would extend just over 140 feet in length.

Pedestrian access would be provided through a combination of stairs and ADA-compliant access ramps on both ends of the bridge. The ramps would have a maximum longitudinal slope of 4.5% and 2% landings, meeting ADA standards for accessibility. Retaining walls would be constructed along the ramp approaches to minimize the required right-of-way footprint and reduce impacts to adjacent properties.

Figure 10-6. Cross Section - 18th Street Ped Bridge Option 2

Beyond the ramps and staircases, connecting sidewalks would be constructed to tie the bridge infrastructure into the existing pedestrian network along adjacent roads. The total right-of-way required for this option is approximately 1.01 acres.

By offering a flatter, more direct route for pedestrians, this option enhances accessibility while preserving flexibility for integration into future site planning. The surrounding areas of the structure may also be optimized through landscape design to support the development of usable green space and enhance the aesthetic quality of the site.

Table 10-3. 18th Ped Bridge Estimated Costs - Option 2

CATEGORY	COST (2024 USD)
Roadway Items	$440,000
Railroad Items	$130,000
Right-of-Way	$370,000
Structural Items	$3,510,000
Survey, Design, Admin, etc.	$1,110,000
ROUNDED TOTAL COST	**$5,600,000**

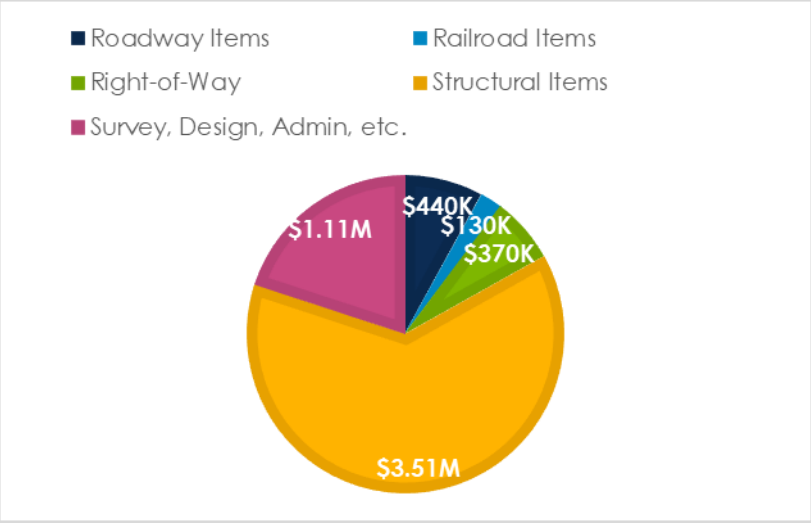

Figure 10-7. 18th Ped Bridge Cost Distribution - Option 2

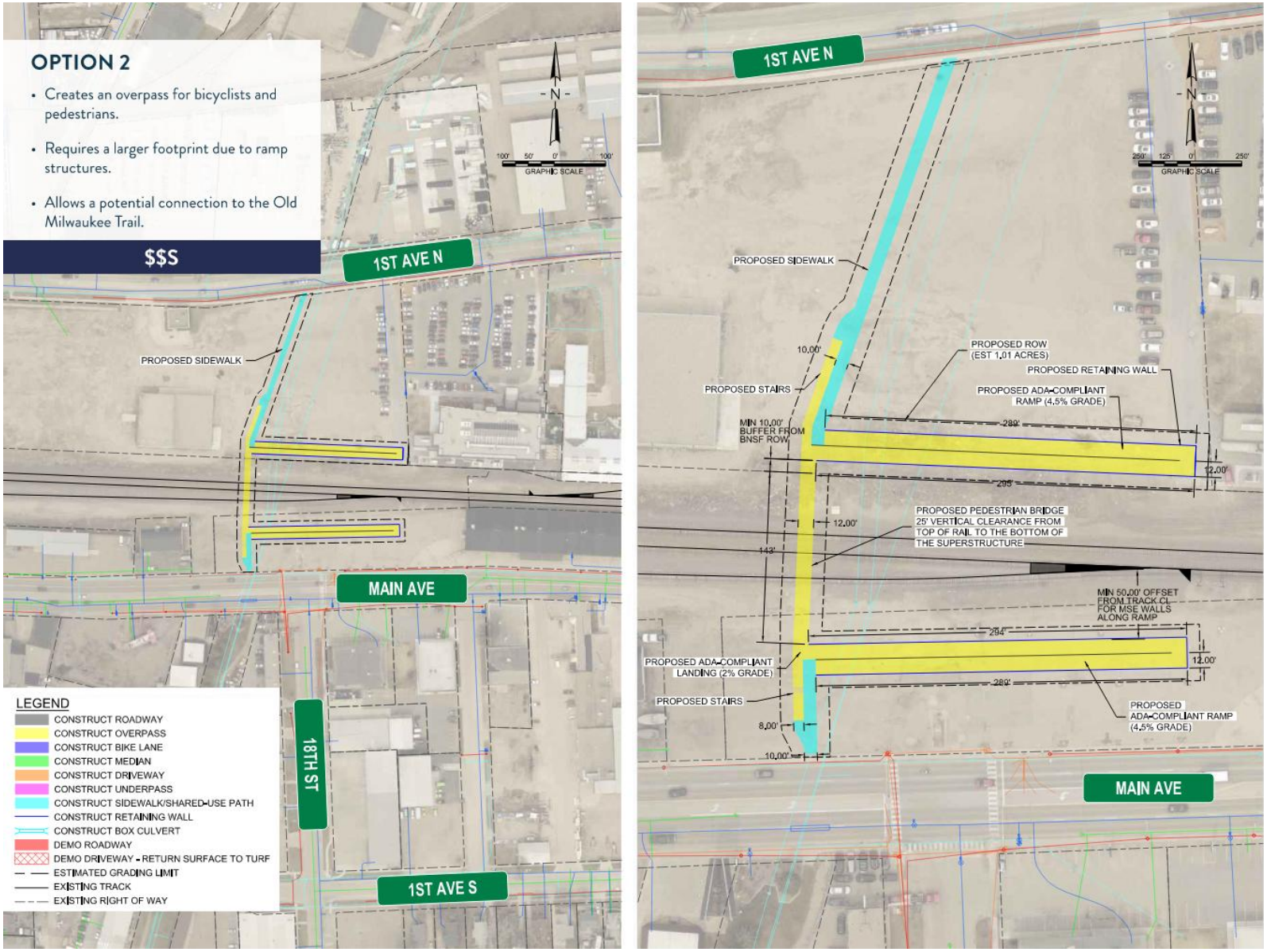

Figure 10-8: 18th Street Pedestrian Crossing Option 2

Option 3 - Pedestrian Underpass

This option proposes the construction of a pedestrian underpass beneath the existing at-grade BNSF tracks using a 16-foot-wide by 8-foot-tall box culvert structure. The underpass would span approximately 120 feet in length and would provide a grade-separated crossing for pedestrians.

ADA-compliant access ramps would be constructed at both ends of the underpass, with a 4.5% grade on the south side and a 5.0% grade on the north side. These ramps would connect to new sidewalk segments that tie directly into the existing pedestrian networks along Main Avenue and 1st Avenue North, ensuring seamless connectivity.

A stormwater lift could be constructed to manage drainage within the underpass if needed and ensure proper operation during weather events. The grading and ramp design would require approximately 0.64 acres of additional right-of-way.

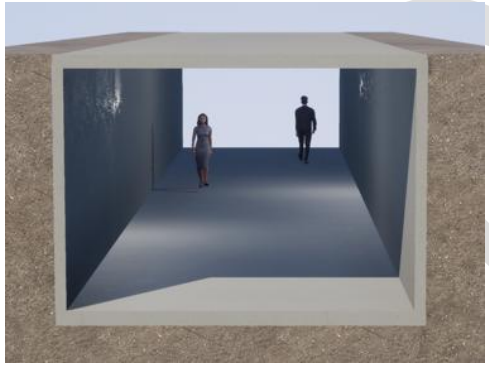

Figure 10-9. Cross Section - 18th Street Ped Underpass

This option preserves surface-level site availability for future development while providing a safe pedestrian crossing. The underpass improves north–south pedestrian access in an area currently lacking in connectivity.

Table 10-4. 18th Ped Underpass Estimated Costs - Option 3

CATEGORY	COST (2024 USD)
Roadway Items	$530,000
Railroad Items	$1,290,000
Right-of-Way	$240,000
Structural Items	$1,960,000
Survey, Design, Admin, etc.	$1,400,000
ROUNDED TOTAL COST	**$5,400,000**

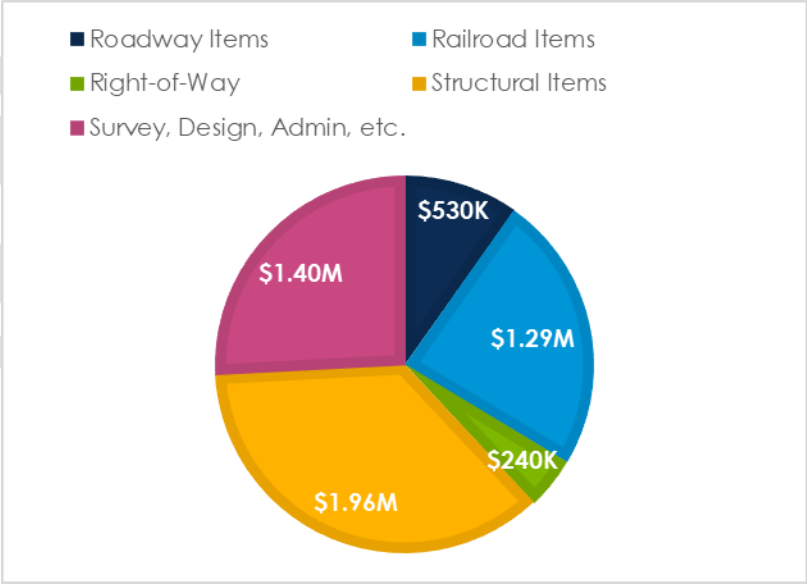

Figure 10-10. 18th Ped Bridge Cost Distribution - Option 3

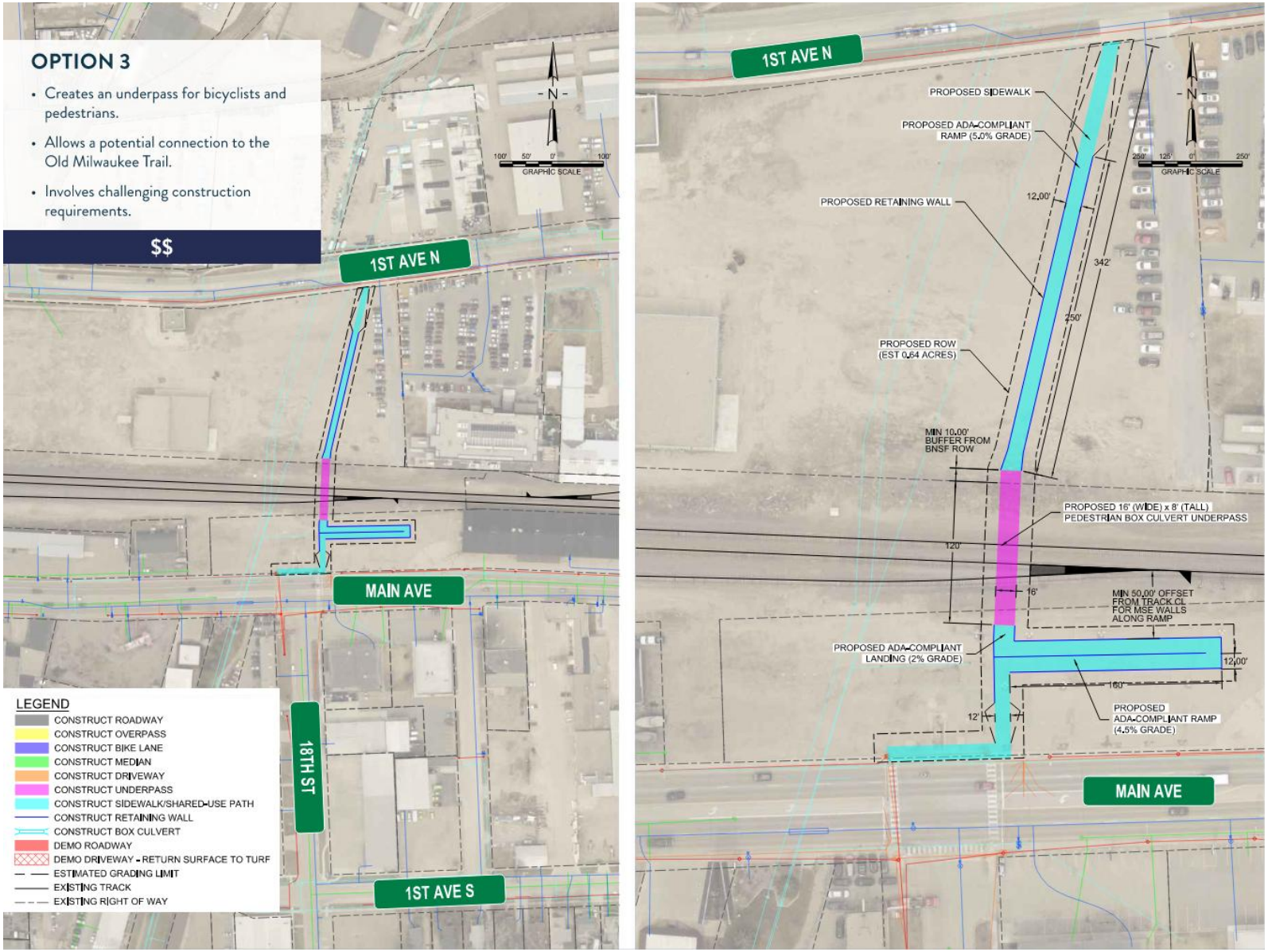

Figure 10-11: 18th Street Pedestrian Crossing Option 3

Benefit-Cost Analysis

Table 10-5 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that was used for the BCA.

Table 10-5: 18th Street Assumptions

Variable Name	Unit	Value	Source
Active Transportation Assumptions			
Pedestrians per Day	pedestrians/day	685	Replica data for area surrounding 18th St. 2023.
Cyclists per Day	cyclists/day	125	

Option 1

Option 1 proposes to develop and construct a pedestrian overpass connecting 1st Ave N and Main Ave, in line with 18th Street. This pedestrian bridge would incorporate a ramp structure on the northern side, and a spiral ramp with stairs next to it on the southern side. The implementation of this alternative would provide a more direct route for pedestrians and cyclists to cross the rail tracks. Additionally, while Option 1 would contribute to the reduction of trespasser activities, due to a lack of information, these impacts were not assessed.

Table 10-6: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$6,800,000	
Residual Value	2024$	$4,413,135	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	30	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	30	
Impacted Active Transportation Users	%	10%	HDR Engineering estimate.
Length of Existing Route	miles	0.6	Estimated using Google Maps pedestrian distances.
Length of Future Route	miles	0.1	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate $1.51 million in discounted benefits while costing $4.13 million (discounted). This translates to a net present value (NPV) of -$2.62 million and a benefit-cost ratio of 0.37.

Option 2

Option 2 proposes to develop and construct a pedestrian overpass connecting 1st Ave N and Main Ave, in line with 18th Street, similar to Option 1, just with a differed overpass structure. Similar to Option 1, while this Option would contribute to the reduction of trespasser activities, due to a lack of information, these impacts were not assessed.

Table 10-7: Option 2 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$5,600,000	
Residual Value	2024$	$2,997,688	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/ hour	30	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/ hour	30	
Impacted Active Transportation Users	%	10%	HDR Engineering estimate.
Length of Existing Route	miles	0.6	Estimated using Google Maps pedestrian distances.
Length of Future Route	miles	0.1	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 2 is expected to generate $1.39 million in discounted benefits while costing $3.41 million (discounted). This translates to a net present value (NPV) of -$2.02 million and a benefit-cost ratio of 0.41.

Option 3

Unlike the previous options, Option 3 proposes to solve the same issues with an underpass. Similar to the previous options, while Option 3 would contribute to the reduction of trespasser activities, due to a lack of information, these impacts were not assessed.

Table 10-8: Option 3 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$5,400,000	
Residual Value	2024$	$2,146,565	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	30	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	30	
Impacted Active Transportation Users	%	10%	HDR Engineering estimate.
Length of Existing Route	miles	0.6	Estimated using Google Maps pedestrian distances.
Length of Future Route	miles	0.1	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 3 is expected to generate $1.30 million in discounted benefits while costing $3.28 million (discounted). This translates to a net present value (NPV) of -$1.98 million and a benefit-cost ratio of 0.40.

Environmental Permitting

Development within the 500-year flood zone may require a Floodplain Development Permit and compliance with local floodplain management regulations.

Current options do not impact Teamsters Park, however future considerations should be given to avoid impacting this Section 4(f) property.

Draft Purpose & Need Discussion

Purpose

The purpose of the 18th Street Pedestrian Crossing project is to improve pedestrian connectivity and safety across the rail corridor between 1st Avenue North and Main Avenue in Fargo, ND. The project aims to provide a safe, accessible, and direct pedestrian route that supports multimodal transportation and improves access to community amenities and future development areas.

Need

The need for the project arises from the following transportation-related deficiencies:

- **Lack of Existing Crossing**: There is currently no pedestrian crossing at this location. 25th Street S is located approximately ½ mile to the west and is a large intersection where pedestrians must cross seven traffic lanes. University Drive is located approximately

½ mile to the east and includes five traffic lanes, which is also not pedestrian-friendly.

- **Connectivity Gaps**: The absence of pedestrian infrastructure between 1st Avenue N and Main Avenue creates a barrier to mobility, particularly for residents without access to a vehicle. Residential land use to the south, in combination with the existing pedestrian infrastructure in McCormick Park, Jefferson West Park, and leading up to Main Avenue, makes this a logical pedestrian crossing
- **Urban Development Context**: The north side of the rail corridor includes active destinations such as Brewhalla, Drekker Brewing Company, and a fitness studio, which generate consistent pedestrian traffic. Additionally, nearby vacant and underutilized parcels present opportunities for future development that would benefit from improved pedestrian access.
- **High Rail Traffic Volume**: The corridor accommodates approximately 26 freight trains per day, traveling at speeds up to 35 mph. A grade crossing would pose significant safety risks, making grade separation a consideration for addressing the need.

Preferred Option

For 18th Street Pedestrian Crossing, Option 1 is preferred. This option has the most compact right of way footprint and has a geometry that would be the easiest to maintain during winter snow conditions.

11 7th Avenue North

Crossing Number 070851M

Fargo, ND

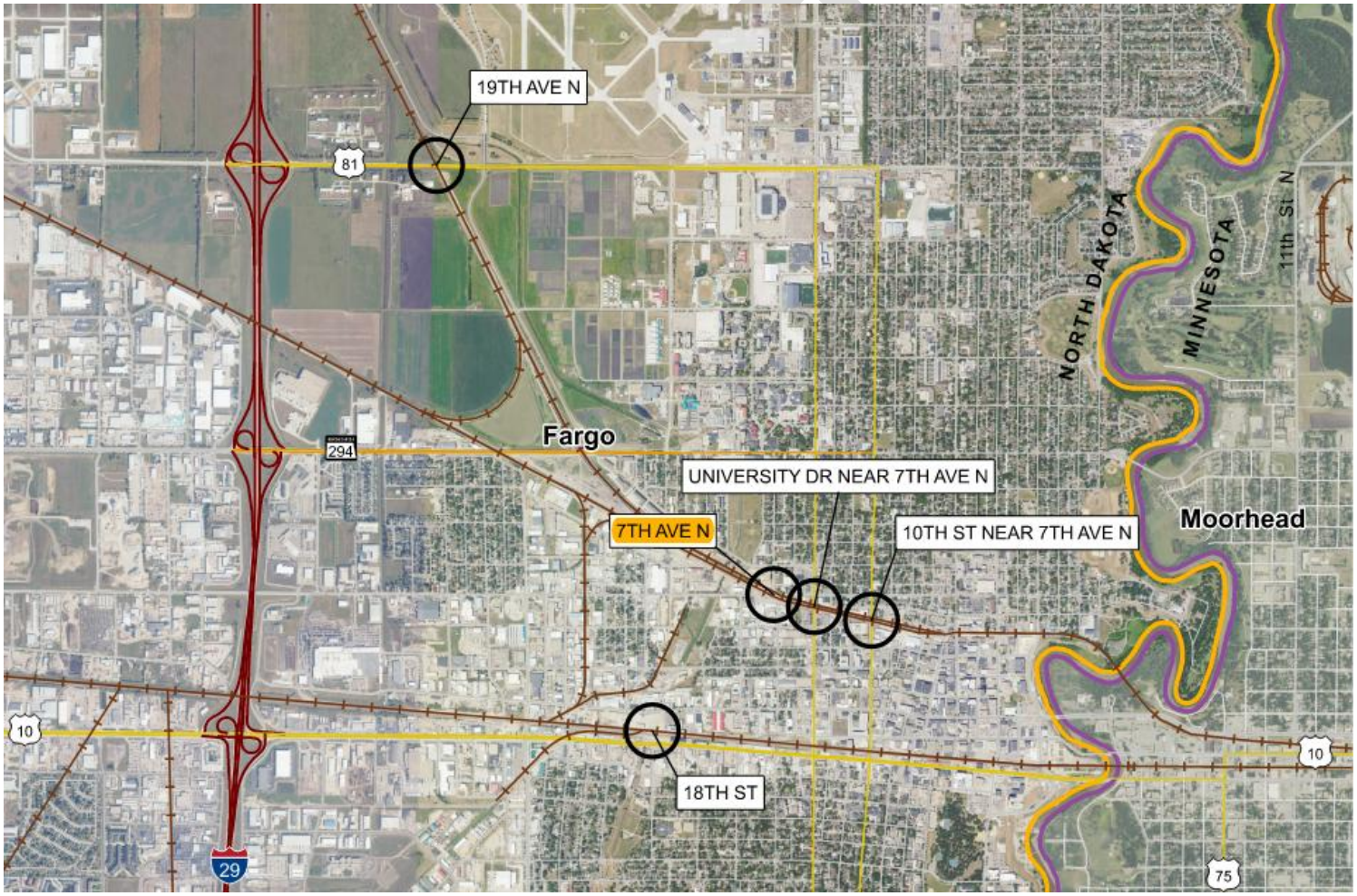

Figure 11-1: 7th Avenue North Study Location

Table 11-1: Crossing Summary – 7th Avenue

Existing Warning Device	Gates / flashers
Railroad	BNSF/ATK
Trains per Day/ Timetable Speed	6/ 49 mph
AADT/Posted Speed Limit	8,885 (2024) / 35 mph
Crash History	1 since 2008
Existing Roadway Surface	Paved

Existing Conditions

7th Avenue is a two-lane paved roadway with a grade crossing consisting of one track owned by BNSF. The crossing is equipped with active warning devices, including gates and flashing lights, and is used for both freight and intercity passenger rail service. Approximately six trains pass through the area daily at a maximum timetable speed of 49 mph.

Non-traversable medians are located on both approaches to the crossing, providing limited channelization. The crossing is a partial quiet zone configuration. Sidewalks are present on both sides of the roadway; however, neither sidewalk is equipped with pedestrian gates or dedicated crossing protection at the rail interface.

The surrounding area includes a mix of residential homes and local businesses. The intersection of 7th Avenue and 14th Street is located approximately 160 feet east of the crossing, which contributes to constrained vehicle storage space between the crossing and the nearby intersection.

Traffic volumes recorded in 2024 indicate an Annual Average Daily Traffic (AADT) of 8,885 vehicles, with approximately 2% attributed to semi-truck traffic. The posted speed limit is 35 mph.

The existing crossing geometry is skewed at an angle of 25 degrees, contributing to limited sight distance and insufficient storage length for vehicles queuing at the tracks. The crossing is not currently designated as a quiet zone, but its proximity to residential properties has prompted interest in implementing noise-reduction measures as part of future upgrades.

The environmental review identified two NWI wetlands, including (City Drain 1) within the 1,000-foot buffer of the crossing. The crossing is located within the 500-year flood zone (Zone X). The Class I file search resulted in one NRHP-listed site (32CS4471), the BNSF Railroad Bridge.

Figure 11-2: 7th Avenue North Existing Conditions

Proposed Mitigation

Option 1 - Underpass

This option proposes the removal of approximately 870 feet of existing paved roadway, along with the existing railroad crossing gates, flashers, and associated warning devices. The roadway would be regraded and reconstructed for about 1000 feet at a maximum slope of 6.0% to achieve the required minimum vertical clearance of 16 feet 6 inches beneath the proposed rail bridge structure.

A total of 1,820 linear feet of retaining walls would be constructed along both sides of the regraded roadway to minimize impacts to adjacent properties and maintain access where feasible. The existing sidewalks on both sides of 7th Avenue would be preserved; however, new guardrails would be installed along the top of all retaining walls to enhance pedestrian safety.

As part of this improvement, access from 7th Avenue to 14th Street would be rerouted due to vertical and horizontal alignment constraints. One driveway would be relocated to match the new roadway profile, while three existing driveways would be permanently removed. Advanced signage would be installed along 14th Street to notify drivers of the closed intersection with 7th Avenue.

This underpass alternative eliminates at-grade train–vehicle conflict points, significantly improves safety and traffic flow, and supports future quiet zone designation by fully separating rail and roadway operations.

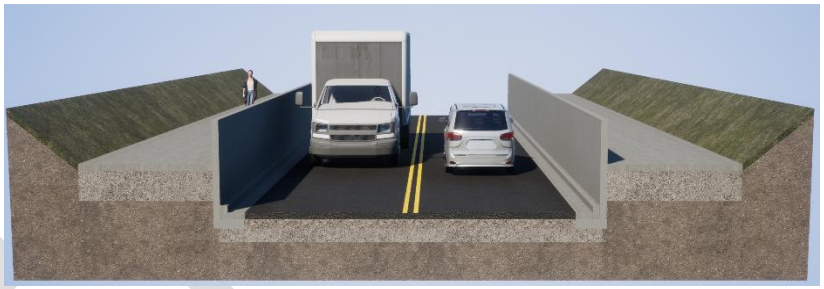

Figure 11-3: Cross Section – 7th Avenue N Near Underpass

Table 11-2. 7th Avenue N Estimated Costs - Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$1,270,000
Railroad Items	$1,820,000
Structural Items	$15,040,000
Survey, Design, Admin, etc.	$4,530,000
ROUNDED TOTAL COST	**$23,000,000**

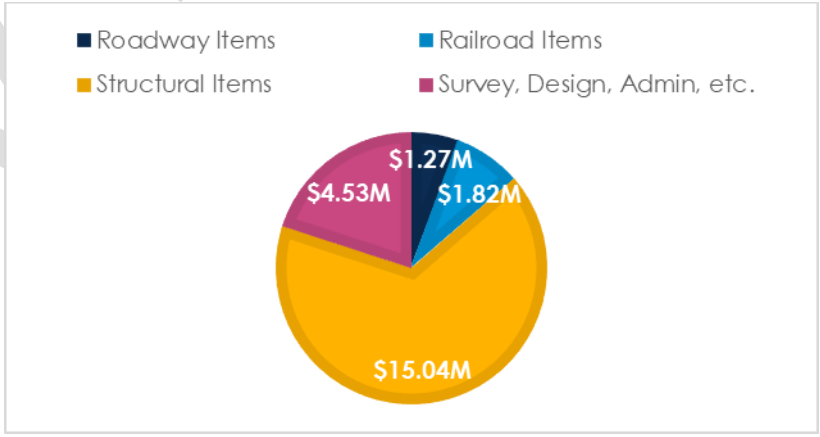

Figure 11-4. 7th Avenue N Cost Distribution - Option 1

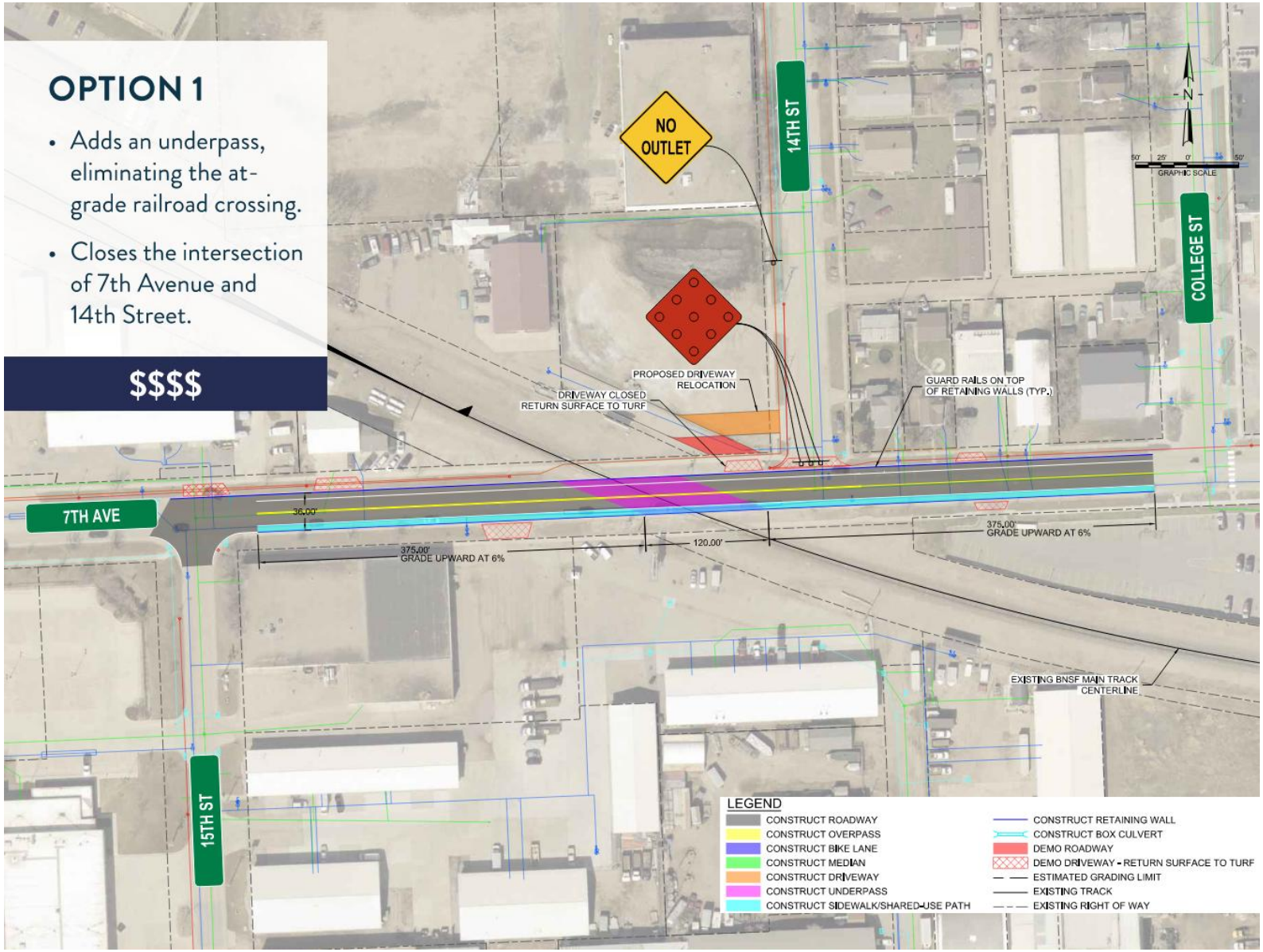

Figure 11-5: 7th Avenue North Option 1

Option 2 – Quiet Zone

This option proposes a 24-hour Quiet Zone-ready configuration in accordance with FRA requirements. The existing median would be removed and replaced with new 10-foot-wide non-traversable medians on both approaches to the crossing, extending approximately 100 feet to the west and just under 230 feet to the east in order to physically restrict vehicle movement across lanes and discourage illegal maneuvers around lowered gates.

Access to 7th Avenue from 14th Street would be closed, with traffic rerouted to College Street. One business access west of the crossing would be shifted and widened to accommodate changes in traffic flow and roadway configuration.

The existing sidewalks on both sides of the roadway could remain in place for pedestrian connectivity. At a minor cost, sidewalks can be realigned to get closer to a 90 degree crossing angle as part of the upgrades. Widening the sidewalk from the current width would reduce the ability to improve the crossing angle.

Current active warning devices, including gates and flashing lights, would be salvaged and reinstalled as appropriate, supplemented by additional Quiet Zone–compliant safety infrastructure, such as constant warning time circuitry and updated signage, as required by FRA standards.

This option enhances the safety of the crossing by upgrading the physical configuration to reduce the risk of vehicle-train collisions, discouraging illegal movements, and improving warning systems. It also supports the establishment of a Quiet Zone to minimize train horn noise in this residential area.

Figure 11-6. Cross Section - 7th Avenue N Quiet Zone

Table 11-3. 7th Avenue N Estimated Costs - Option 2

CATEGORY	COST (2024 USD)
Roadway Items	$70,000
Railroad Items	$500,000
Survey, Design, Admin, etc.	$140,000
ROUNDED TOTAL COST	**$700,000**

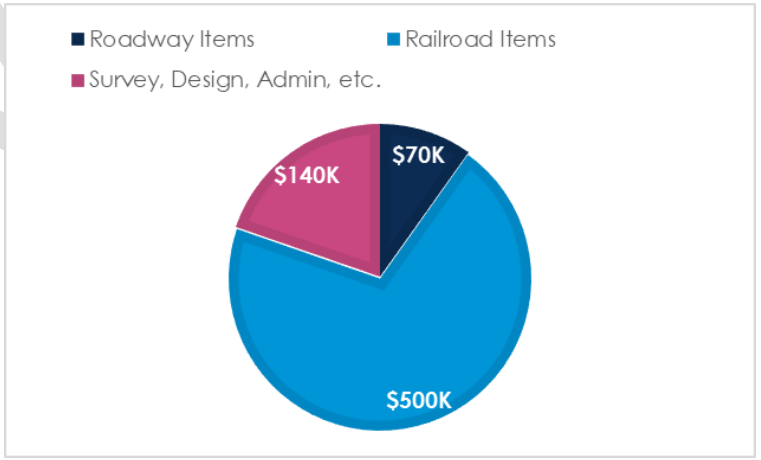

Figure 11-7. 7th Avenue N Cost Distribution - Option 2

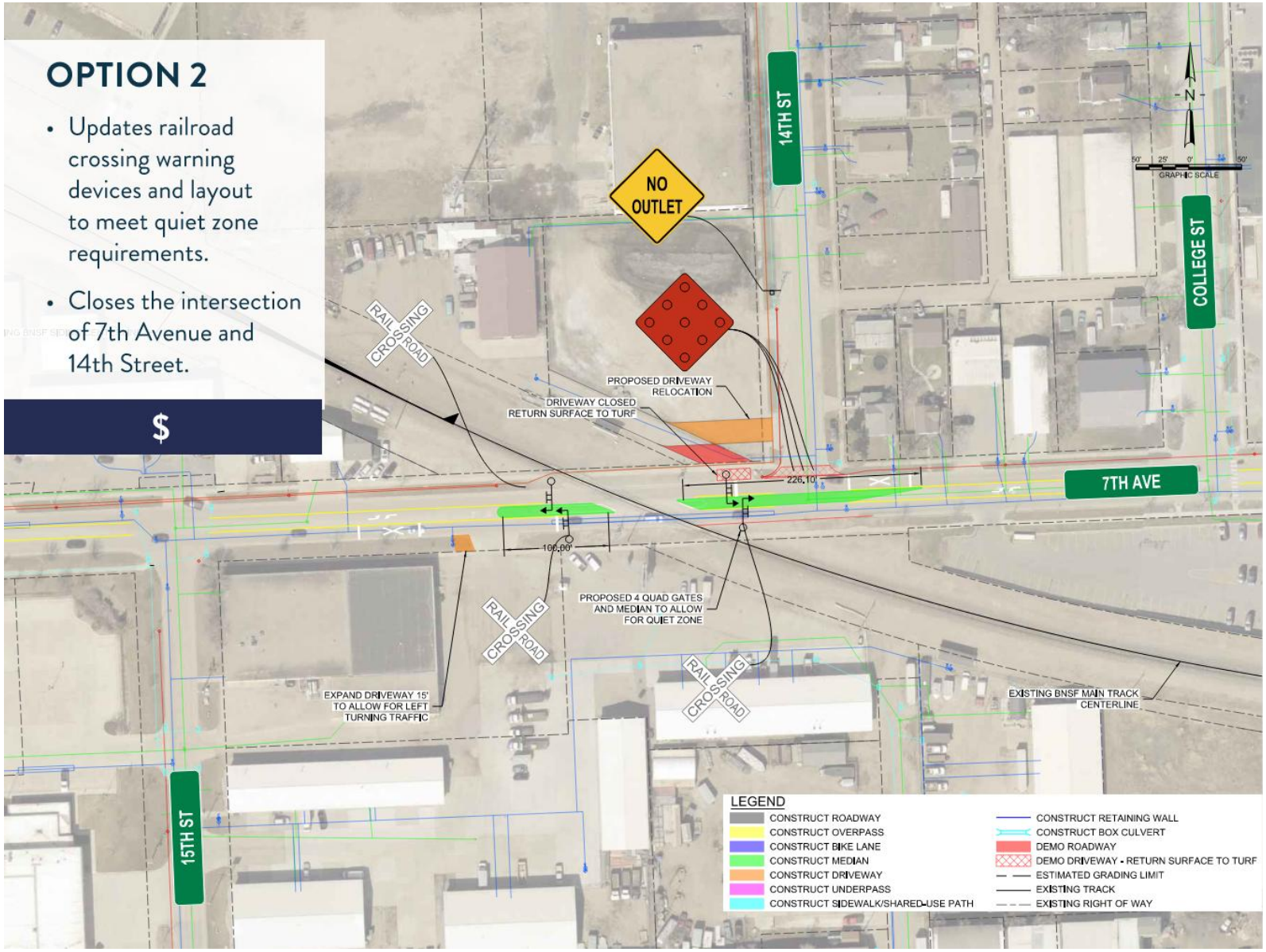

Figure 11-8: 7th Avenue North Option 2

Benefit-Cost Analysis

Table 11-4 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that was used for the BCA.

Table 11-4: 7th Ave Crossing Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID	factor	070851M	FRA Grade Crossing Inventory.
Rail Assumptions			
Freight Trains per Day	trains/day	8	FRA Grade Crossing Inventory and BNSF
Passenger Trains per Day	trains/day	2	
Switching Trains per Day	trains/day	0	
Maximum Timetable Speed	miles/hour	49	FRA Grade Crossing Inventory.
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type	factor	Gates	
Crossing Surface Material	factor	Concrete	
Roadway Assumptions			
AADT	vehicles/day	8,885	FRA Grade Crossing Inventory. MetroCOG 2024 Traffic Count Maps. North Dakota Department of Transportation's Traffic Counts.
Truck Share of Traffic	%	3%	
School Buses per Day	buses/day	0	
Traffic Year	year	2024	

Option 1

Option 1 for this location proposes to develop an underpass, grade separating the existing 7th Ave crossing. By separating the grade crossing, the alternative is expected to eliminate the likelihood of vehicle-train crashes and vehicle idling time. This is expected to translate into improved transportation safety, as well as reduced travel time, vehicle operating costs, and emissions.

Table 11-5: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$23,000,000	
Residual Value	2024$	$15,031,640	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	35	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	35	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate $1.78 million in discounted benefits while costing $13.99 million (discounted). This translates to a net present value (NPV) of -$12.21 million and a benefit-cost ratio of 0.13.

Option 2

Option 2 proposes to improve the existing grade crossing safety equipment to incorporate 4 quad railroad crossing gates with flashing lights and arms. Upgrading the safety equipment at the 7th Avenue crossing is expected to improve transportation safety and reduce the likelihood of vehicle-train collisions.

Table 11-6: Option 2 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$700,000	
Residual Value	2024$	$0	
Useful Life of Asset	years	20	Reasoned Assumption
Existing Speed Limit	miles/hour	35	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	35	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 2 is expected to generate over $77,000 in discounted benefits while costing almost $426,000 (discounted). This translates to a net present value (NPV) of over -$348,000 and a benefit-cost ratio of 0.18.

Environmental Permitting

An aquatic resource delineation and potential permitting under Section 404 of the Clean Water Act (CWA) may be required.

Development within the 500-year flood zone would require a Floodplain Development Permit, including compliance with local floodplain management regulations.

Consultation with NDSHPO and the lead federal agency for the crossing would be required to comply with Section 106 of the National Historic Preservation Act (NRHPA). Impacts to the NRHP-listed site would require mitigation through an MOA with NDSHPO and Metro COG.

Draft Purpose & Need Discussion

Purpose

The purpose of the 7th Avenue North Railroad Crossing Improvement Project is to enhance safety, reduce noise impacts, and improve traffic operations at the existing grade crossing. The project aims to address current deficiencies in roadway geometry, traffic flow, and multimodal safety while supporting community livability through noise mitigation.

Need

The need for the project is based on several transportation-related issues and community concerns:

- **Skewed Crossing Geometry**: The crossing intersects the BNSF rail line at an angle less than 90 degrees, resulting in limited sight distance and insufficient vehicle storage, especially near the intersection with 14th Street.
- **Crash History**: One recorded crash since 2008 highlights the safety risks associated with the current configuration.
- **High Traffic Volume**: The crossing accommodates an Average Annual Daily Traffic (AADT) of 8,885 vehicles (2024), including 2% semi-truck traffic, which indicates a high demand for safe and efficient infrastructure.
- **Noise Concerns**: The crossing is not currently designated as a quiet zone, but its proximity to residential areas has led to community interest in reducing train horn noise.
- **Pedestrian Safety**: While sidewalks are present on both sides of the roadway, there are no pedestrian gates at the crossing, which does not meet best practices for pedestrian protection at rail crossings.

Preferred Option

For 7th Avenue North, Option 2 is preferred. This option adds a quiet zone which will improve the crossing infrastructure effectiveness and is less disruptive to the neighboring buildings than the underpass Option 1.

12 University Near 7th Underpass

Crossing Number 070848E

Fargo, ND

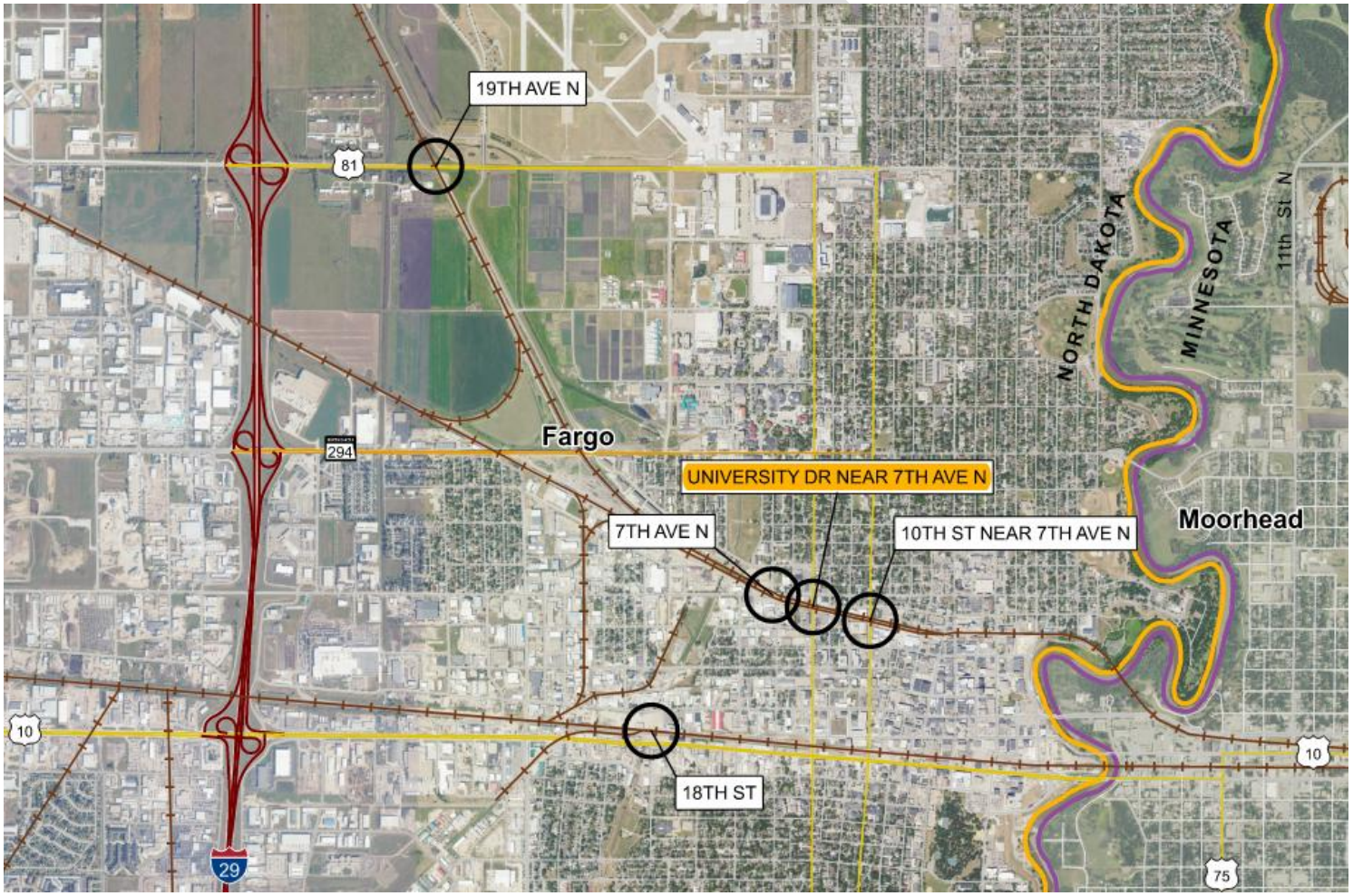

Figure 12-1: University Near 7th Underpass Study Location

Table 12-1: Crossing Summary – University Near 7th Underpass

Existing Warning Device	Underpass
Railroad	BNSF/ATK
Trains per Day/ Timetable Speed	8/ 49 mph
AADT/Posted Speed Limit	>10,000 (2024) /30 mph
Crash History	N/A
Existing Roadway Surface	Paved

Existing Conditions

North University Drive is a two-lane paved roadway that slopes downward into an underpass beneath BNSF rail bridge. The current vertical clearance is 13 feet 9 inches, measured from the top of the roadway to the underside of the bridge.

The surrounding area is predominantly commercial, with businesses located on both sides of the corridor. Retaining walls are in place along the underpass to maintain the existing roadway grade. The posted speed limit on North University Drive is 30 mph. With its high AADT, the roadway serves as a key connection in the area.

The corridor includes multimodal infrastructure, with designated bicycle lanes and sidewalks on both sides of the roadway, providing pedestrian and cyclist access through the underpass.

The single railroad track above is owned and operated by BNSF Railway and is used for both freight and intercity passenger service. Approximately 10 trains pass through this location daily at a maximum timetable speed of 49 mph.

The crossing is located within the 500-year flood zone (Zone X). The National Park Service (NPS) identified one NRHP-listed site the Woodrow Wilson High School.

Figure 12-2: University Near 7th Underpass Existing Conditions

Proposed Mitigation

Option 1 – Replace Rail Bridge and Regrade Underpass

This option proposes the replacement of the existing rail bridge with a wider structure to accommodate future traffic demands and structural improvements. The roadway beneath the bridge would be regraded to achieve improved vertical clearance as feasible.

On the south side of the underpass, approximately 370 feet of roadway would be regraded at a maximum slope of 4.5% to tie in smoothly with 7th Avenue North. Additionally, 100 feet of roadway beyond the intersection of North University Drive and 7th Avenue North would be regraded to ensure a continuous and seamless transition.

Sidewalks along both sides of the corridor would be removed and reconstructed to match the new roadway profile. Approximately 1,000 linear feet of retaining walls would be constructed along the sidewalk limits to minimize impacts to adjacent properties and maintain accessibility. A total of five driveways would be impacted by the grading changes; these would be regraded and adjusted to match the proposed roadway elevation.

New pavement striping would be installed to align with existing traffic patterns and maintain consistent lane configurations.

By increasing the vertical clearance, this option eliminates current semi-truck clearance conflicts, enhances operational efficiency, and improves overall safety for all roadway users.

Figure 12-3: Cross Section – University Near 7th Underpass

Table 12-2. University Near 7th Estimated Costs - Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$2,280,000
Railroad Items	$2,410,000
Structural Items	$8,970,000
Survey, Design, Admin, etc.	$3,420,000
ROUNDED TOTAL COST	**$17,100,000**

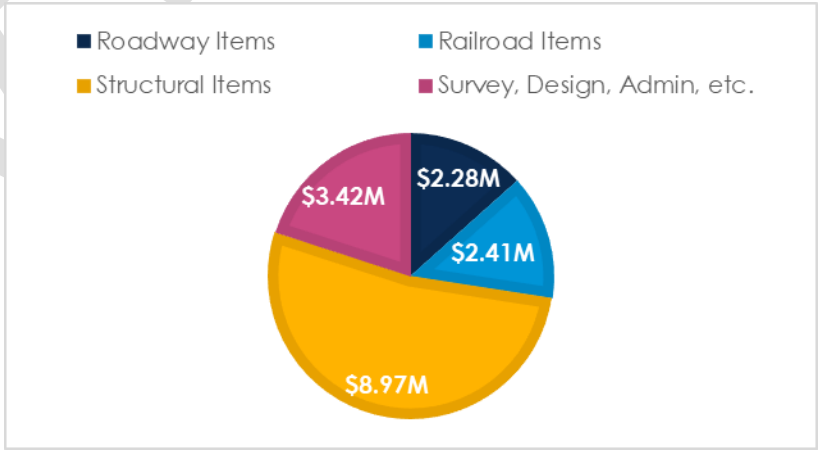

Figure 12-4. University Near 7th Cost Distribution - Option1

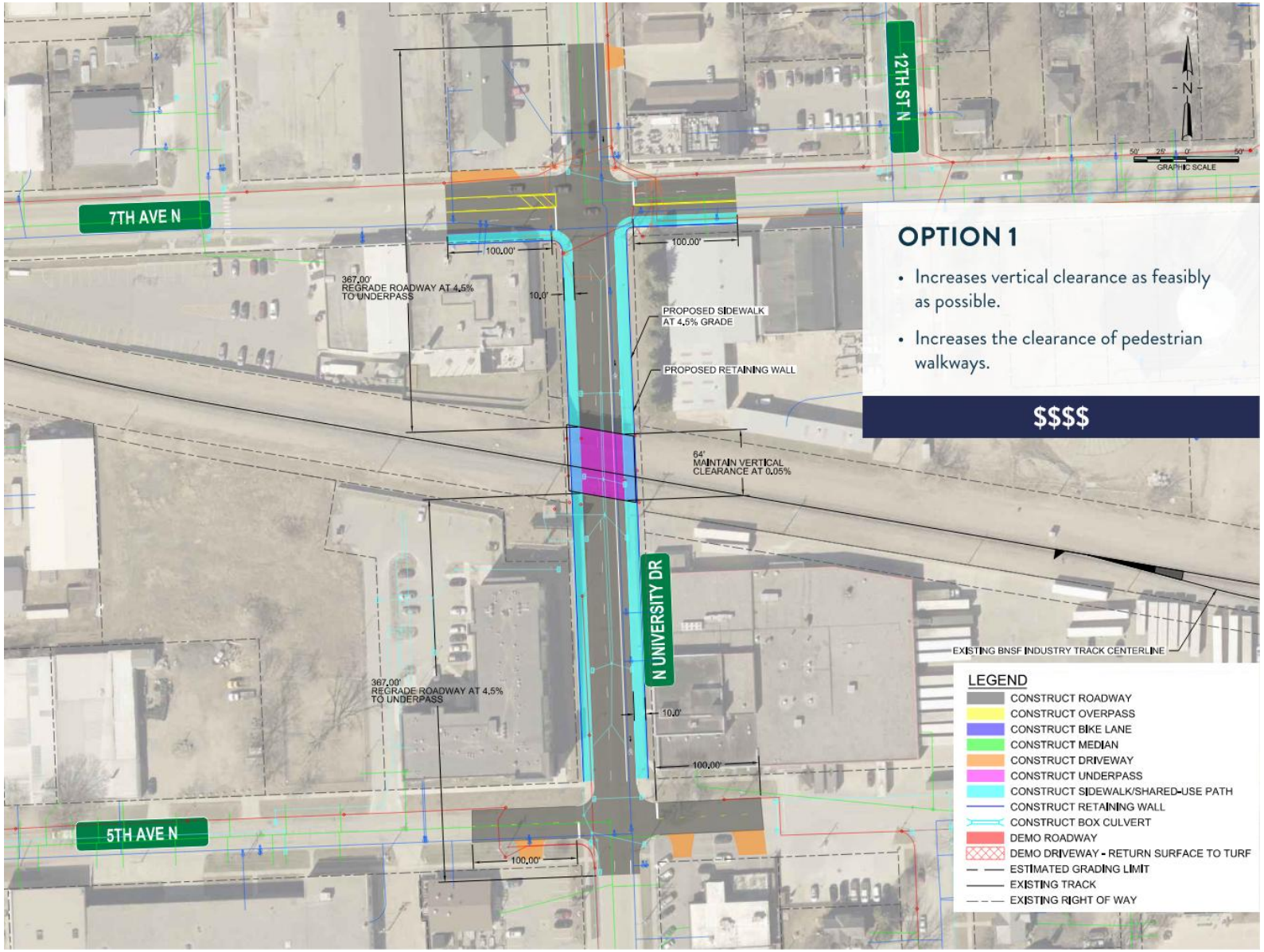

Figure 12-5: University Near 7th Underpass Option 1

Benefit-Cost Analysis

Table 12-3 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that was used for the BCA.

Table 12-3: University Bridge Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID	factor	070848E	FRA Grade Crossing Inventory.
Rail Assumptions			
Freight Trains per Day	trains/day	8	FRA Grade Crossing Inventory and BNSF.
Passenger Trains per Day	trains/day	2	
Switching Trains per Day	trains/day	0	
Maximum Timetable Speed	miles/hour	49	FRA Grade Crossing Inventory
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type	factor	Bridge	
Crossing Surface Material	factor	Concrete	

Option 1

Option 1 proposes to replace the existing aging rail overpass with a new structure. The replacement of the aging infrastructure is expected to avoid repair costs that would otherwise be incurred to ensure the structural integrity of the structures.

Table 12-4: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$17,100,000	
Residual Value	2024$	$8,966,659	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	30	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	30	
Bridge Major Rehabilitation Year	year	2036	HDR Engineering estimate.

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate $1.68 million in discounted benefits while costing $10.40 million (discounted). This translates to a net present value (NPV) of -$8.72 million and a benefit-cost ratio of 0.16.

Environmental Permitting

Development within the 500-year flood zone may require a Floodplain Development Permit, and compliance with local floodplain management regulations.

Current options do not impact the Woodrow Wilson High School building. However, consultation with NDSHPO and the lead federal agency for the crossing may still be required to comply with Section 106 of the National Historic Preservation Act (NRHPA). Impacts to the NRHP-listed site would require mitigation through an MOA with NDSHPO and Metro COG.

Draft Purpose & Need Discussion

Purpose

The purpose of the proposed University Drive Underpass Improvement Project is to enhance safety and accessibility by increasing vertical clearance at the existing grade-separated railroad crossing. The project also seeks to maintain and improve multimodal connectivity and support adjacent commercial activity by upgrading critical infrastructure.

Need

The need for the project is based on several transportation-related deficiencies and contextual factors:

- **Insufficient Vertical Clearance**: The current clearance of 13'-9" is below the preferred minimum of 16'-6", which restricts access for taller vehicles and increases the risk of semi-truck impacts.
- **Multimodal Corridor**: University Drive includes designated bike lanes and sidewalks on both sides, making it a key corridor for multimodal transportation. Improvements must preserve and enhance these facilities.
- **Commercial and Economic Context**: The surrounding area includes active businesses, and the underpass serves as a critical access route. Infrastructure upgrades are needed to support continued economic activity and future growth.
- **Rail Traffic Safety**: The corridor accommodates approximately 10 trains per day at speeds up to 49 mph, reinforcing the need for a safe and structurally sound grade-separated crossing.

Preferred Option

For the University Near 7th Avenue N Underpass, Option 1 is preferred. This option replaces aging infrastructure and proposes to improve the vertical clearance below the rail bridge which can reduce the risk of vehicle strikes.

13 10th Street N Near 7th Avenue N

Crossing Number 070845J

Fargo, ND

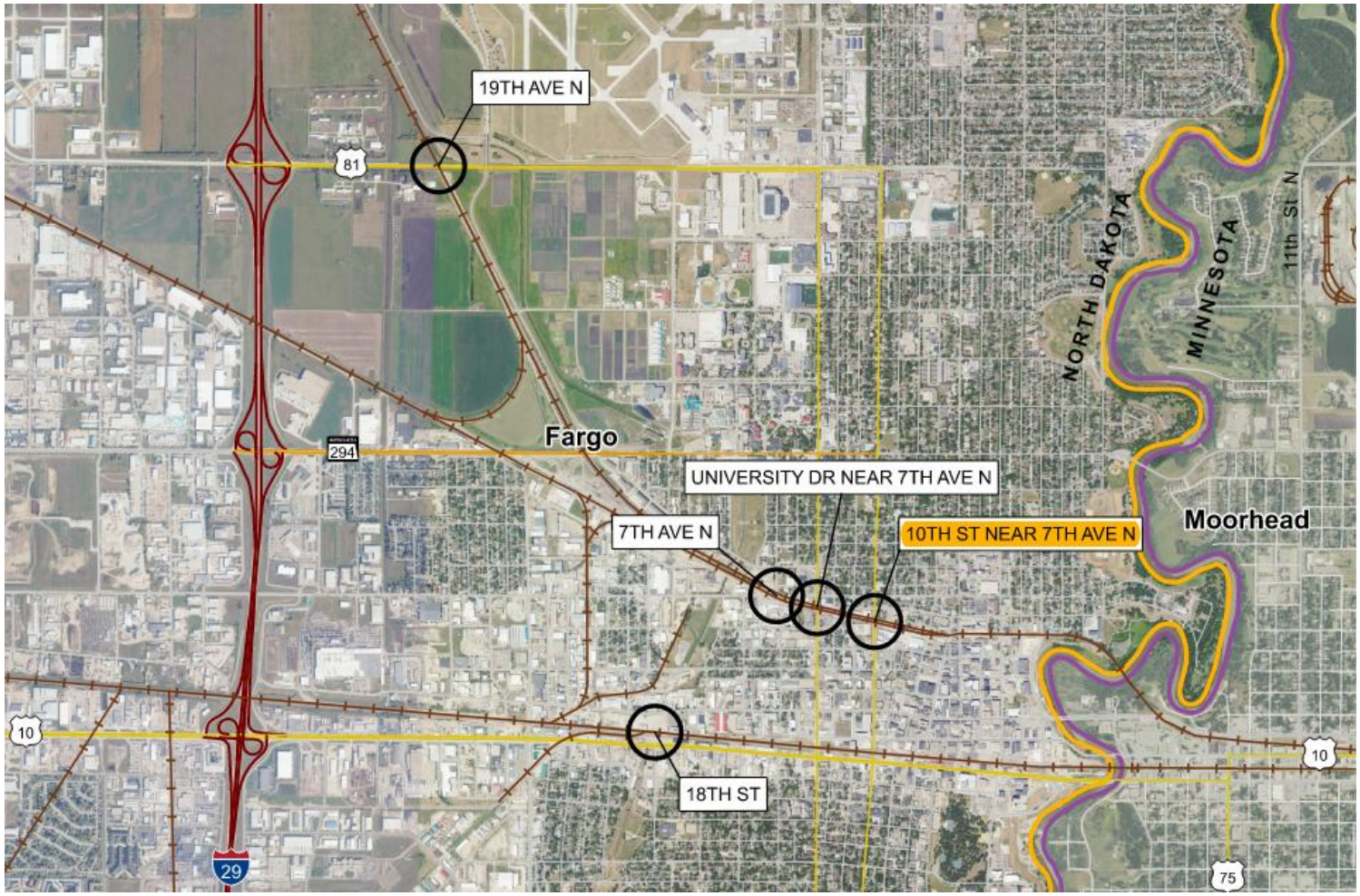

Figure 13-1. 10th Street N Near 7th Avenue N Study Location

Table 13-1: Crossing Summary – 10th Near 7th Underpass

Existing Warning Device	Underpass
Railroad	BNSF/ATK
Trains per Day/ Timetable Speed	1 per Week / 10 mph
AADT/Posted Speed Limit	~10,000 (2024) /30 mph
Crash History	N/A
Existing Roadway Surface	Paved

Existing Conditions

10th Street North is a two-lane paved roadway that descends into an underpass beneath a single-track rail line owned and operated by BNSF Railway. The existing vertical clearance under the bridge is 13 feet 9 inches, measured from the roadway surface to the underside of the rail structure.

The underpass is situated within a commercial corridor, with businesses located on both sides of the roadway. Retaining walls are present along the corridor to accommodate the grade differential while minimizing impacts to adjacent properties. The posted speed limit along 10th Street North is 30 mph. This busy corridor includes multimodal infrastructure such as a designated bicycle lane and sidewalks on both sides of the street.

The rail line is used for both freight and intercity passenger service, with approximately two train movements per day at a maximum timetable speed of 10 mph. A turnout is located directly above the underpass structure, contributing to the operational complexity at this location.

The crossing is located within the 500-year flood zone (Zone X). The Class I file search resulted in one NHP-listed site (32CS4470), the BNSF Rail Bridge.

Figure 13-2: 10th Street Near 7th Avenue N Existing Conditions

Proposed Mitigation

Option 1 – Regrade Underpass and Improve Vertical Clearance

This option proposes regrading the existing underpass at 10th Street North to achieve improved vertical clearance.

To tie the new underpass profile into the surrounding street network, up to 370 feet of roadway on the south side would be regraded at a maximum slope of 4.5% to connect with the existing grade of 4th Avenue North. On the north side, approximately 370 feet of roadway would also be regraded, including the intersection of 10th Street North and 6th Avenue North. An additional 100 feet on either side of this intersection would be resurfaced to achieve a smooth transition.

Existing sidewalks on both sides of the corridor would be removed and reconstructed to match the revised roadway profile. Approximately 1,360 linear feet of retaining walls would be constructed along the corridor to minimize right-of-way impacts and maintain property access. A total of six driveways would be regraded to conform to the new roadway elevation.

Pavement striping would be applied to match the existing lane configuration and ensure continuity throughout the corridor.

By improving vertical clearance at the underpass, this option would eliminate height-related vehicle restrictions, particularly for semi-trucks, and enhance overall traffic safety and connectivity along this key corridor.

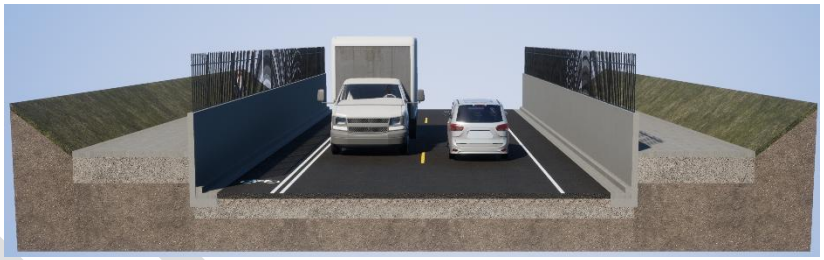

Figure 13-3: Cross Section – 10th St N Near 7th Ave N

Table 13-2. 10th St N Near 7th Ave N Estimated Costs

CATEGORY	COST (2024 USD)
Roadway Items	$2,500,000
Railroad Items	$2,480,000
Structural Items	$10,930,000
Survey, Design, Admin, etc.	$3,980,000
ROUNDED TOTAL COST	**$20,000,000**

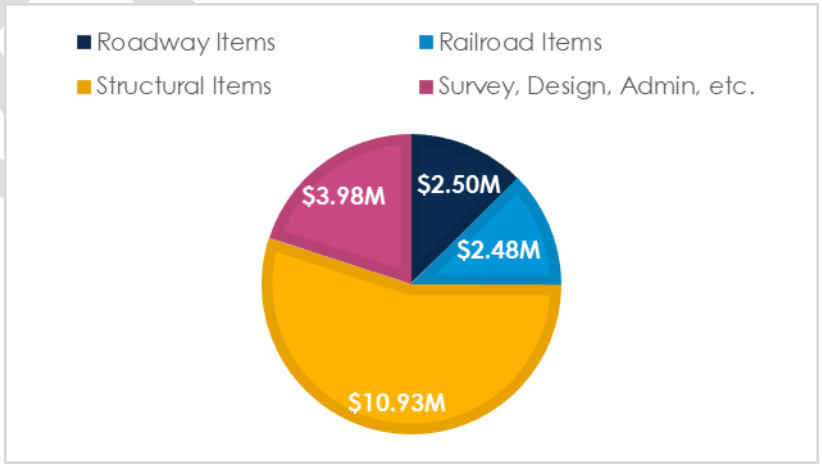

Figure 13-4. 10th St N Near 7th Ave N Cost Distribution

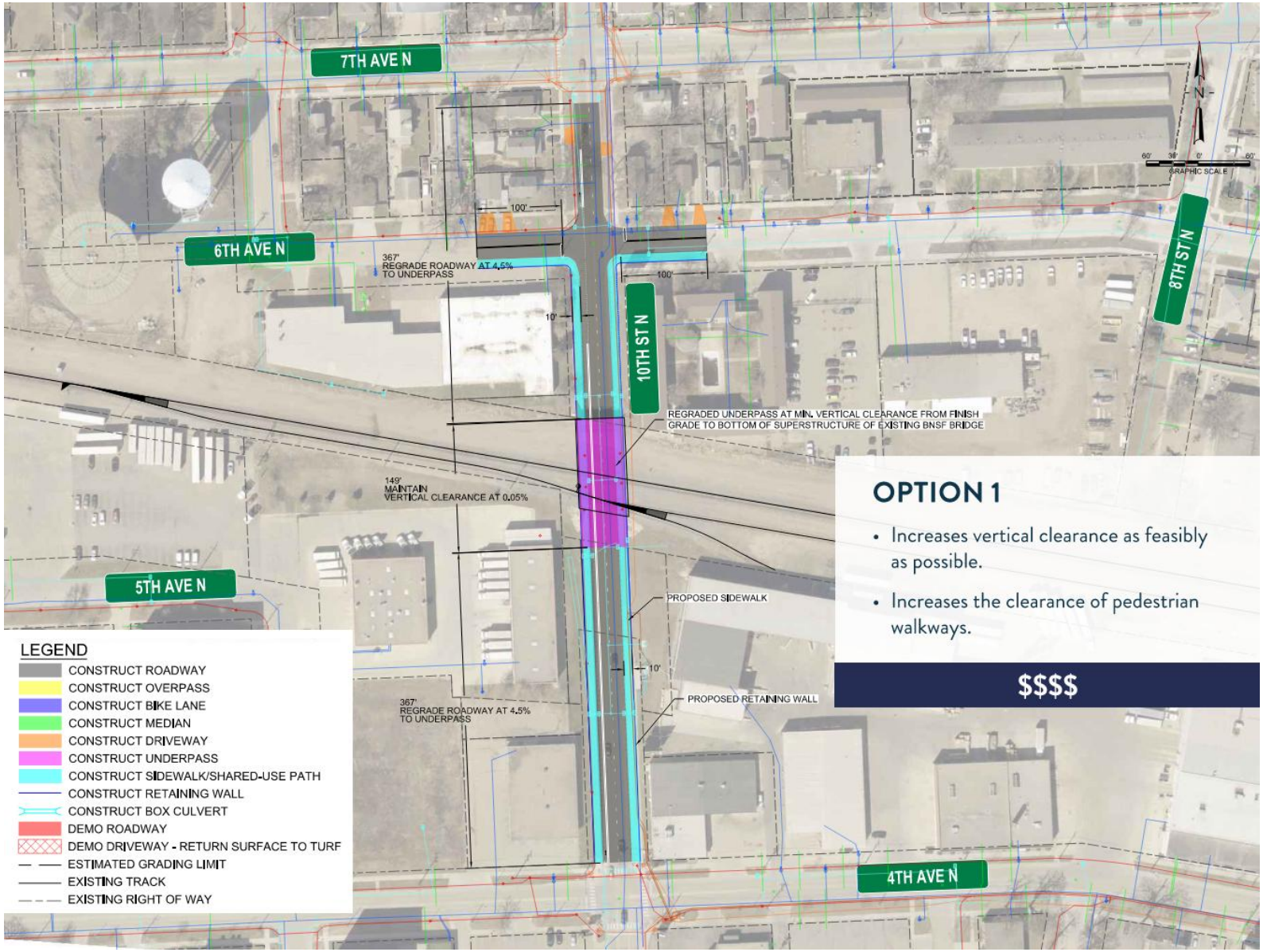

Figure 13-5: 10th Street N Near 7th Avenue N Option 1

Benefit-Cost Analysis

Table 13-3 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that was used for the BCA.

Table 13-3: 10th Bridge Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID	factor	070845J	FRA Grade Crossing Inventory.
Rail Assumptions			
Freight Trains per Day	trains/day	8	FRA Grade Crossing Inventory and BNSF.
Passenger Trains per Day	trains/day	2	
Switching Trains per Day	trains/day	0	
Maximum Timetable Speed	miles/hour	10	FRA Grade Crossing Inventory.
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type	factor	Bridge	
Crossing Surface Material	factor	Concrete	

Option 1

Option 1 proposes to replace the existing aging rail overpass with a new structure. The replacement of the aging infrastructure is expected to avoid repair costs that would otherwise be incurred to ensure the structural integrity of the structures.

Table 13-4: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$20,000,000	
Residual Value	2024$	$10,926,843	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	30	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	30	
Bridge Major Rehabilitation Year	year	2030	HDR Engineering estimate.

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate $2.28 million in discounted benefits while costing $12.16 million (discounted). This translates to a net present value (NPV) of -$9.89 million and a benefit-cost ratio of 0.19.

Environmental Permitting

Development within the 500-year flood zone would require a Floodplain Development Permit and compliance with local floodplain management regulations.

Consultation with NDSHPO and the lead federal agency for the crossing would be required to comply with Section 106 of the National Historic Preservation Act (NRHPA). Impacts to the NRHP-listed site would require mitigation through an MOA with NDSHPO and Metro COG.

Draft Purpose & Need Discussion

Purpose

The purpose of the 10th Street North Underpass Improvement Project is to enhance vertical clearance, improve safety, and extend the service life of the existing grade-separated railroad crossing. The project also aims to maintain multimodal access and minimize impacts to adjacent properties and businesses, ensuring continued functionality of this critical transportation corridor.

Need

The need for the project is based on several transportation-related deficiencies and contextual factors:

- **Insufficient Vertical Clearance**: The current posted clearance of 13′-9″ is below the preferred standard of 16′-6″, limiting access for taller vehicles and increasing the risk of vehicle strikes.
- **Aging Infrastructure**: The underpass structure is aging and may require rehabilitation or replacement to meet future demands and safety standards.
- **Multimodal Corridor**: The corridor includes designated bike lanes and sidewalks on both sides, making it a key route for non-motorized users. Improvements must preserve and enhance these facilities.
- **Rail Operations**: Although only two trains per day pass through this location at low speeds (approximately 10 mph), the presence of a rail turnout directly above the underpass introduces operational and structural complexities that must be addressed.
- **Commercial Context**: The underpass provides vital access to surrounding businesses and commercial areas. Infrastructure upgrades are necessary to support ongoing economic activity, ensure reliable access, and minimize disruptions to adjacent properties.

Preferred Option

For 10th Street N Near 7th Avenue N, Option 1 is preferred. This option replaces aging infrastructure and proposes to improve the vertical clearance below the rail bridge which can reduce the risk of vehicle strikes.

14 19th Avenue N

Crossing Number 081377X

Fargo, ND

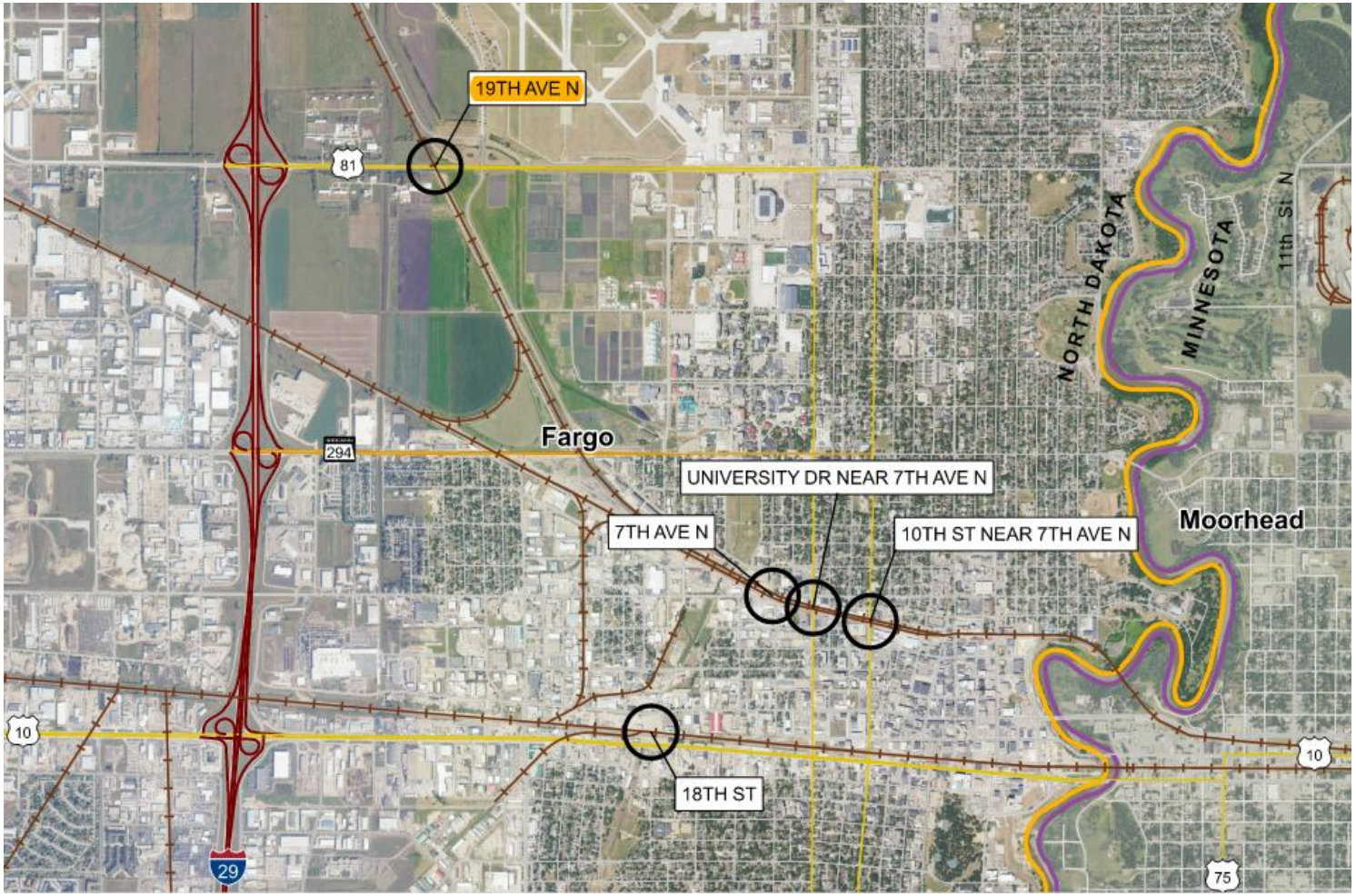

Figure 14-1: 19th Avenue Study Location

Table 14-1: Crossing Summary – 19th Avenue N

Existing Warning Device	Underpass
Railroad	BNSF/ATK
Trains per Day/ Timetable Speed	7/ 50 mph
AADT/Posted Speed Limit	19,985 (2024) / 30 mph
Crash History	N/A
Existing Roadway Surface	Paved

Existing Conditions

19th Avenue North is a four-lane paved roadway that grades downward into an underpass beneath a single-track rail line owned and operated by BNSF Railway. The surrounding area is predominantly agricultural, with open farmland on the east side and NDSU campus. The posted speed limit along 19th Avenue North is 40 mph with an AADT of 19,985.

SRC members brought up slope stability issues with previous projects near the railroad structure. This information led to the inclusion of additional retaining wall in both options that were investigated.

There are currently no pedestrian or bicycle facilities along this segment of roadway.

The track above the underpass is used exclusively for freight operations with a maximum authorized timetable speed of 50 mph.

The environmental review identified one NWI wetland (City Drain) within the 1,000-foot buffer of the crossing. The crossing is located within the 500-year flood zone (Zone X).

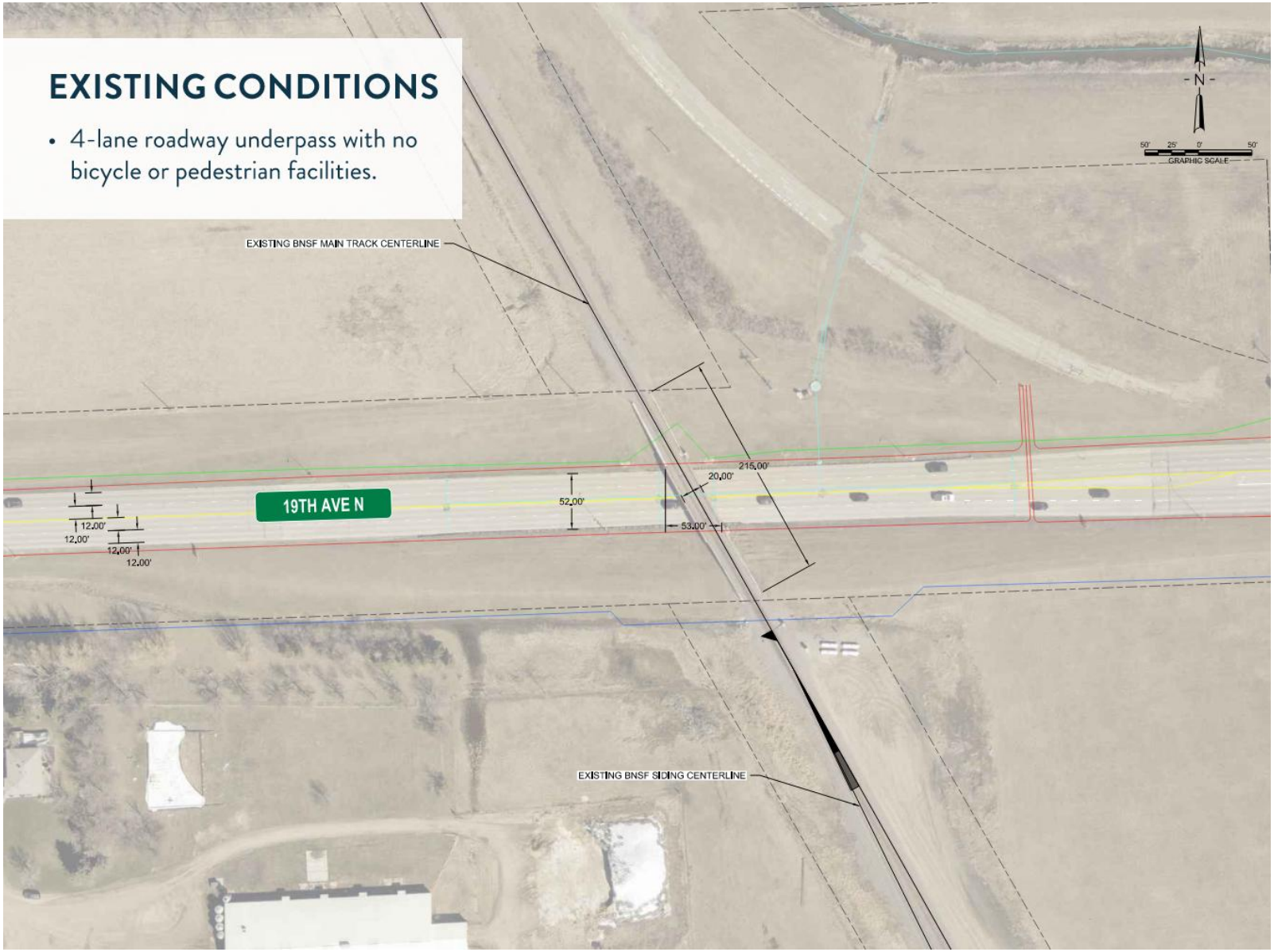

Figure 14-2: 19th Avenue N Existing Conditions

Proposed Mitigation

Option 1A – Shared-Use path on North Side

This option proposes the construction of a 14-foot-wide shared-use path along the north side of 19th Avenue North to enhance pedestrian and bicycle connectivity. The path would be constructed at 4.5% grade. The existing rail bridge would remain in place; however, its foundation and adjacent retaining walls would be widened to provide sufficient clearance for the path to pass safely beneath the structure.

Approximately 945 linear feet of new retaining walls would be constructed along the north side of the roadway to support and stabilize the shared-use path. On the west end, the path would extend the 34th Street North, but then have to cross to the south side of 19th Avenue North in a less than ideal location. On the east end, the path would tie into the existing sidewalk along Dakota Drive, creating a continuous facility for non-motorized users.

Figure 14-3. Cross Section - 19th Avenue N Path on North

Table 14-2. 19th Avenue N Estimated Costs - Option 1A

CATEGORY	COST (2024 USD)
Roadway Items	$1,200,000
Railroad Items	$90,000
Right-of-Way	$360,000
Structural Items	$650,000
Survey, Design, Admin, etc.	$570,000
ROUNDED TOTAL COST	**$2,900,000**

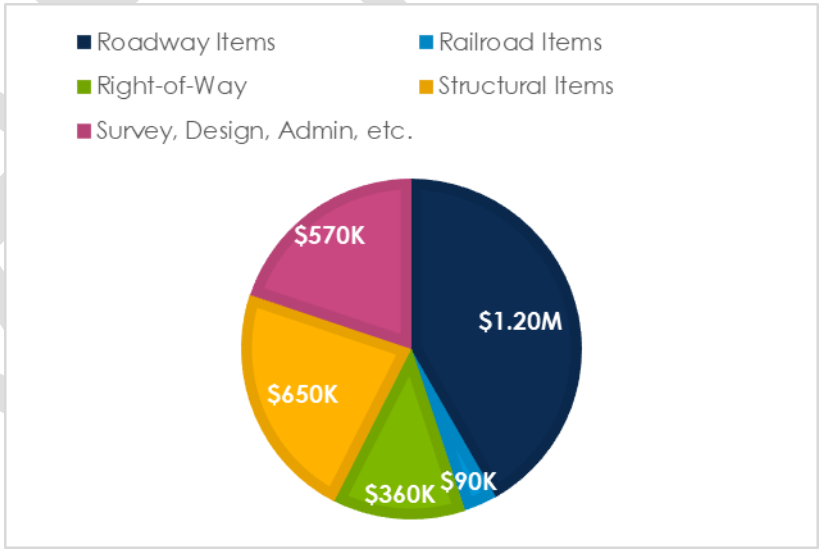

Figure 14-4. 19th Avenue N Cost Distribution - Option 1A

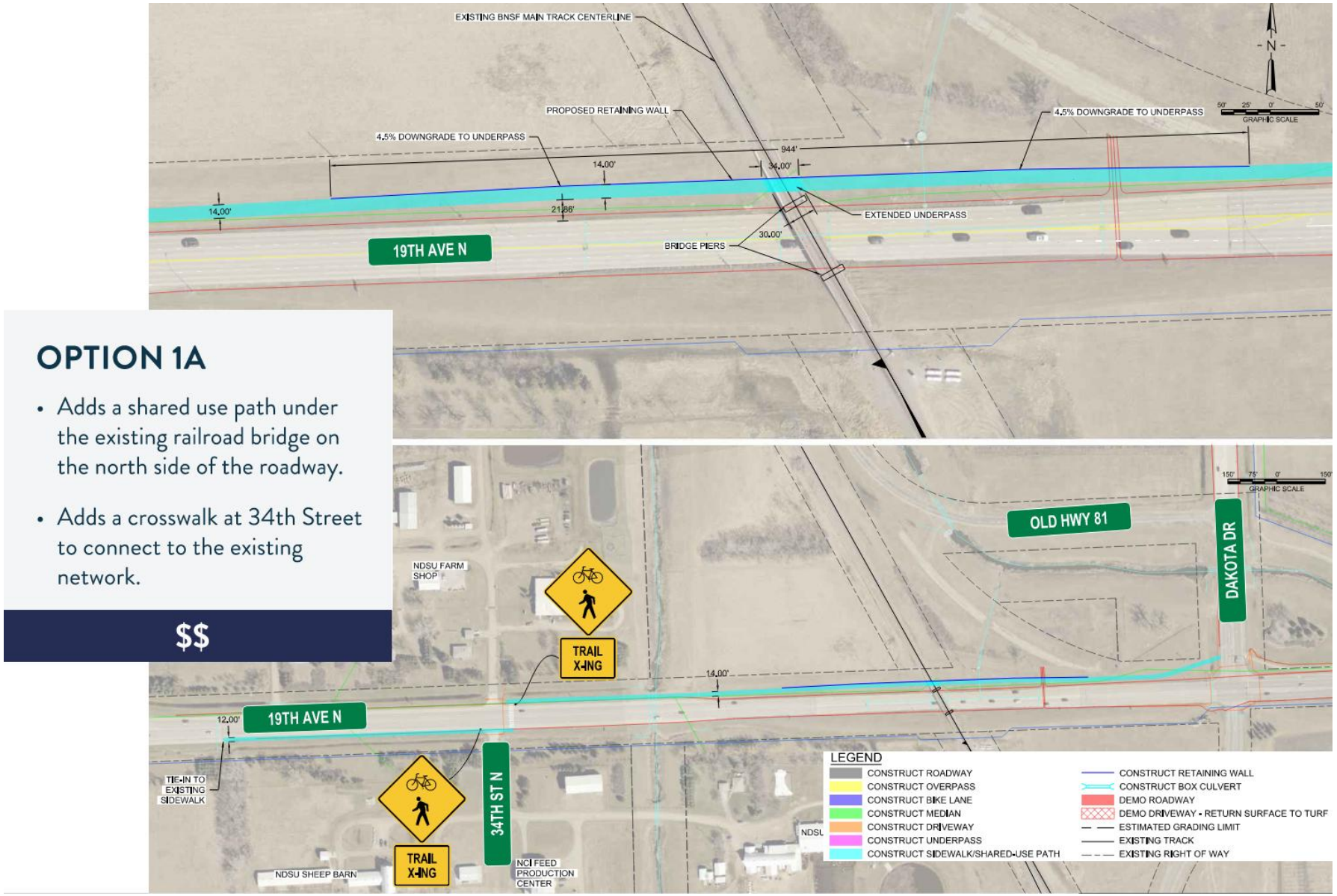

Figure 14-5: 19th Avenue N Option 1A

Option 1B – Shared-Use path on South Side

This option proposes the construction of a 12-foot-wide shared-use path along the south side of 19th Avenue North, designed with a maximum longitudinal slope of 4.5% to meet ADA accessibility standards. The proposed path would extend from the existing sidewalk on the south side of 19th Avenue North and continue eastward to connect with Dakota Drive.

The existing rail bridge would remain in place; however, the bridge foundation and adjacent retaining walls would be widened to accommodate the path beneath the structure. Approximately 945 linear feet of retaining walls would be constructed to support and stabilize the shared-use path along the corridor.

This option extends the existing sidewalk system on the south side of 19th Avenue North and provides a continuous multimodal connection for pedestrians and cyclists. At the eastern end, users can cross 19th Avenue North at the Dakota Drive intersection to access the existing sidewalk network on the east side of the roadway.

By enhancing connectivity and safety for non-motorized users, this option supports active transportation while minimizing impacts to the existing bridge infrastructure.

Figure 14-6: Cross Section – 19th Avenue N Path on South

Table 14-3. 19th Avenue N Estimated Costs - Option 1B

CATEGORY	COST (2024 USD)
Roadway Items	$1,130,000
Railroad Items	$90,000
Right-of-Way	$220,000
Structural Items	$650,000
Survey, Design, Admin, etc.	$520,000
ROUNDED TOTAL COST	**$2,600,000**

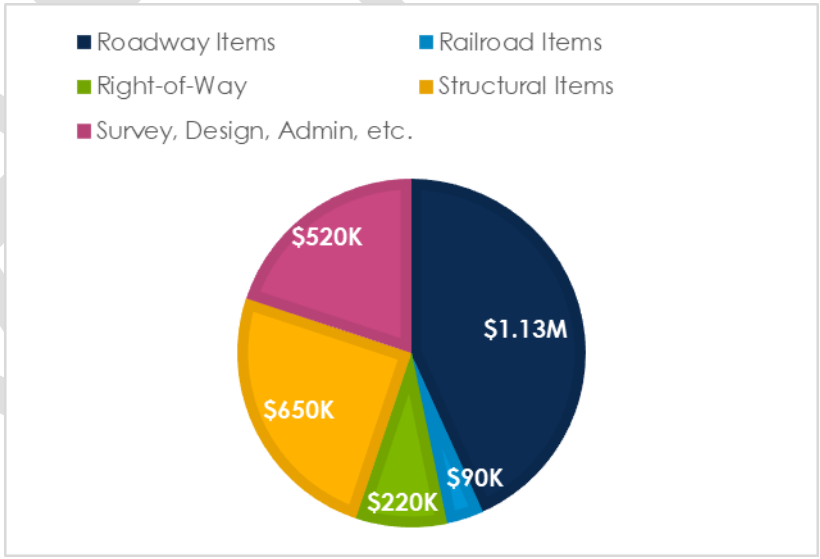

Figure 14-7. 19th Avenue N Cost Distribution - Option 1B

OPTION 1B

- Adds a shared use path under the existing railroad bridge on the south side of the roadway.
- Adds two crosswalks to at the intersection of 19th Avenue and Dakota Drive.

$$

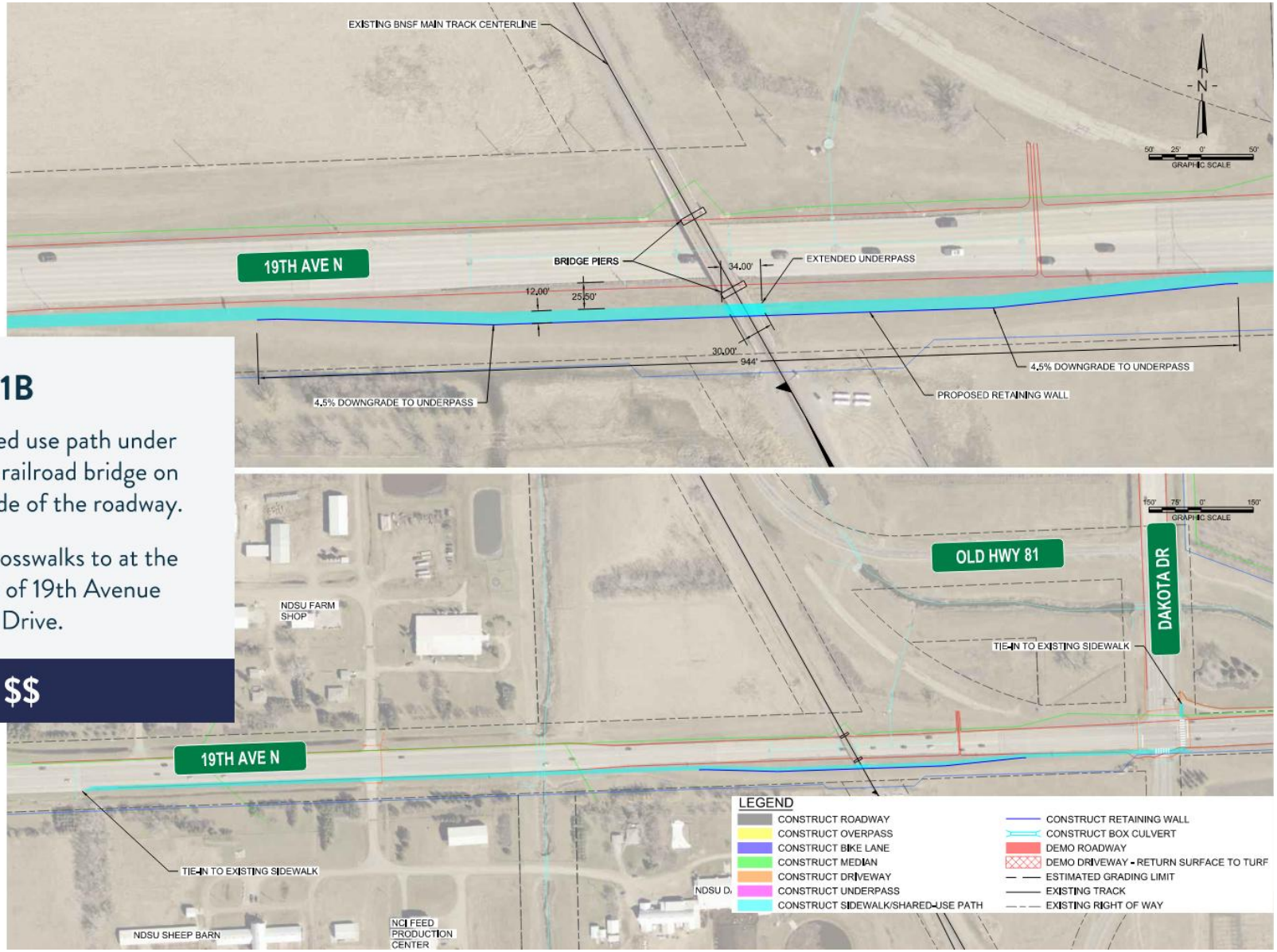

Figure 14-8: 19th Avenue N Option 1B

Benefit-Cost Analysis

Table 14-4 provides a list of assumptions for the crossing characteristics and traffic demand that was used for the BCA.

Table 14-4: 19th Ave N Assumptions

Variable Name	Unit	Value	Source
Active Transportation Assumptions			
Pedestrians per Day	pedestrians/day	6	Replica data for 9th Street NW. 2023.
Cyclists per Day	cyclists/day	5	

Option 1A

Option 1A proposes to provide a connection for the existing sidewalk on 19th Ave N that currently ends west of 34th Street N and the existing sidewalk on the northwest side of the 19th Ave N and Dakota Dr intersection. This alternative is expected to improve travel experience for pedestrians and cyclists and induce additional users, which is expected to correlate with overall health improvements for the induced users.

Table 14-5: Option 1A Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$2,900,000	
Residual Value	2024$	$789,600	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	40	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	40	
Length of Existing Shared-Use Path	miles	0	Metro Railroad Needs Study. Alternative Development. April 2025.
Length of Future Shared-Use Path	miles	0.6	
Width of Future Shared-Use Path	feet	14.0	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1A is expected to generate over $500,000 in discounted benefits while costing $1.76 million (discounted). This translates to a net present value (NPV) of -$1.26 million and a benefit-cost ratio of 0.28.

Option 1B

Option 1B proposes to accomplish a similar goal as Option 1A with a slight variation in the alignment.

Table 14-6: Option 1B Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$2,600,000	
Residual Value	2024$	$673,600	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	40	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	40	
Length of Existing Shared-Use Path	miles	0	Metro Railroad Needs Study. Alternative Development. April 2025.
Length of Future Shared-Use Path	miles	0.6	
Width of Future Shared-Use Path	feet	12.0	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1B is expected to generate over $482,000 in discounted benefits while costing $1.58 million (discounted). This translates to a net present value (NPV) of -$1.10 million and a benefit-cost ratio of 0.31.

Environmental Permitting

An aquatic resource delineation and potential permitting under Section 404 of the Clean Water Act (CWA) may be required.

Development within the 500-year flood zone would require a Floodplain Development Permit and compliance with local floodplain management regulations.

Draft Purpose & Need Discussion

Purpose

The purpose of the 19th Avenue North Railroad Underpass improvement project is to enhance multimodal connectivity between Dakota Drive and an existing sidewalk just west of 34th Street North. This facility will provide a continuous, ADA-accessible route for pedestrians and bicyclists, improving connectivity between the North Dakota State University (NDSU) campus and surrounding neighborhoods. The project also aims to maintain the structural integrity of the existing underpass while accommodating non-motorized users, thereby supporting safe, inclusive, and efficient transportation options for the community.

Need

The need for the project is based on several transportation-related deficiencies and community mobility concerns:

- **Connectivity Gaps**: Existing sidewalks on either end of the corridor are not connected along this segment of 19th Avenue North, creating a gap in the pedestrian and bicycle network, limiting safe access for non-motorized users.
- **University Proximity**: The corridor serves as a key route for students, faculty, and staff traveling to and from the NDSU campus, increasing demand for safe, accessible infrastructure.
- **Safety and Accessibility**: Without a dedicated facility, pedestrians and cyclists must share the roadway with vehicles, posing safety risks and limiting accessibility, especially for disabled persons.

Preferred Option

For 19th Avenue N, Option 1B is preferred. This option provides a shared use path connection under the existing rail bridge but connects to the existing path on the northeast corner of the 19th Avenue N and Dakota Drive with crosswalks at the intersection as opposed to the non-signalized crossing location in Option 1A. This is a more desirable location for bikes and pedestrians to cross 19th Avenue N. This option also sets up a better connection to the path on the south side of 19th Avenue near the Interstate 29 interchange.

15 34th Street

Moorhead, MN & Dilworth, MN

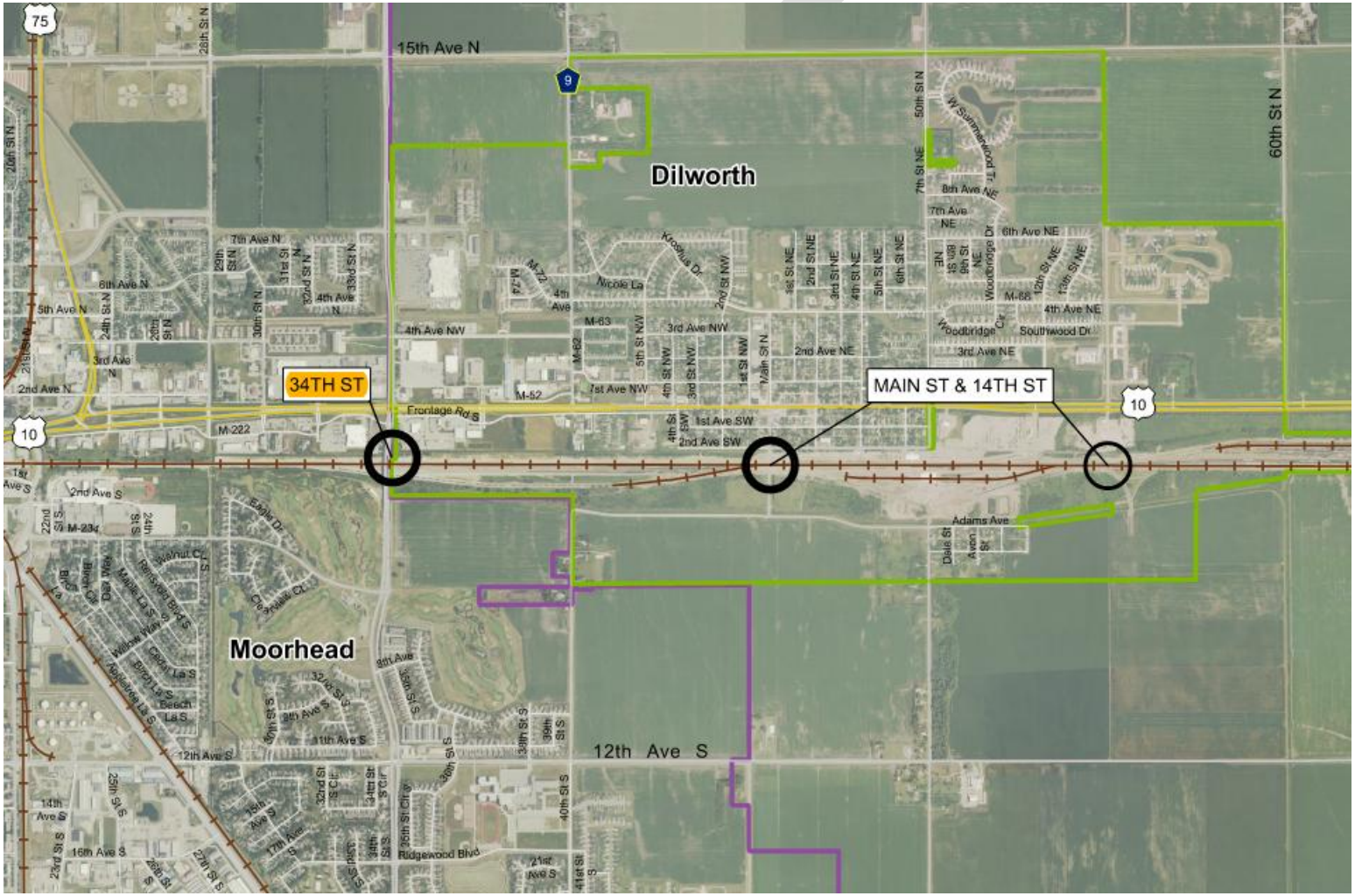

Figure 15-1: 34th Street Study Location

Existing Conditions

34th Street South is a four-lane overpass that provides a north–south connection across the BNSF rail yard at the US-10 corridor. The structure spans a high-traffic commercial area, with major destinations including a Target store and a tap house located to the west, and a local church, several small businesses, and a strip mall situated to the east.

A parallel frontage road, Center Avenue West / US-10 Frontage Road, previously connected to 34th Street South via an intersection located approximately 175 feet south of the 34th Street and US-10 interchange. However, due to safety concerns, a raised median was installed along 34th Street South, resulting in the discontinuation of access from the frontage road to the main corridor.

The area remains active with both vehicular and commercial activity, and the overpass plays a key role in maintaining connectivity between the north and south sides of the rail corridor.

The environmental review identified two NWI wetlands (Ditch 41) and (Lateral 2 Ditch 41) within the 1,000-foot buffer of the crossing. Portions of the crossing are located within the 100-year flood zone and a smaller portion is within a regulatory floodway (Zone X; Zone AE, respectively). The crossing is also located within the BNSF Historic District and near the NRHP-listed BNSF Historic ROW. Additionally, the crossing is located near the Meadows Golf Course, a Section 4(f) property.

Figure 15-2: 34th Street Existing Conditions

Proposed Mitigation

Option 1 – Construct Access Road beneath 34th Street South

This option proposes the construction of a new access road beneath the existing 34th Street South overpass structure to re-establish access between the disconnected segments of Center Avenue West / US-10 Frontage Road.

The proposed configuration extends the south leg of the existing Center Avenue West intersection by approximately 340 feet to create a new T-intersection at the rear of the commercial site along BNSF yard. The extended roadway would be a two-lane paved section designed to accommodate local traffic and business access.

The access road would be designed to provide a minimum vertical clearance of 16 feet 6 inches from the finished roadway surface to the bottom of the superstructure. The underpass approach would include extended transitions on both ends, integrating into a new 2,680-foot-long access road running parallel to Center Avenue West. This backage road would serve as a secondary access route, enhancing local circulation and restoring connectivity for adjacent properties.

Due to the alignment of the proposed roadway, the existing detention pond would be bisected. To address this, two symmetrical stormwater ponds would be constructed on either side of the new road, connected by approximately 65-foot-long culverts for hydraulic continuity. The existing drainage ditch would be realigned to accommodate the revised layout.

Additionally, the existing pond would be regraded to approximately 0.26 acres, and a new 0.26-acre pond would be constructed to make up pond capacity.

A total of four new driveways would be constructed along the proposed access road to provide alternative access to the local business and BNSF yard. Approximately 1.86 acres of additional right-of-way would be required for the roadway and drainage improvements.

This option improves access, restores local connectivity, and supports future development while addressing stormwater and site constraints.

Figure 15-3. Cross Section - Road Beneath 34th Street

Table 15-1. 34th Street Estimated Costs - Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$1,610,000
Right-of-Way	$540,000
Survey, Design, Admin, etc.	$540,000
ROUNDED TOTAL COST	**$2,700,000**

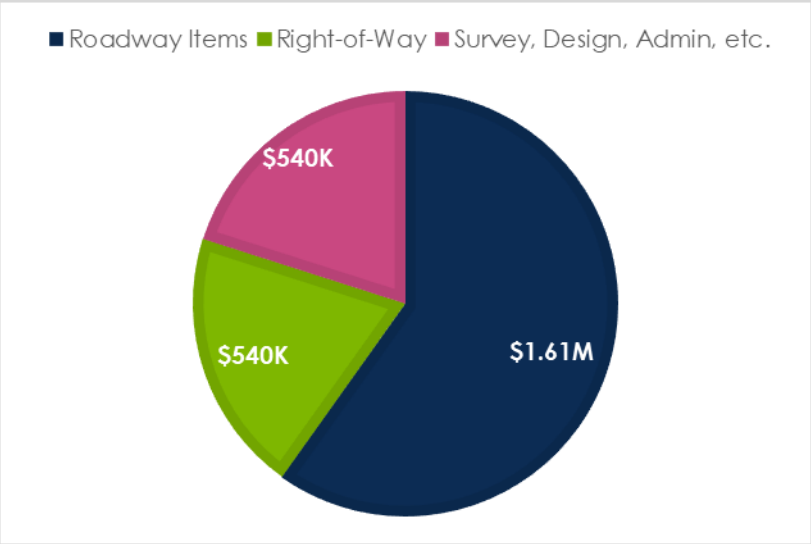

Figure 15-4. 34th Street Cost Distribution

Figure 15-5: 34th Street Option 1

Benefit-Cost Analysis

Option 1 proposes to develop a new roadway parallel to US-10 Frontage Road and US-10, underneath the 34th Street S roadway overpass. This new roadway would provide a connection for roadway users east and west of 34th Street S, without requiring the roadway users to travel on US-10. While this realignment is expected to generate some impacts on motorists, the magnitude of these impacts are undetermined due to limited data on those impacted by the proposed alternative. Moreover, due to the limited data, the BCA only assesses the residual value of the capital assets.

Table 15-2: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$2,700,000	
Residual Value	2024$	$450,000	
Useful Life of Asset	years	20	Reasoned Assumption

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate almost $71,000 in discounted benefits while costing $1.64 million (discounted). This translates to a net present value (NPV) of -$1.57 million and a benefit-cost ratio of 0.04.

Environmental Permitting

An aquatic resource delineation and potential permitting under Section 404 of the Clean Water Act (CWA) may be required. Current options do not impact Ditch 41 or Lateral 2 Ditch 41.

Development within the 100-year flood zone would require a Floodplain Development Permit, including elevation certificate and compliance with local floodplain management regulations. Development within portions of the regulatory floodway would have strict permitting requirements including a Floodplain Development Permit and subject to encroachment restrictions, floodproofing standards, and watercourse alteration assessments.

Consultation with MNSHPO and the lead federal agency for the crossing would be required to comply with Section 106 of the National Historic Preservation Act (NRHPA). Impacts to the NRHP-listed site or BNSF Historic District would require mitigation through an MOA with MNSHPO and Metro COG.

Draft Purpose & Need Discussion

Purpose

The purpose of the project is to improve local connectivity, enhance access to adjacent commercial properties, and support safe and efficient circulation within a high-traffic commercial corridor near 34th Street South. The project is intended to address existing barriers to east-west travel, improve access for businesses and customers, and accommodate current and future transportation demands in the area.

Need

The need for the project is based on several transportation and infrastructure-related deficiencies:

- **Disconnected Roadway Network**: A raised median along 34th Street South has eliminated direct access between the US-10 frontage road and Center Avenue West, reducing connectivity and complicating local circulation.
- **Commercial Access Constraints**: Businesses on both sides of the corridor rely on efficient access for customers, deliveries, and operations. The current configuration limits direct access and increases travel distances.
- **High-Traffic Corridor**: The area includes major commercial destinations such as retail stores, restaurants, and service businesses, generating significant local traffic that requires improved infrastructure.
- **Stormwater and Site Constraints**: The proposed alignment intersects an existing detention pond, requiring drainage improvements and potential realignment to maintain stormwater management capacity.

Preferred Option

For 34th Street, if a build scenario is opted for, Option 1 is preferred. This option provides a new backage road connection to replace the frontage road movement that needed to be blocked off at 34th Street due to large volumes of crashes. This option improves connectivity in the area.

16 Main Street & 14th Street Grade Separation

Crossing Number 062934E

Dilworth, MN

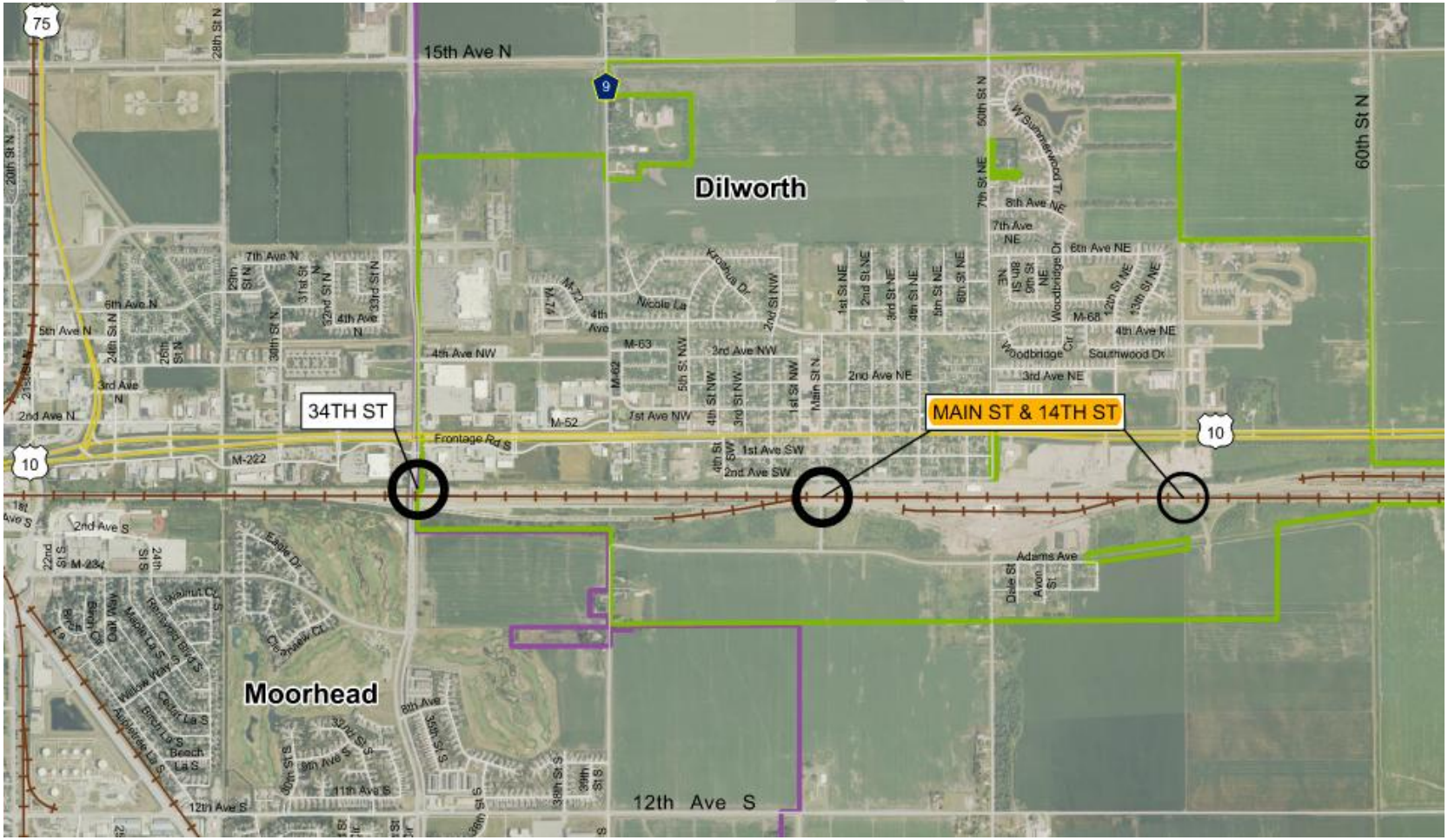

Figure 16-1: Main Street & 14th Street Grade Separation Study Location

Table 16-1: Crossing Summary – Main Street

Existing Warning Device	Quad Gates with flashers and crossbucks
Railroad	BNSF/ATK
Trains per Day/ Timetable Speed	32/ 35mph
AADT/Posted Speed Limit	318 (2024)
Crash History	1 since 1990
Existing Roadway Surface	Paved

Existing Conditions

The existing Main Street crossing is a public grade crossing located within the BNSF yard. It operates as a 24-hour quiet zone and features a standard safety configuration, including two quad gates with arms, flashing lights, crossbucks, and non-traversable medians on both sides. Traffic at the crossing is stop-controlled. Main Street is a two-lane paved roadway with a posted speed limit of 30 mph. The crossing is situated south of a residential neighborhood and north of farmland. According to 2024 traffic data, the Annual Average Daily Traffic (AADT) is approximately 318 vehicles, including two buses crossing daily.

The Main Street crossing serves as a critical bottleneck within the yard, where three main tracks converge. These tracks accommodate a high volume of rail traffic, with 16 trains passing during the day and another 16 at night, including two passenger trains. Active train switching operations occur in both directions, contributing to operational inefficiencies despite the existing quiet zone and relatively low vehicular traffic volume.

Adjacent to the yard, 14th Street intersects with US-10, with its southern leg terminating to provide access solely for yard businesses. The most recent 2021 AADT recorded on the northern segment of 14th Street approaching US-10 was 909 vehicles. Notably, 14th Street is identified to form part of the Heartland Trail, a multi-use trail currently in the design phase, which would connect 14th Street southward to 12th Avenue South, traversing past the BNSF yard and surrounding farmland. As part of a MnDOT US-10 project currently planned for 2031 construction, a roundabout is proposed at the intersection of 14th Street and US-10.

The environmental review identified four NWI wetlands, including (Clay County Ditch 41) and (Lateral 2 Ditch 41) within the 1,000-foot buffer of the crossing. Portions of the crossing are located within the 100-year flood zone and a smaller portion is within a regulatory floodway (Zone X; Zone AE, respectively). The crossing is also located within the BNSF Historic District and near the NRHP-listed BNSF Historic ROW, a Section 4(f) property.

Figure 16-2: Main Street & 14th Street Grade Separation Existing Conditions

Proposed Mitigation

Option 1 – Main Street closure and 14th Street Overpass

This option proposes the permanent closure of the Main Street grade crossing to optimize train operations within the BNSF yard. All existing quiet zone components including non-traversable medians, pavement, warning gates, and associated signal equipment would be removed. In accordance with MUTCD standards and BNSF crossing closure requirements, Type D guardrail and object markers would be installed at the former crossing location. Access for BNSF personnel would be preserved on both the north and south sides of the yard.

To maintain vehicular and multi-modal connectivity, a new overpass is proposed to extend south from the planned 14th Street and US-10 roundabout. The overpass would span the BNSF yard and descend through the adjacent farmland, ultimately connecting to 12th Avenue South. The alignment of the extended 14th Street would be designed to incorporate the Heartland Trail and support anticipated future development in the area.

The proposed overpass structure would span approximately 460 feet in length and would be supported by retaining walls to minimize the overall footprint and reduce right-of-way impacts. A minimum vertical clearance of 23 feet 6 inches would be provided above the active rail tracks to accommodate all train movements.

To achieve this elevation, the southern approach would consist of an 800-foot ramp graded at 4.5%, transitioning smoothly to existing ground levels near 12th Avenue South. On the north

Figure 16-3: Cross Section – 14th Street Grade Separation

side, a 515-foot ramp at a 7% grade would tie directly into the southern leg of the planned roundabout at 14th Street and US-10. Initial layouts for this option have been shared with MnDOT District 4, with the suggestion of considering a slightly raised elevation for the proposed roundabout, to reduce the required grade for tie-in.

To maintain essential yard connectivity, a large box culvert would be constructed beneath the overpass, enabling uninterrupted access between the north and south sides of the BNSF facility for both railroad operations and tenant use.

Additionally, a new driveway would be constructed along US-10 to maintain access to nearby properties. Drainage improvements would include a new culvert at the southern edge of the yard to improve stormwater flow between the rail yard and adjacent farmland.

The proposed 14th Street Overpass offers a range of operational, safety, and community benefits. By eliminating the existing Main Street grade crossing, the project resolves a major bottleneck within the BNSF yard, enabling uninterrupted train movement and more efficient switching operations. The grade-separated design not only ensures a safer environment but also integrates the planned Heartland Trail extension, offering a continuous and secure connection for pedestrians and bicyclists between 12th Avenue S and US-10.

The option preserves internal yard access for BNSF and its tenants through the installation of a large box culvert beneath the overpass. This maintains the functionality of the yard for both freight and business operations.

Table 16-2: Main Street & 14th Street Grade Separation Estimated Costs

CATEGORY	COST (2024 USD)
Roadway Items	$10,920,000
Railroad Items	$670,000
Right-of-Way	$1,800,000
Structural Items	$13,290,000
Survey, Design, Admin, etc.	$6,670,000
ROUNDED TOTAL COST	**$34,000,000**

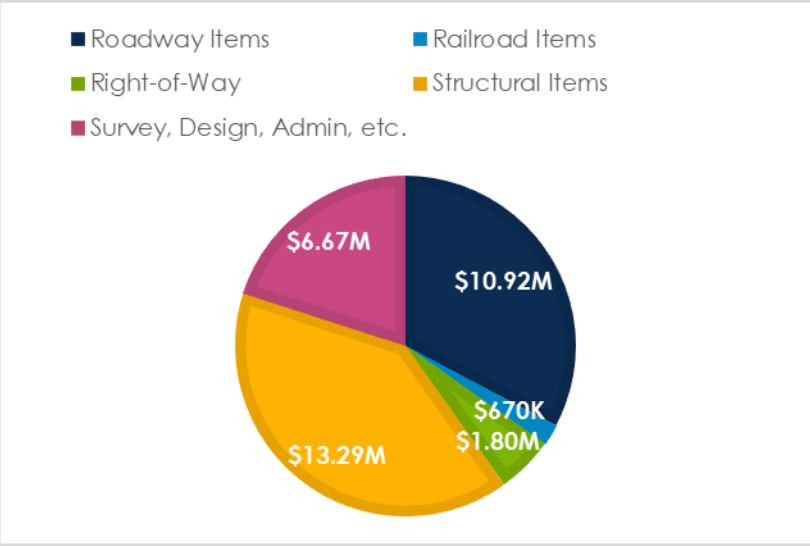

Figure 16-4. Main Street & 14th Street Grade Separation Cost Distribution

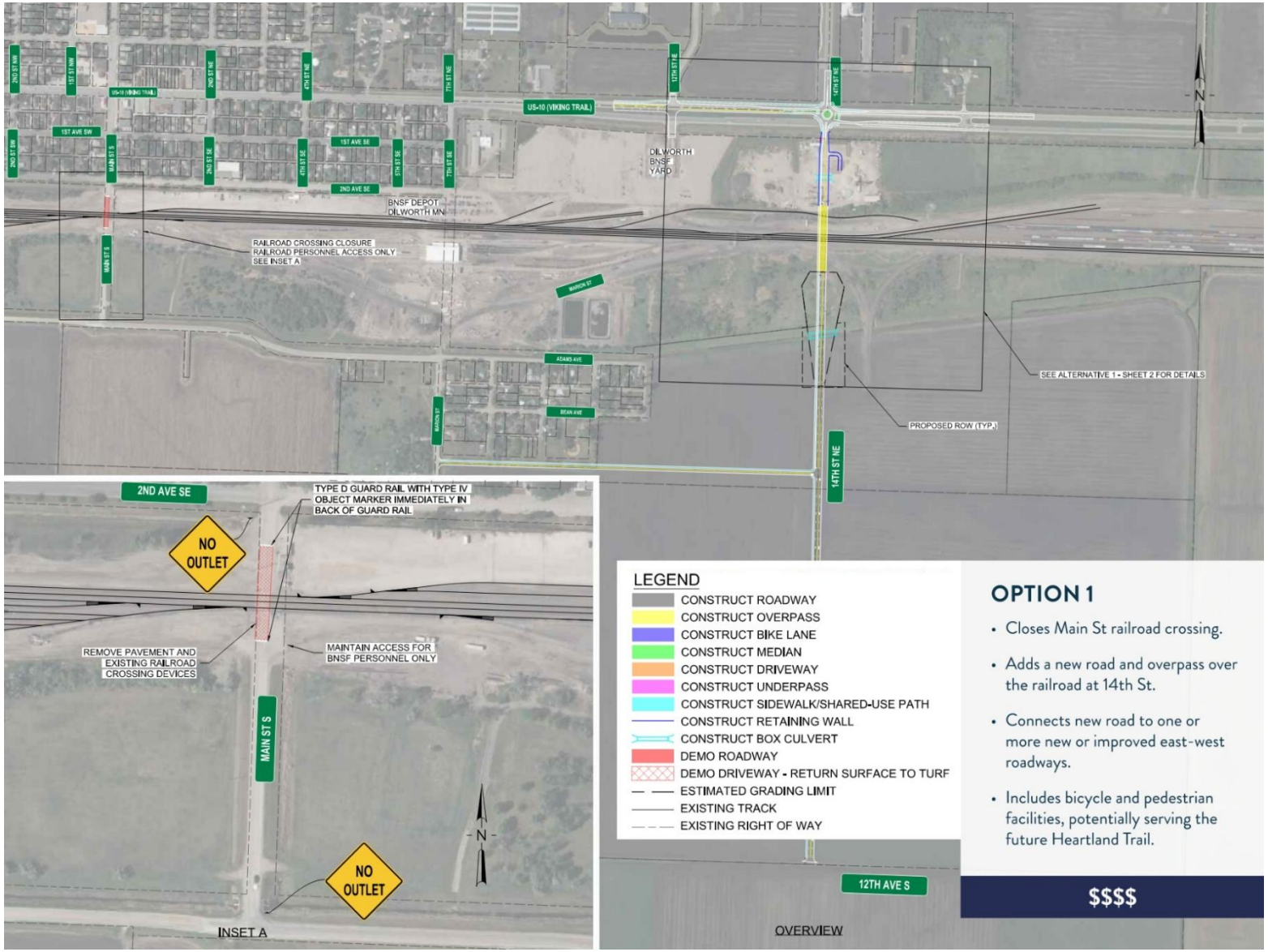

Figure 16-5: Main Street & 14th Street Grade Separation Option 1

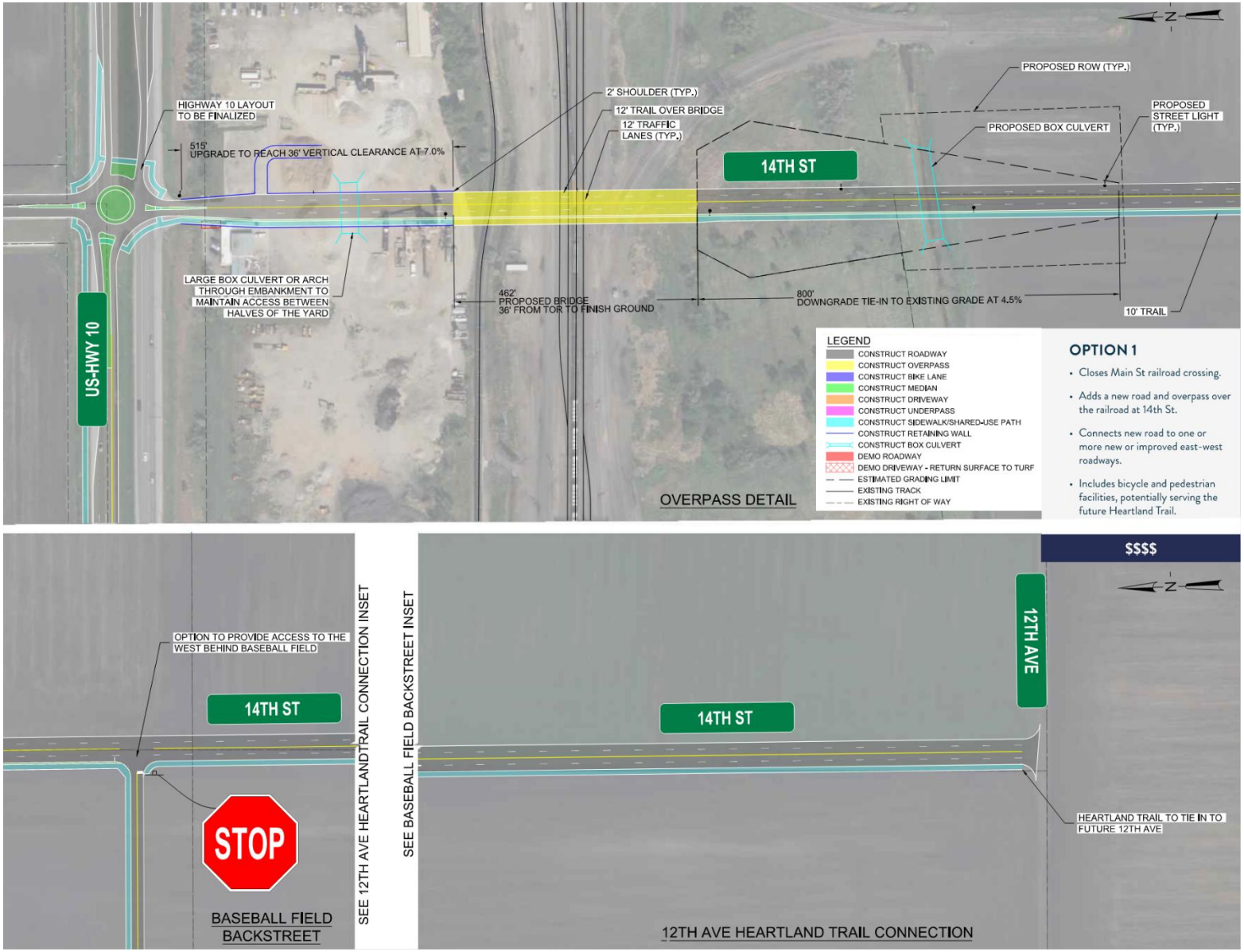

Figure 16-6: Main Street & 14th Street Grade Separation Option 1 Detail

Benefit-Cost Analysis

Table 16-3 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that was used for the BCA.

Table 16-3: Main Street and 14th Street Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID - 14th Street	factor	NEW	FRA Grade Crossing Inventory.
Grade Crossing ID - Main Street	factor	062934E	
Rail Assumptions			
Freight Trains per Day	trains/day	30.0	FRA Grade Crossing Inventory.
Passenger Trains per Day	trains/day	2.0	
Switching Trains per Day	trains/day	0.0	
Maximum Timetable Speed	miles/hour	35	
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type	factor	Gates	
Crossing Surface Material - Main St.	factor	Concrete	
Crossing Surface Material - 14th St.	factor	N/A	
Roadway Assumptions			
AADT - 14th Street	vehicles/day	909	FRA Grade Crossing Inventory. Minnesota Department of Transportation Traffic Count (TCDS).
AADT - Main Street	vehicles/day	318	
Truck Share of Traffic - 14th	%	0%	
Truck Share of Traffic - Main St.	%	0%	
School Buses per Day	buses/day	4	
Traffic Year - 14th Street	year	2021	
Traffic Year - Main Street	year	2024	

Option 1

Option 1 proposes to close the existing Main Street grade crossing and extend 14th Street from US-10 to 12 Ave S, with a roadway overpass over the rail tracks. By closing the Main Street crossing, and providing an overpass over the rail tracks, the alternative is expected to eliminate the likelihood of vehicle-train crashes and vehicle idling time. This is expected to translate into improved transportation safety, as well as reduced travel time, vehicle operating costs, and emissions. However, these benefits are expected to be slightly offset by the incremental distance that vehicles previously using the Main Street crossing would travel due to the closure of the crossing.

Table 16-4: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2031	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$34,000,000	
Residual Value	2024$	$11,714,342	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	30	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	30	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate $1.18 million in discounted benefits while costing $20.00 million (discounted). This translates to a net present value (NPV) of -$18.81 million and a benefit-cost ratio of 0.06.

Environmental Permitting

An aquatic resource delineation and potential permitting under Section 404 of the Clean Water Act (CWA) may be required.

Development within portions of the regulatory floodway would have strict permitting requirements including a Floodplain Development Permit and subject to encroachment restrictions,

floodproofing standards, and watercourse alteration assessments.

Consultation with MNSHPO and the lead federal agency for the crossing would be required to comply with Section 106 of the National Historic Preservation Act (NRHPA). Impacts to the NRHP-listed sites would require mitigation through an MOA with MNSHPO and Metro COG.

Draft Purpose & Need Discussion

Purpose

The purpose of the 14th Street Grade Separation project is to improve rail and roadway operational efficiency, enhance safety, and support multimodal connectivity within the area surrounding Main Street and 14th Street in Dilworth, Minnesota. The project is intended to reduce conflicts between rail and roadway users, improve mobility for vehicles, pedestrians, and bicyclists across the rail corridor, and support planned trail extensions and future development in the area.

Need

The need for the project is based on several transportation-related deficiencies and operational challenges:

- **Rail Yard Bottleneck**: The Main Street grade crossing is located at a convergence point for three mainline tracks and is subject to frequent train movements and switching operations, creating delays and operational inefficiencies.
- **Safety and Quiet Zone Limitations**: Despite being a quiet zone with active warning devices, the crossing remains a point of conflict between rail and roadway users. The presence of 32 daily train movements and regular school bus traffic further elevates safety concerns.
- **Disconnected Access**: Closure of the Main Street crossing without a replacement would limit access between the north and south sides of the yard, affecting both public and BNSF operations.
- **Multimodal Connectivity**: The planned Heartland Trail will rely on a safe, grade-separated crossing to connect users between 12th Avenue South and US-10, supporting regional trail development and active transportation.
- **Future Growth**: The area is experiencing development pressure, and improved infrastructure is needed to accommodate increased traffic volumes and support long-term community growth.

Preferred Option

For Main Street & 14th Street Grade Crossing, Option 1 is preferred. This option closes the grade crossing at Main Street which removes a crossing that is frequently blocked and replaces it with a grade separation in close proximity. This option greatly reduces potential train-vehicle conflicts and adds a reliable crossing to the Dilworth area.

17 40th Avenue S

Crossing Number 080730S

Moorhead, MN

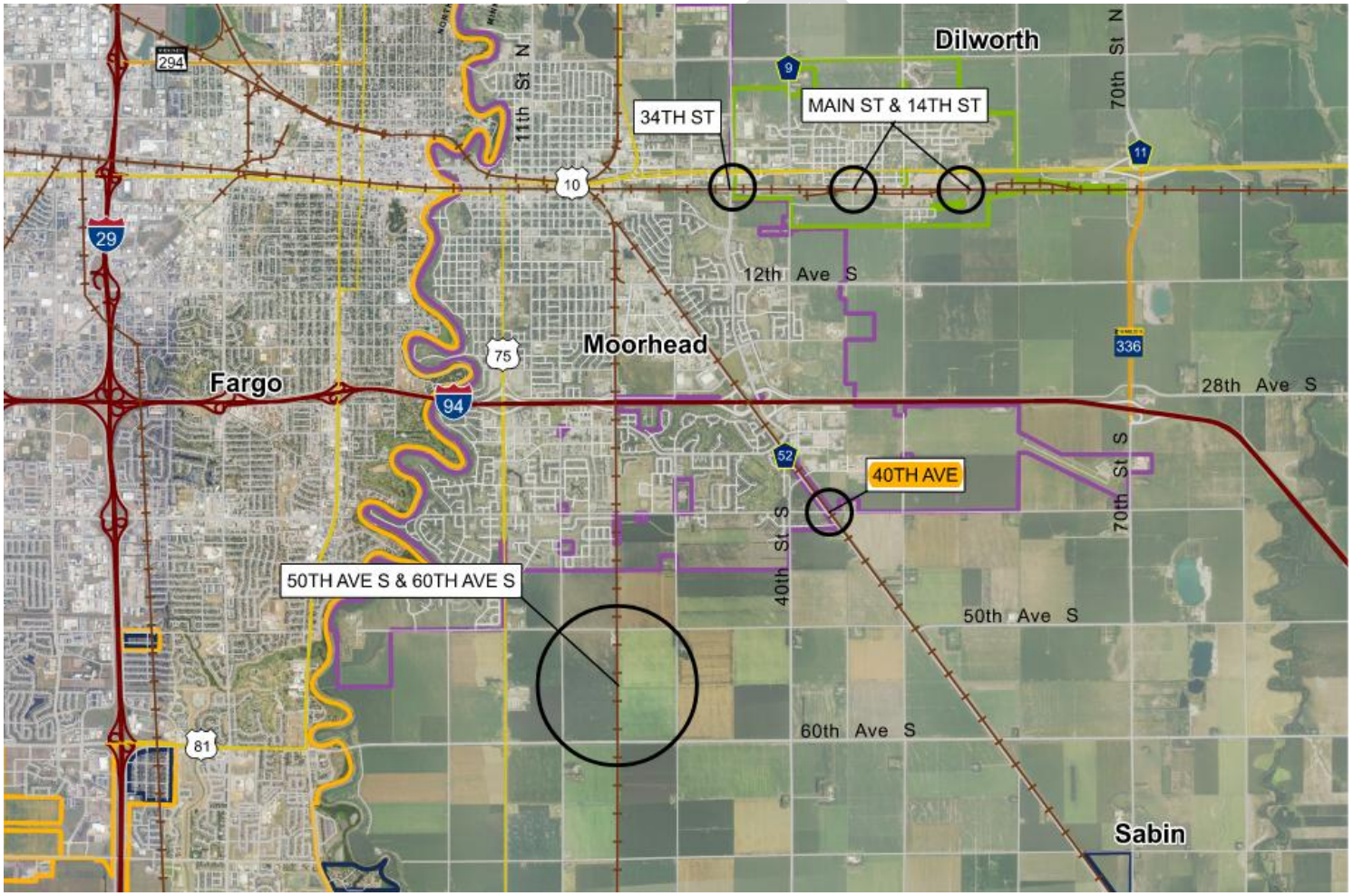

Figure 17-1: 40th Avenue S Study Location

Table 17-1: Crossing Summary – 40th Avenue S

Existing Warning Device	Crossbucks and stop/ yield sign
Railroad	OTVR
Trains per Day/ Timetable Speed	2/ 40mph
AADT/Posted Speed Limit	120 (2024)/55mph
Crash History	0
Existing Roadway Surface	Paved

Existing Conditions

40th Avenue intersects Highway 52 at a 52-degree skew, with the existing railroad track running parallel to the highway. On the west side of the crossing, approximately 73 feet of the roadway is paved, transitioning to an unpaved surface east of the crossing. The surrounding area is predominantly farmland. Two gravel driveways are located immediately east of the crossing, providing access to farmland on the north side and a residential property on the south. A box culvert is situated approximately 70 feet east of the track centerline.

According to a 2024 traffic record, the Annual Average Daily Traffic (AADT) is 120 vehicles, including 12 school buses. The posted speed limit is 55 mph. There are no pedestrian or bicycle facilities currently in place.

The existing grade crossing is owned and maintained by Otter Tail Valley Railroad (OTVR) under the American Division Fergus Falls Subdivision. It consists of a single Class III track used for freight transit. Two trains operate through the crossing each night at a maximum timetable speed of 40 mph.

The crossing is skewed at less than 90 degrees, resulting in inadequate vehicle storage space and reduced sight distances for approaching traffic. Additionally, the nighttime train schedule, lack of street lighting, and minimal traffic control—limited to stop or yield signs with standard crossbucks—raise significant safety concerns. Notably, this corridor is frequently used by cyclists, further underscoring the need for safety improvements.

The environmental review identified one NWI wetland (Ditch 47) within the 1,000-foot buffer of the crossing. The crossing is located within an area of undetermined flood hazard. The BNSF railroad is eligible but not listed under the NRHP.

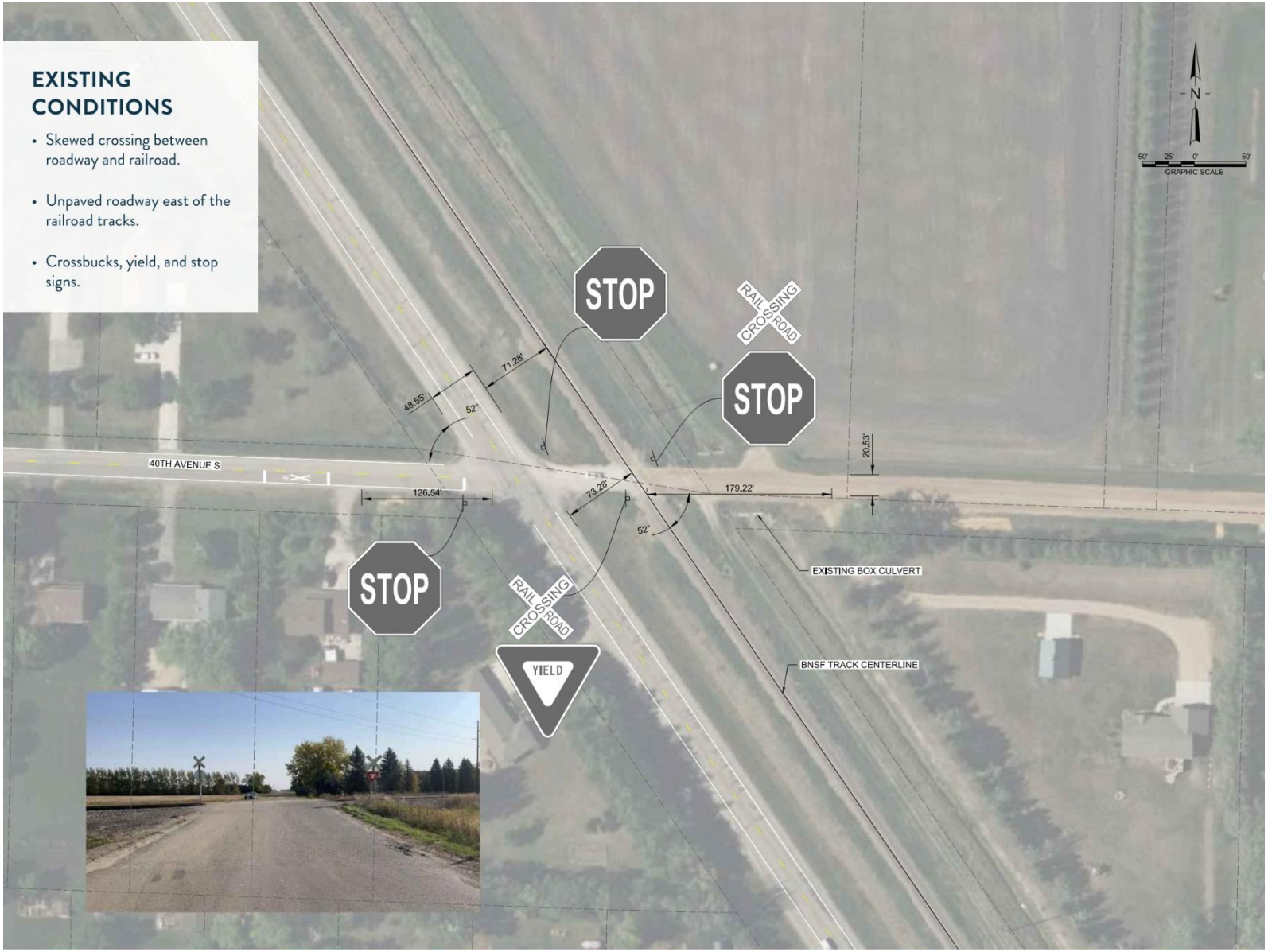

Figure 17-2: 40th Avenue S Existing Condition

Proposed Mitigation

Option 1A – Improve Existing Crossing Conditions

This option proposes extending and widening the paved roadway on the east leg of 40th Avenue S to accommodate advanced railroad crossing warning striping. Approximately 240 feet of pavement would be added east of the existing crossing panels, including 6-foot shoulders on both sides to support potential future trail extensions or designated bike lanes.

The existing crossing panels would be removed and replaced with wider concrete panels to match the upgraded pavement width. The current gravel driveway serving farmland access would be relocated further east to improve safety and reduce conflict with the crossing area. Advanced warning signage would be installed in accordance with MUTCD guidelines to alert approaching motorists of the railroad crossing and the need to prepare to stop.

A streetlight is proposed at the corner of the intersection to improve visibility during nighttime hours and provide enhanced safety for cyclists. Approximately 0.17 acres of additional right-of-way would be required to accommodate these improvements.

This option presents a cost-effective solution that upgrades the current crossing conditions, enhances safety, supports future multi-modal development, and reduces the overall risk at the crossing.

Figure 17-3. Cross Section - 40th Avenue S Improvements

Table 17-2. 40th Avenue S Estimated Costs - Option 1A

CATEGORY	COST (2024 USD)
Roadway Items	$100,000
Railroad Items	$140,000
Right-of-Way	$60,000
Survey, Design, Admin, etc.	$80,000
ROUNDED TOTAL COST	**$360,000**

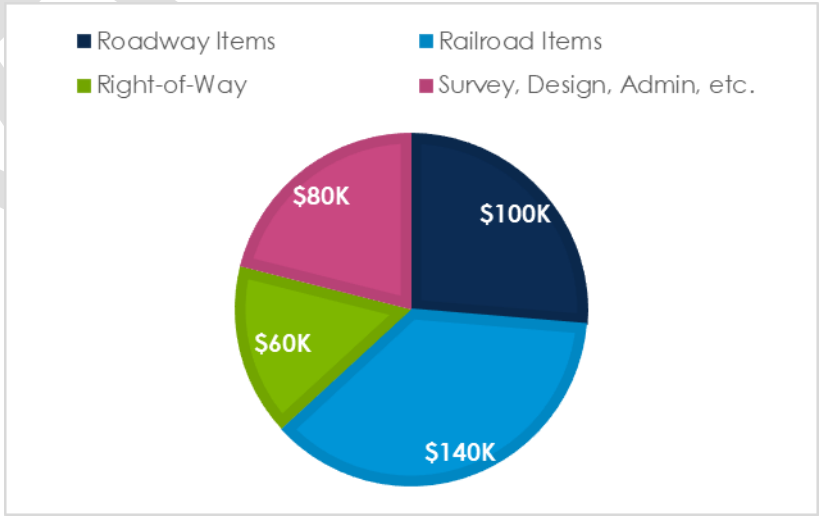

Figure 17-4. 40th Avenue S Cost Distribution - Option 1A

Figure 17-5: 40th Avenue S Option 1A

Option 1B – Upgrade to a Quiet Zone Ready Configuration

This option proposes to enhance the safety and operational efficiency of the existing crossing by upgrading it to a quiet zone-ready configuration in accordance with Federal Railroad Administration (FRA) guidelines. Non-traversable medians would be constructed on both approaches to the crossing to physically restrict vehicle movements and meet quiet zone standards. The crossing would be equipped with quad gates, including flashing lights and standard railroad warning signage. Advanced warning signs would be installed per the MUTCD requirements to provide adequate notification to approaching motorists.

The existing roadway would be widened to accommodate an additional left-turn lane and shoulders on both sides. Approximately 315 feet of pavement would be constructed on the east side of the crossing on 40th Ave S, including new striping. Additional railroad crossing panels would be installed to provide path continuity across the tracks.

The existing gravel driveway for farmland access would be paved in place. Street lighting would be installed at the crossing and along the path to enhance nighttime visibility and safety. The existing box culvert east of the crossing would be extended as needed to accommodate the widened roadway. Approximately 0.47 acres of additional right-of-way would be required to accommodate these improvements.

This option provides a comprehensive safety upgrade while supporting multimodal connectivity and quiet zone designation.

Figure 17-6. Cross Section - 40th Avenue S Quiet Zone

Table 17-3. 40th Avenue S Estimated Costs - Option 1B

CATEGORY	COST (2024 USD)
Roadway Items	$150,000
Railroad Items	$640,000
Right-of-Way	$150,000
Survey, Design, Admin, etc.	$230,000
ROUNDED TOTAL COST	**$1,200,000**

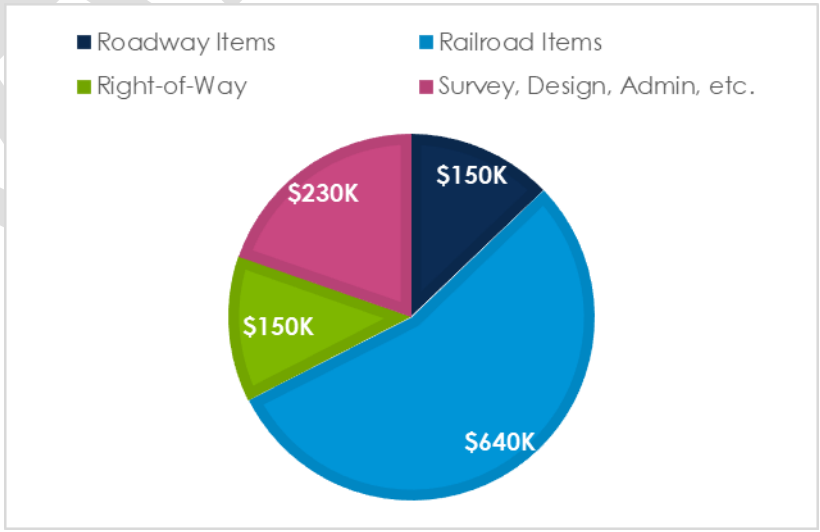

Figure 17-7. 40th Avenue S Cost Distribution - Option 1B

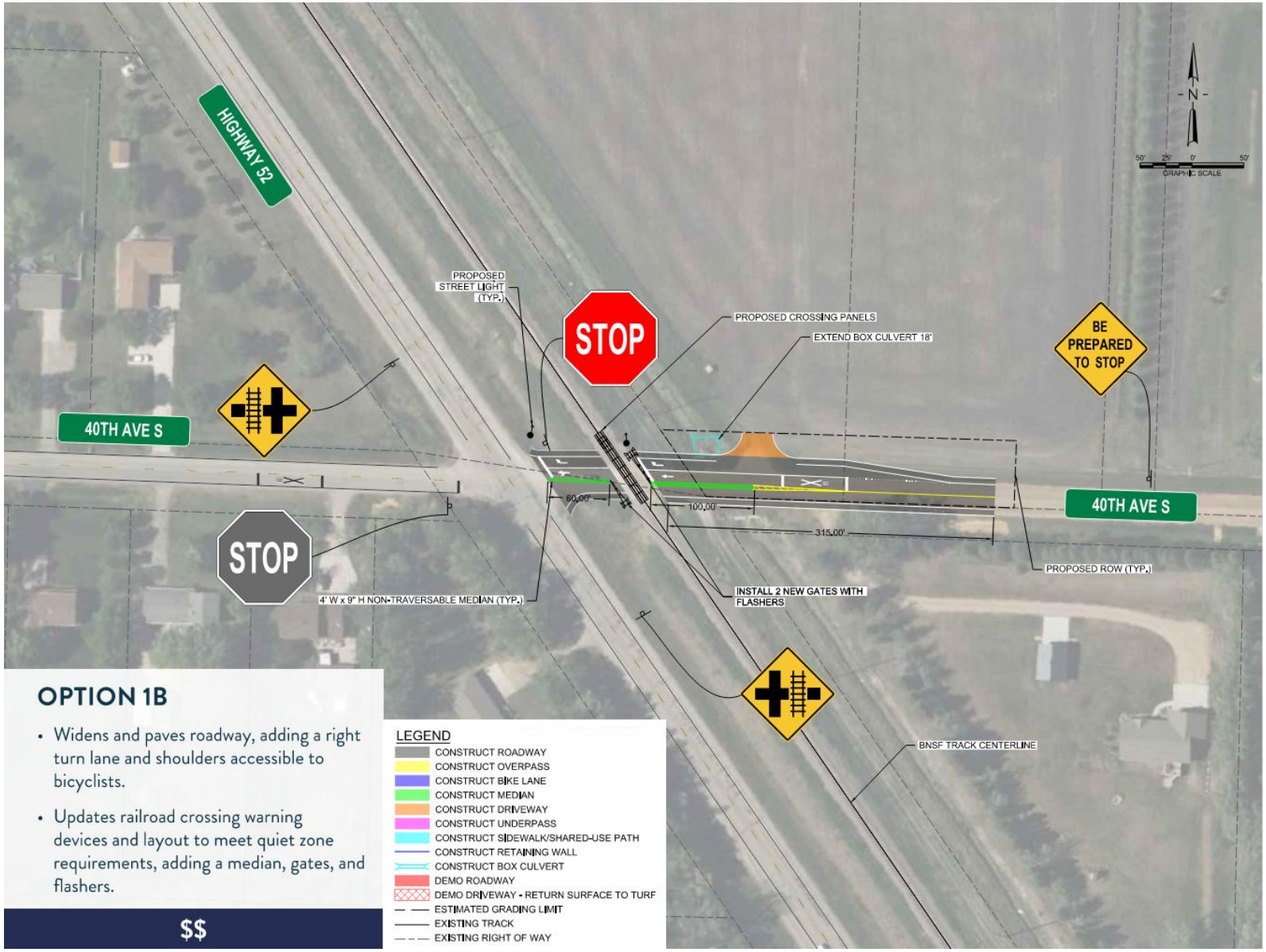

Figure 17-8: 40th Avenue S Option 1B

Option 2A – Close Existing Crossing and Re-Route Traffic to 34th Avenue S Crossing

This option proposes to permanently close the existing 40th Avenue S railroad crossing. Approximately 400 feet of existing pavement would be removed and restored to turf. All associated railroad crossing signage, pavement markings, and crossing panels would be removed. Road closure signage would be installed at appropriate locations to alert and redirect users.

Vehicular and bicycle traffic would be re-routed to the existing 34th Avenue S railroad crossing, located northwest of the current crossing along Highway 52. The 34th Avenue S crossing is a designated quiet zone with a perpendicular (90-degree) rail angle and fully equipped with active warning devices, including gates, flashing lights, and advanced signage.

The existing intersection at 40th Avenue S and 40th Street S would be upgraded to a four-way stop to accommodate redirected traffic and improve intersection safety.

This is the most cost-effective option, as it eliminates the risks associated with the skewed rail alignment at the existing crossing. It also promotes safer vehicle and bicycle movements by redirecting users to a crossing designed with enhanced safety measures.

Table 17-4. 40th Avenue S Estimated Costs - Option 2A

CATEGORY	COST (2024 USD)
Roadway Items	$50,000
Railroad Items	$110,000
Survey, Design, Admin, etc.	$40,000
ROUNDED TOTAL COST	**$180,000**

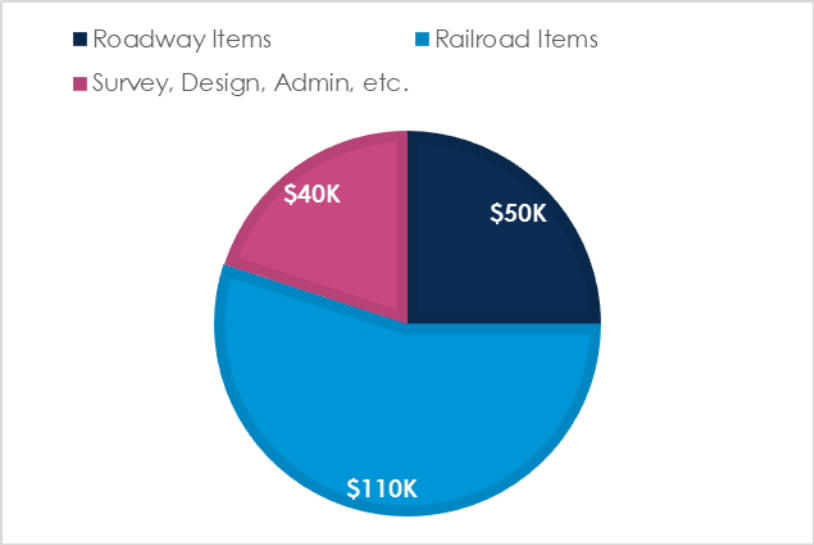

Figure 17-9. 40th Avenue S Cost Distribution - Option 2A

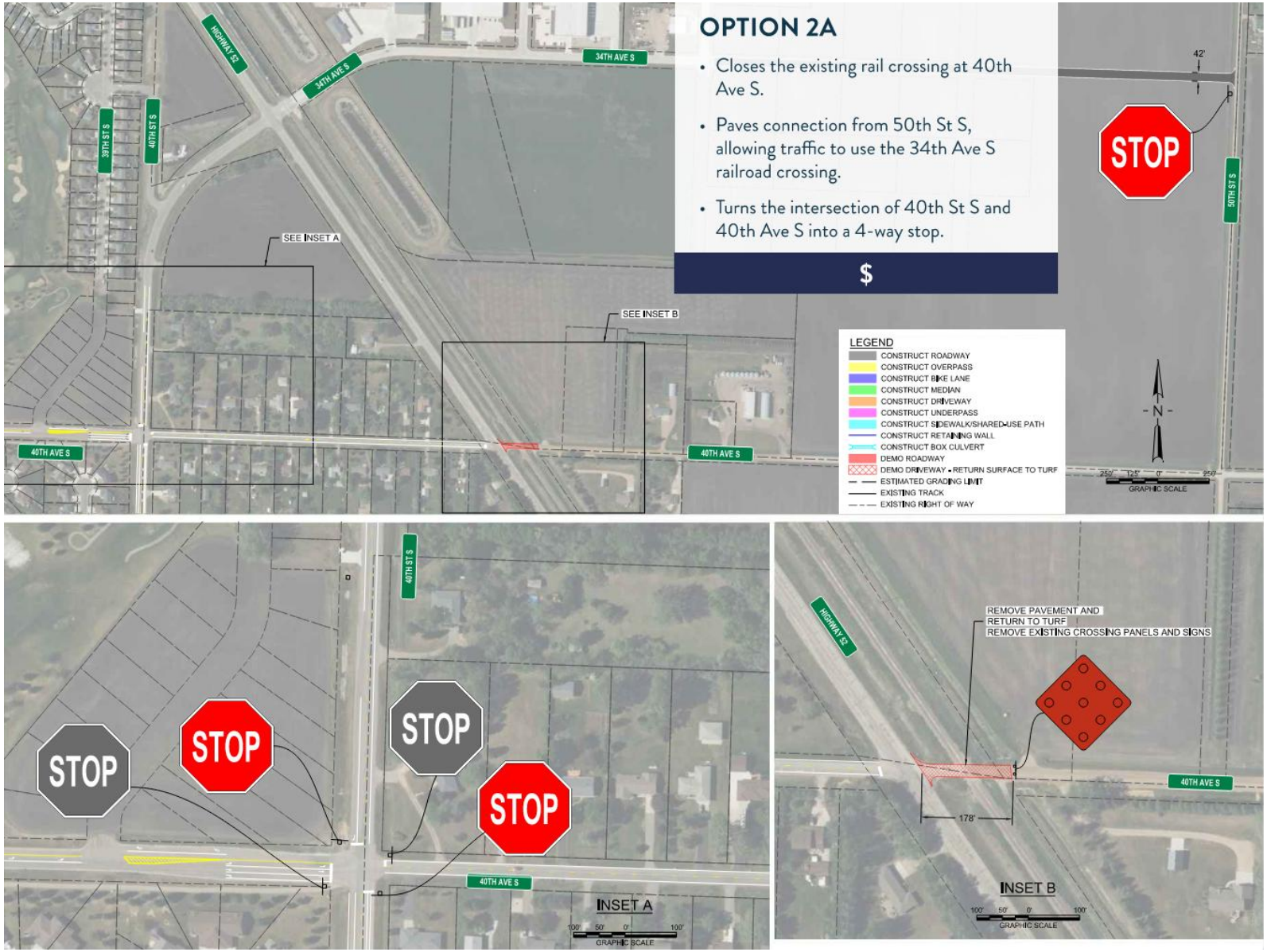

Figure 17-10: 40th Avenue S Option 2A

Benefit-Cost Analysis

Table 17-5 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that was used for the BCA.

Table 17-5: 40th Ave Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID - 40th Ave S	factor	080730S	FRA Grade Crossing Inventory.
Grade Crossing ID - 34th Ave S	factor	921653U	
Rail Assumptions			
Freight Trains per Day	trains/day	2.0	FRA Grade Crossing Inventory.
Passenger Trains per Day	trains/day	0.0	
Switching Trains per Day	trains/day	1.0	
Maximum Timetable Speed	miles/hour	40	
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type - 40th Ave S	factor	Passive	
Current Crossing Type - 34th Ave S	factor	Gates	
Crossing Surface Material - 40th Ave S	factor	Concrete	
Crossing Surface Material - 34th Ave S	factor	Concrete	
Roadway Assumptions			
AADT - 40th Ave S	vehicles/day	120	FRA Grade Crossing Inventory. Minnesota Department of Transportation Traffic Count (TCDS).
AADT - 34th Ave S	vehicles/day	2,059	
Truck Share of Traffic - 40th Ave S	%	10%	
Truck Share of Traffic - 34th Ave S	%	5%	
School Buses per Day	buses/day	12	
Traffic Year - 40th Ave S	year	2024	
Traffic Year - 34th Ave S	year	2024	

Option 1A

Option 1A proposes to improve the roadway around the 40th Ave crossing. Specifically, the alternative proposes to install roadside streetlights, install 6 to 8.5 ft railroad crossing panels, and convert the roadway around the crossing from an unpaved roadway to a 2-lane rural roadway with shoulders. While this alternative would likely generate some minor transportation benefits, these impacts are difficult to determine with industry-standard approaches and data limitations.

Table 17-6: Option 1A Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$360,000	
Residual Value	2024$	$42,500	
Useful Life of Asset	years	20	Reasoned Assumption
Existing Speed Limit	miles/hour	55	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	55	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1A is expected to generate almost $7,000 in discounted benefits while costing almost $219,000 (discounted). This translates to a net present value (NPV) of over -$212,000 and a benefit-cost ratio of 0.03.

Option 1B

Option 1B proposes to improve the safety equipment of the 40th Ave crossing, in addition to various roadway improvements around the crossing. In particular, the key impact from this alternative is the improved transportation safety due to the implementation of flashing lights and gates at the grade crossing. Additionally, while the roadway improvements proposed within this alternative would likely generate some minor transportation benefits, these impacts are difficult to determine with industry-standard approaches and data limitations.

Table 17-7: Option 1B Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$1,200,000	
Residual Value	2024$	$117,500	
Useful Life of Asset	years	20	Reasoned Assumption
Existing Speed Limit	miles/hour	55	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	55	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1B is expected to generate over $38,000 in discounted benefits while costing almost $730,000 (discounted). This translates to a net present value (NPV) of over -$691,000 and a benefit-cost ratio of 0.05.

Option 2A

Option 2A proposes to close the existing 40th Ave crossing and re-route vehicle traffic to the 34th Ave crossing, located northwest of the 40th Ave crossing. This alternative is expected to generate some safety benefits as the 34th Ave S crossing has flashing lights and gates, which are more effective than the crossbucks located at the 40th Ave crossing. However, it is assumed that vehicles previously using the 40th Ave crossing may have to travel incrementally further, which is expected to offset the benefits from closing the crossing.

Table 17-8: Option 2A Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$180,000	
Residual Value	2024$	$0	
Useful Life of Asset	years	20	Reasoned Assumption
Existing Speed Limit	miles/hour	55	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	55	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 2A is expected to generate over $19,000 in discounted benefits while costing over $109,000 (discounted). This translates to a net present value (NPV) of over -$90,000 and a benefit-cost ratio of 0.17.

Environmental Permitting

An aquatic resource delineation and potential permitting under Section 404 of the Clean Water Act (CWA) may be required.

Draft Purpose & Need Discussion

Purpose

The purpose of the project is to improve safety and increase operational efficiency at the existing railroad crossing near 40th Avenue South in Moorhead, Minnesota. The project is intended to address geometric and infrastructure deficiencies that limit visibility, vehicle storage, and non-motorized access, while supporting future transportation needs in a rural and transitional development area.

Need

The need for the project is based on several transportation-related deficiencies and safety concerns:

- **Skewed Crossing Geometry**: The crossing intersects the track at a 52-degree angle, resulting in limited sight distance and insufficient vehicle storage space, especially for school buses and farm machinery.
- **Limited Safety Infrastructure**: The crossing is currently controlled only by crossbucks and stop/yield signs, with no active warning devices or lighting, despite nighttime train operations.
- **School Bus Traffic**: Approximately 12 school buses use the crossing daily, highlighting the need for enhanced safety measures.
- **Development Context**: The area is surrounded by farmland and residential access points. Improvements must maintain access while considering future transportation needs associated with future development.

Preferred Option

For 40th Avenue South, Option 1B is preferred. This option improves the visibility of the railroad crossing and adds crossing mechanisms to help physically separate vehicular traffic from crossing trains. The potential to designate the crossing as a quiet zone would also eliminate train horn noise for the surrounding neighborhoods.

18 50th Avenue S

Crossing Number 062580N

Moorhead, MN

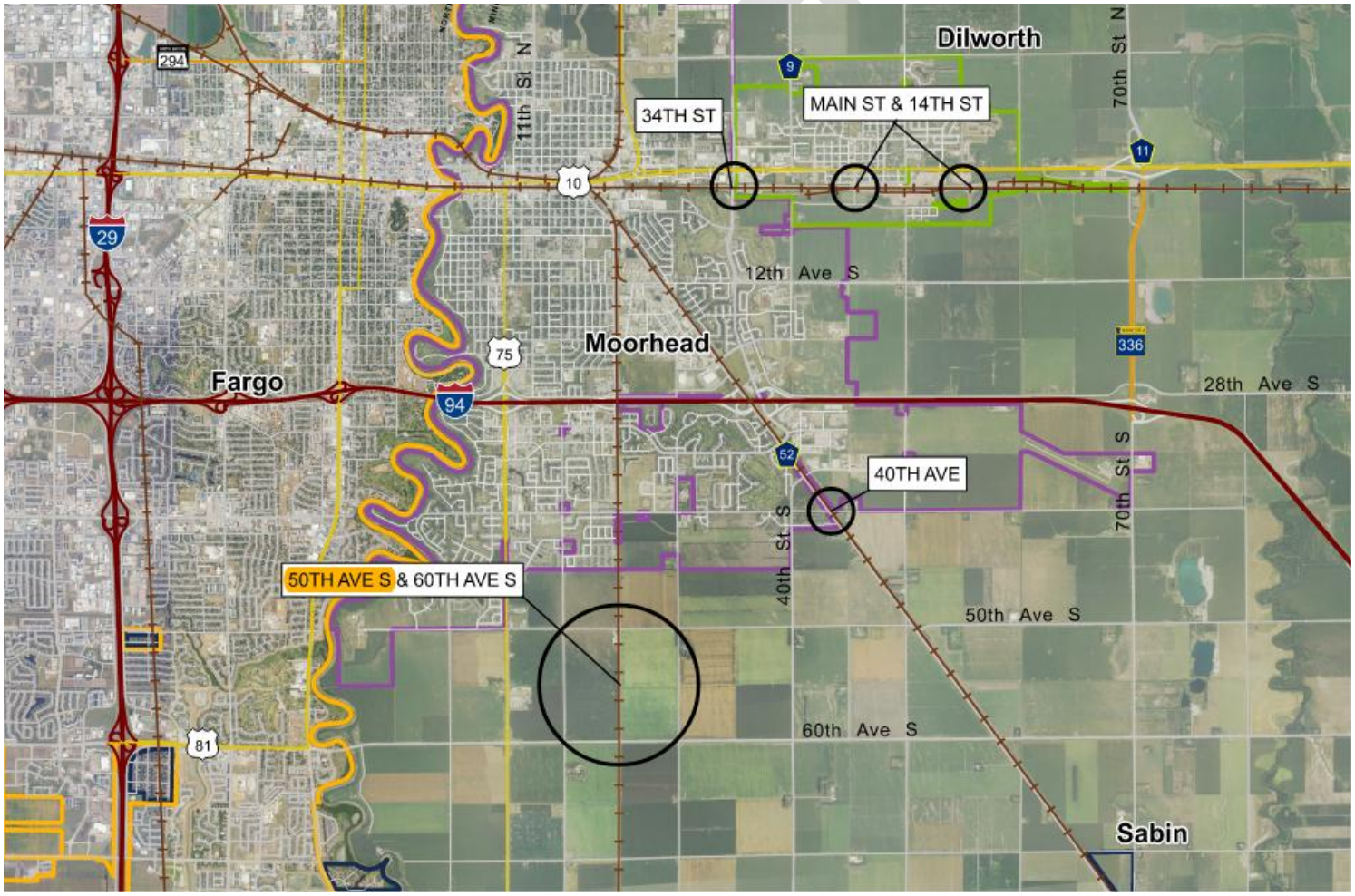

Figure 18-1: 50th Avenue S Study Location

Table 18-1: Crossing Summary – 50th Avenue S

Existing Warning Device	Stop signs with crossbuck
Railroad	BNSF
Trains per Day/ Timetable Speed	8/ 60mph
AADT/Posted Speed Limit	45 (2019)/55mph
Crash History	1 since 1991
Existing Roadway Surface	Unpaved

Existing Conditions

50th Avenue S is an unpaved, two-lane roadway surrounded primarily by farmland. The existing railroad crossing is controlled by a two-way stop, with crossbucks mounted on stop sign poles. The railroad is operated by BNSF under the Twin Cities-Moorhead subdivision on the East Breckenridge to South Moorhead branch. A single track crosses at this location, with an estimated four through trains during the day and four at night, operating at a maximum timetable speed of 60 mph.

The crossing surface is unpaved and equipped with minimal signage, offering limited safety measures despite the relatively high volume of train traffic. Given the current and anticipated future land use developments in the vicinity, enhanced safety treatments at this crossing are necessary to reduce risk and improve overall safety for both vehicles and pedestrians.

The crossing is located within an area of undetermined flood risk. The Class I file search identified one historic site, a Ghost Town (21Cye) within the 1,000-foot buffer that is unevaluated for inclusion in the NRHP.

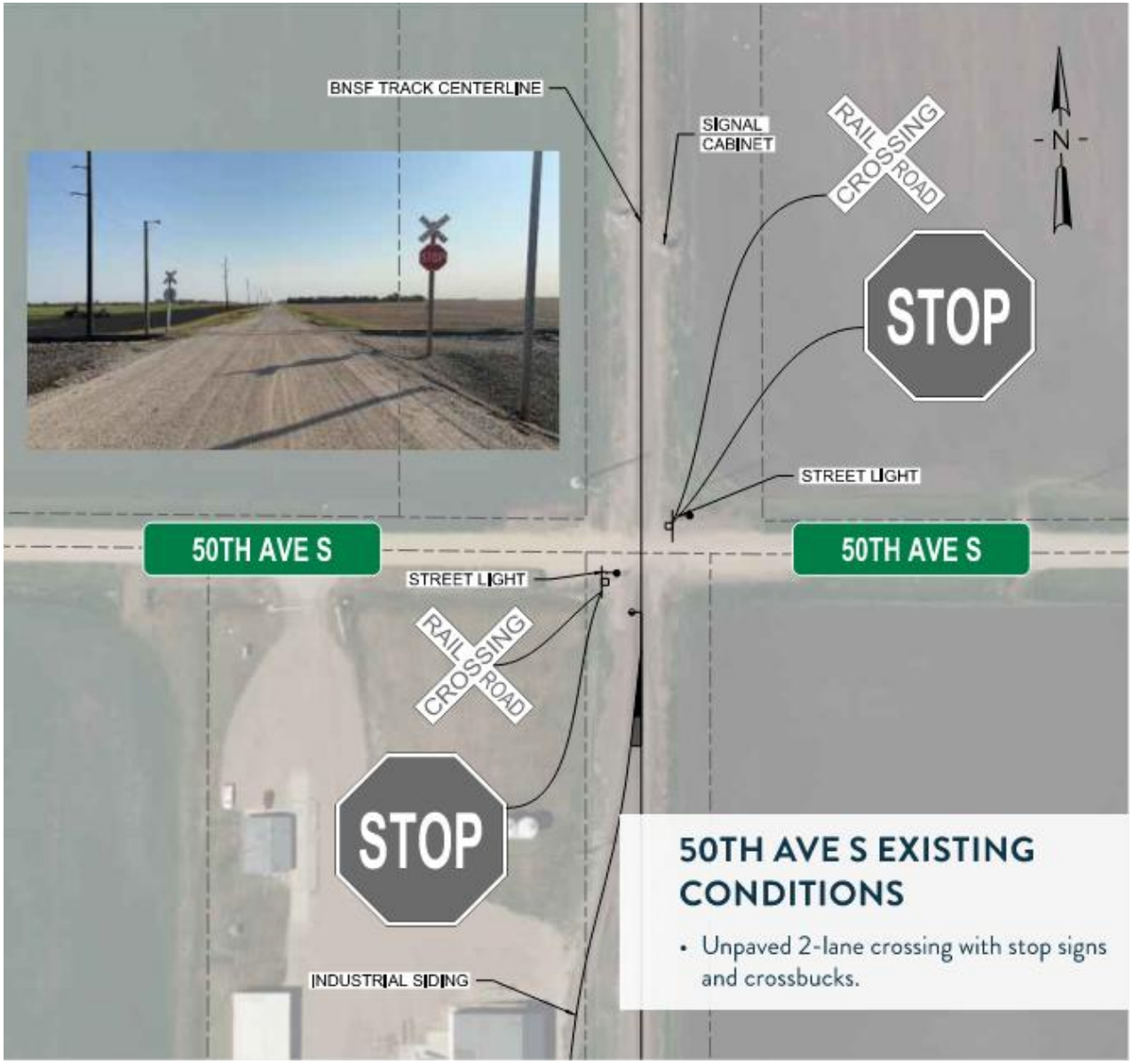

Figure 18-2: 50th Avenue S Existing Conditions

Proposed Mitigation

Option 1 – Upgrade to Quiet Zone Ready Configuration with Assumptions of Future Development

This option assumes future development in the area similar to the 20th Street corridor located north of the existing 60th Avenue S crossing. As part of the proposed improvements, 20th Street would be extended southward to intersect with 50th Avenue S, which would also be extended eastward from the west. The new intersection would be located approximately 350 feet west of the existing railroad track centerline. This offset provides sufficient vehicle storage length and satisfies Federal Railroad Administration (FRA) criteria for a quiet zone crossing.

The existing grade crossing would be upgraded to a quiet zone-ready configuration by constructing non-traversable medians on both sides of the track and installing full active warning devices in accordance with FRA standards. These include crossing gates, flashing lights, and crossbucks on both approaches. New concrete panels that extend to the proposed pavement limits would be installed. In addition, advanced warning signs would be placed in both directions to notify motorists of the upcoming railroad crossing and prompt them to slow down and prepare to stop.

The roadway configuration would be updated from a two-lane undivided section to a divided two-lane roadway with a shared-use path and appropriate buffer space. An additional 0.52 acres right of way would be acquired for the improvements.

This upgrade improves overall crossing safety, accommodates anticipated traffic growth, and supports planned residential development in the surrounding area. By shifting the future intersection to the west, the design also addresses current challenges related to insufficient vehicle queue storage and limited sight distance.

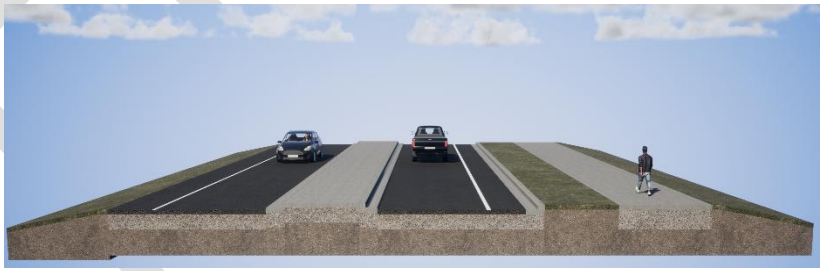

Figure 18-3. Cross Section - 50th Avenue S Quiet Zone

Table 18-2. 50th Avenue S Estimated Costs - Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$290,000
Railroad Items	$580,000
Right-of-Way	$580,000
Survey, Design, Admin, etc.	$260,000
ROUNDED TOTAL COST	**$1,300,000**

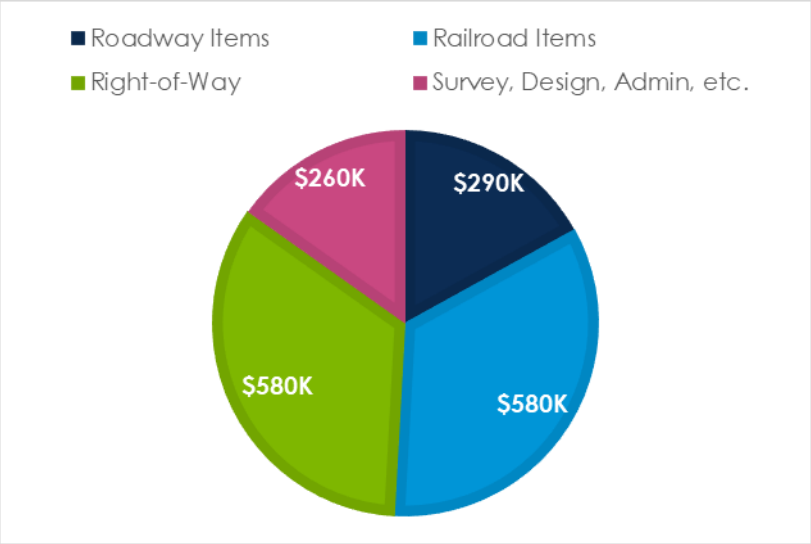

Figure 18-4. 50th Avenue S Cost Distribution - Option 1

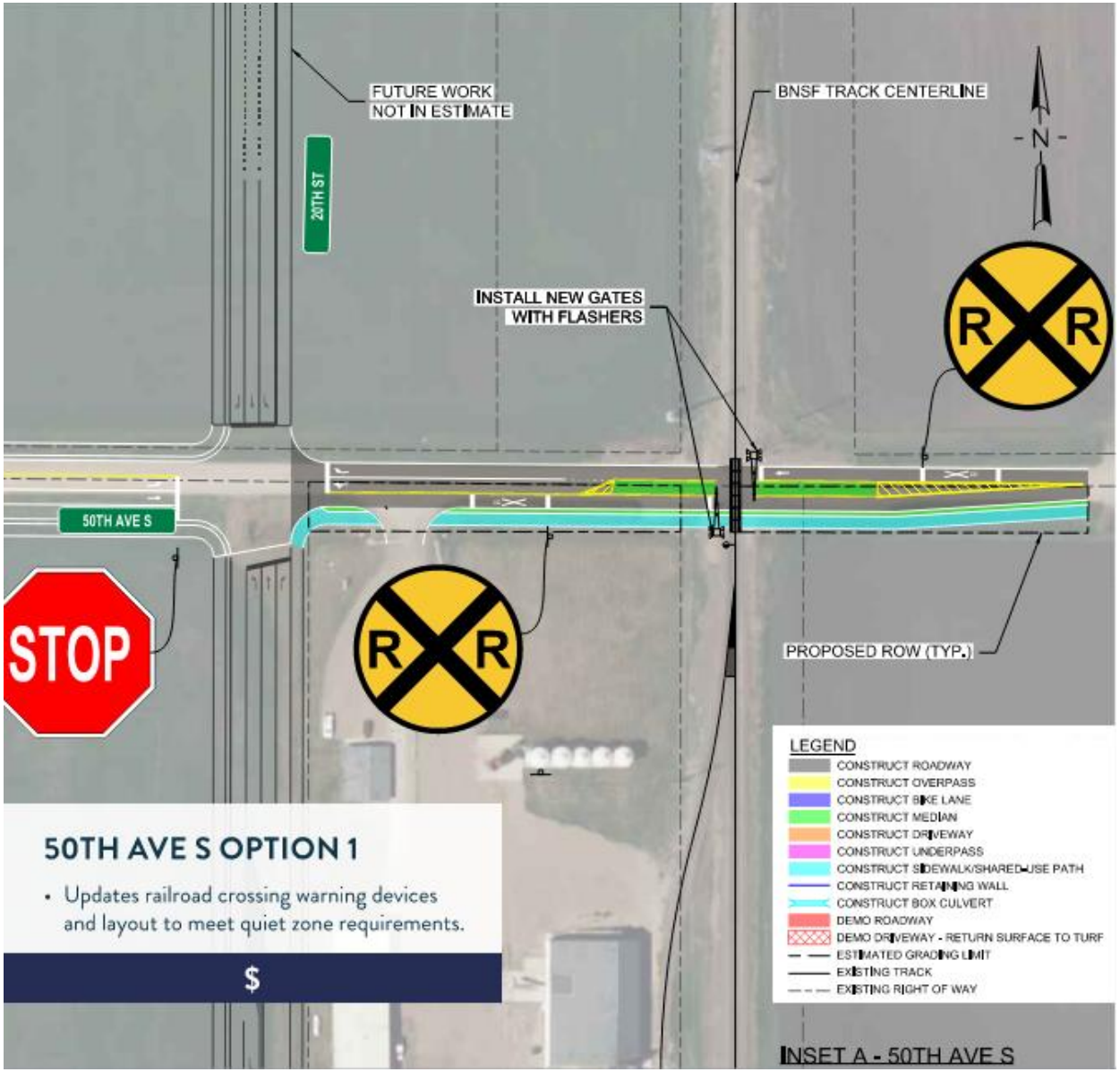

Figure 18-5: 50th Avenue S Option 1

Option 2 – Construct Overpass

This option proposes the construction of an overpass spanning the railroad tracks. Existing railroad crossing devices would be removed. A new roadway bridge approximately 220 feet long and 68 feet wide would be installed, maintaining a minimum vertical clearance of 23 feet 6 inches from the top of the rail to the bottom of the bridge superstructure.

The existing roadway would be widened and upgraded to a four-lane highway with 10-foot-wide shared-use paths on both sides to accommodate future multimodal demand. Pavement limits would be extended to match the regraded approaches, which would include approximately 800 feet of regrading on each end of the bridge at a 4.5% slope. A total of approximately 444 feet of retaining wall would be constructed along the south side adjacent to the existing industrial business to minimize property impacts. The north side would be graded to tie into existing ground elevations. The driveway serving the industrial property would be relocated westward. Street lighting would be installed along the corridor and at the overpass to enhance nighttime visibility and safety. Approximately 6.70 acres of new right-of-way would be required to accommodate the improvements.

This option provides full grade separation, eliminating all potential conflicts between rail and vehicular traffic. It ensures uninterrupted freight rail operations, removes the risk of rail-vehicle collisions, and significantly improves corridor safety. The upgraded roadway configuration also supports anticipated growth and development in the surrounding area.

Figure 18-6. Cross Section - 50th Avenue S Overpass

Table 18-3. 50th Avenue S Estimated Costs - Option 2

CATEGORY	COST (2024 USD)
Roadway Items	$2,250,000
Railroad Items	$320,000
Right-of-Way	$1,610,000
Structural Items	$9,630,000
Survey, Design, Admin, etc.	$3,450,000
ROUNDED TOTAL COST	**$18,000,000**

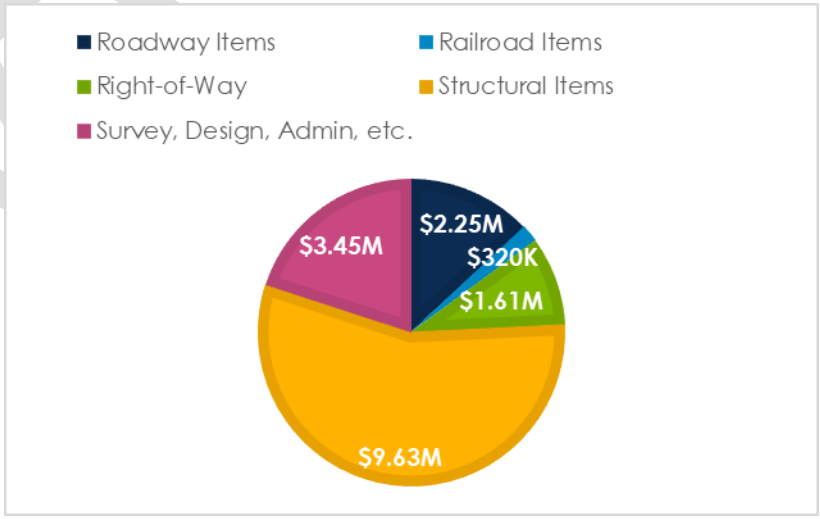

Figure 18-7. 50th Avenue S Cost Distribution - Option 2

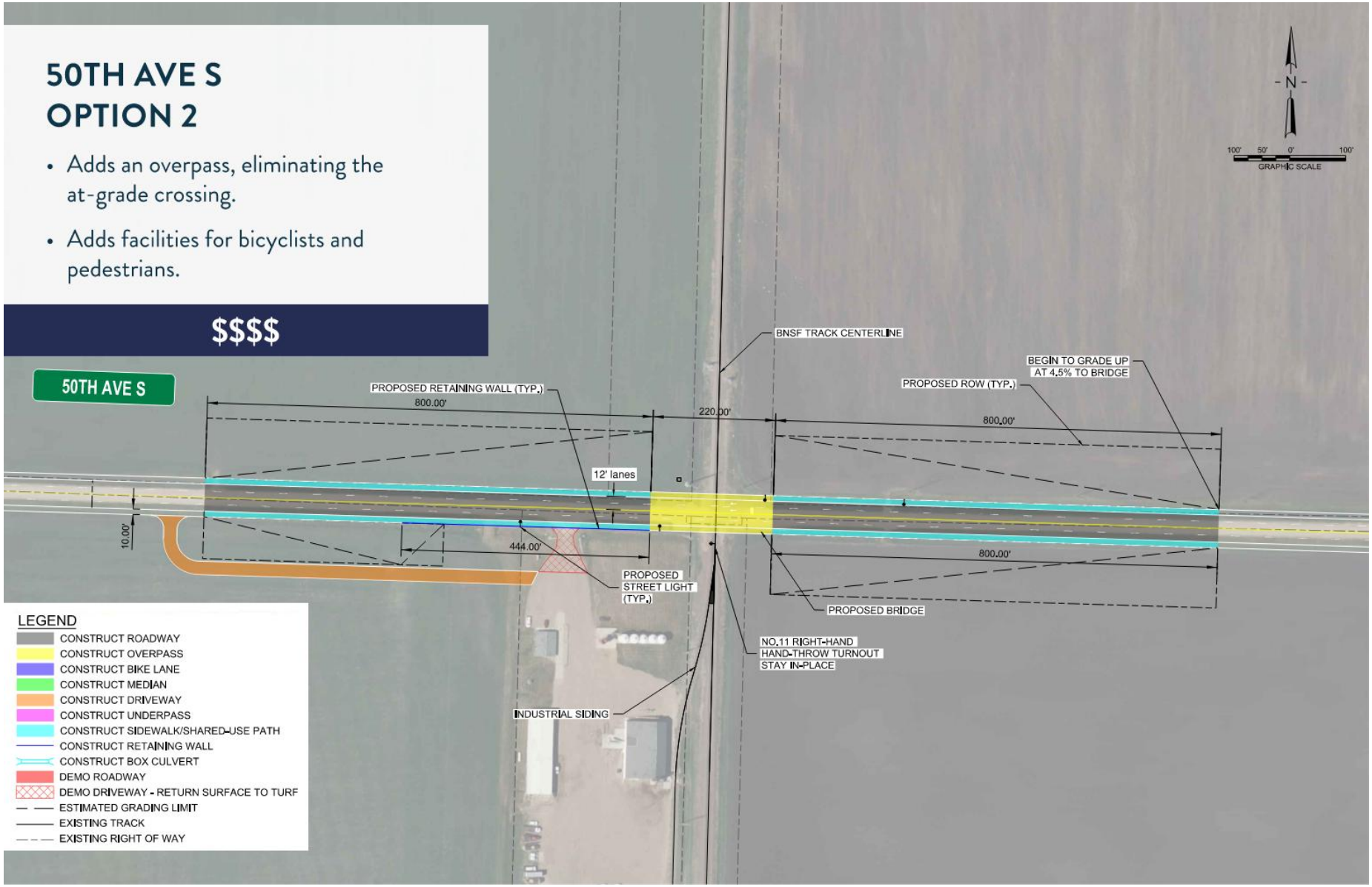

Figure 18-8: 50th Avenue S Option 2

Benefit-Cost Analysis

Table 18-4 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that were used for the BCA. While some options have assumed potential additional connections to 50th Ave, and thus increasing vehicle traffic on 50th Ave, as that information was unavailable during the development of the BCA, traffic levels only reflect existing infrastructure conditions.

Table 18-4: 50th Ave Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID	factor	062580N	FRA Grade Crossing Inventory.
Rail Assumptions			
Freight Trains per Day	trains/day	4	FRA Grade Crossing Inventory.
Passenger Trains per Day	trains/day	0	
Switching Trains per Day	trains/day	0	
Maximum Timetable Speed	miles/hour	60	
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type	factor	Passive	
Crossing Surface Material	factor	Concrete	
Roadway Assumptions			
AADT	vehicles/day	45	FRA Grade Crossing Inventory.
Truck Share of Traffic	%	0%	
School Buses per Day	buses/day	0	
Traffic Year	year	2019	

Option 1

Option 1 proposes to improve the safety equipment of the 50th Ave crossing, in addition to various roadway improvements. The key impact from this alternative is the improved transportation safety due to the implementation of flashing lights and gates at the grade crossing. While the roadway improvements proposed within this alternative would likely generate some minor transportation benefits, these impacts are difficult to determine with industry-standard approaches and data limitations.

Table 18-5: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$1,300,000	
Residual Value	2024$	$130,000	
Useful Life of Asset	years	20	Reasoned Assumption
Existing Speed Limit	miles/hour	55	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	55	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate over $53,000 in discounted benefits while costing over $790,000 (discounted). This translates to a net present value (NPV) of over -$737,000 and a benefit-cost ratio of 0.07.

Option 2

Option 2 proposes to grade separate the 50th Ave crossing with a roadway overpass. By separating the grade crossing, the alternative is expected to eliminate the likelihood of vehicle-train crashes and vehicle idling time. This is expected to translate into improved transportation safety, as well as reduced travel time, vehicle operating costs, and emissions.

Table 18-6: Option 2 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$18,000,000	
Residual Value	2024$	$10,968,982	
Useful Life of Asset	years	20	Reasoned Assumption
Existing Speed Limit	miles/hour	55	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	55	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 2 is expected to generate over $247,000 in discounted benefits while costing $10.94 million (discounted). This translates to a net present value (NPV) of -$10.70 million and a benefit-cost ratio of 0.02.

Environmental Permitting

Consultation with MNSHPO and the lead federal agency for the crossing would be required to comply with Section 106 of the National Historic Preservation Act (NRHPA). Impacts to the NRHP-listed sites would require mitigation through an MOA with MNSHPO and Metro COG.

Draft Purpose & Need Discussion

Purpose

The purpose of the 50th Avenue S Railroad Crossing Improvement Project is to enhance transportation safety and support future development by upgrading the existing grade railroad crossing.

Need

This project is needed to address existing safety deficiencies, infrastructure limitations, and anticipated development pressures. The following conditions demonstrate the need:

- **Insufficient Safety Infrastructure**: The crossing is currently controlled by stop signs with mounted crossbucks and lacks active warning devices, despite approximately 8 trains passing daily at speeds up to 60 mph.
- **Unpaved Roadway**: The unpaved surface reduces vehicle control and increases maintenance demands.
- **Crash History**: Although only one crash has been recorded since 1991, the lack of modern safety features presents ongoing risk.
- **Future Development Potential**: Anticipated zoning and roadway expansion, similar to nearby corridors such as 20th Street, will increase traffic volumes and require upgraded infrastructure.
- **Quiet Zone Eligibility**: The proposed improvements will allow the crossing to meet Federal Railroad Administration (FRA) quiet zone standards, reducing noise impacts for future residential and commercial development.

Preferred Option

For 50th Avenue South, Option 2 is preferred. This option removes the grade crossing and replaces it with an overpass. While there is little development in the area, this would be less disruptive than in the future. If development in the area were to come prior to this crossing being upgraded, the at-grade quiet zone in Option 1 may be preferred due to the smaller construction impact overall.

19 60th Avenue S

Crossing Number 062582C

Moorhead, MN

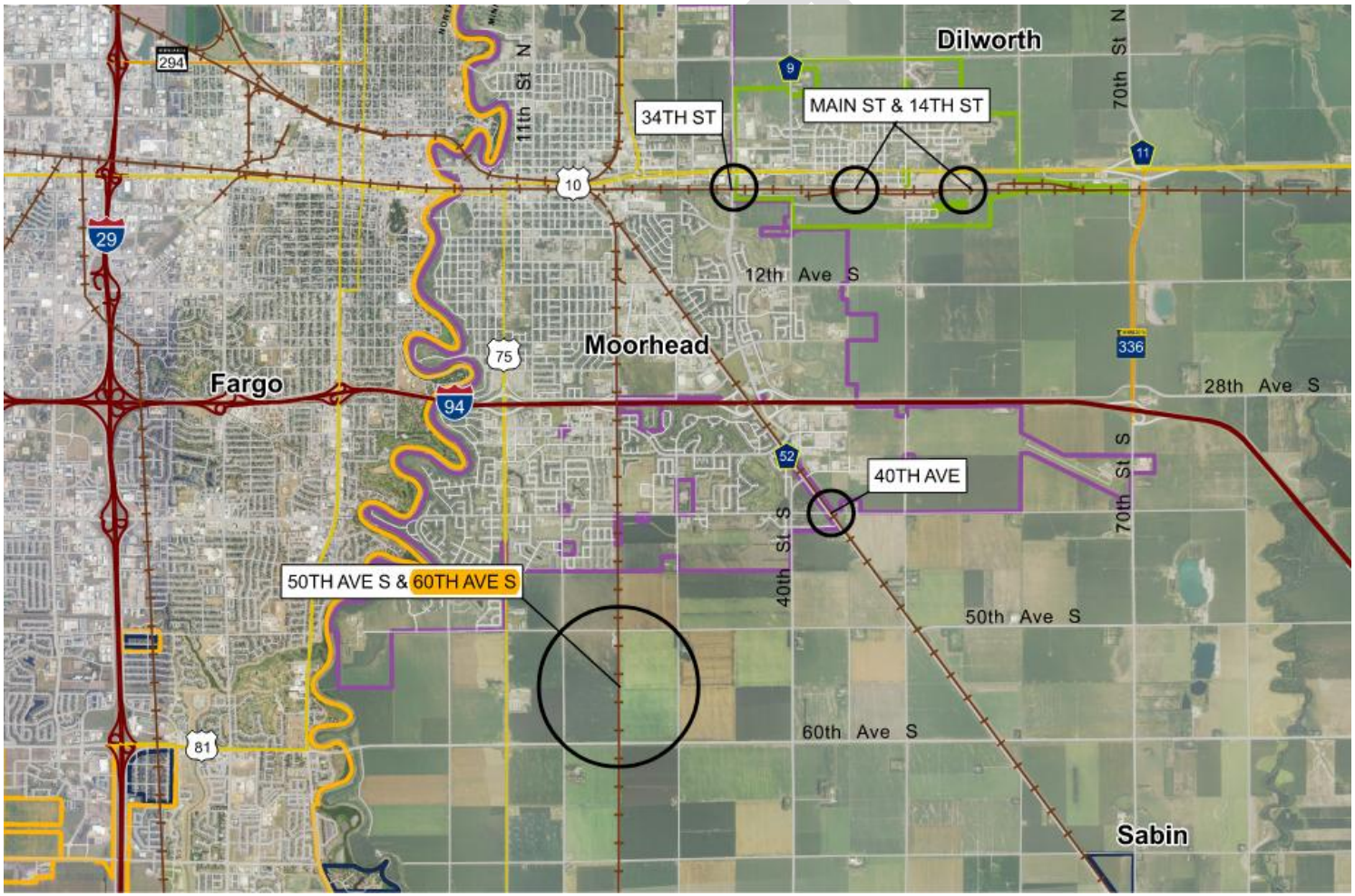

Figure 19-1: 60th Avenue S Study Location

Table 19-1: Crossing Summary – 60th Avenue S

Existing Warning Device	Railroad crossing gates with flashing lights and crossbucks
Railroad	BNSF
Trains per Day/ Timetable Speed	8/60mph
AADT/Posted Speed Limit	2,189 (2021)/55mph
Crash History	3 since 1988
Existing Roadway Surface	Paved

Existing Conditions

The existing grade railroad crossing at 60th Avenue S is located along a paved, two-lane rural highway surrounded by agricultural land. The roadway intersects the BNSF Railway at a near-perpendicular angle and is protected by active warning devices, including two quad gates with flashing lights and mounted crossbucks. Based on 2021 traffic data, the Annual Average Daily Traffic (AADT) is approximately 2,189 vehicles, with a posted speed limit of 55 miles per hour.

Rail operations at this location include approximately eight freight trains per day and four during the day and four overnight with a maximum timetable speed of 60 mph.

The primary safety concern at this location is limited sight distance, particularly during the growing season when tall crops in adjacent fields obstruct visibility for motorists approaching the crossing from either direction. Given the frequency of train movements and relatively high roadway speeds, the existing flashing lights may not provide sufficient advance warning for drivers to safely react and stop.

Additionally, with anticipated future development in the surrounding areas such as potential residential or commercial expansion similar to nearby corridors like 20th Street S. The current lane configuration and crossing protection may no longer be adequate to support growing traffic demand and maintain safe operations.

The environmental review identified one NWI wetland (60th Avenue Ditch) within the 1,000-foot buffer of the crossing. The crossing is located within an area of undetermined flood risk.

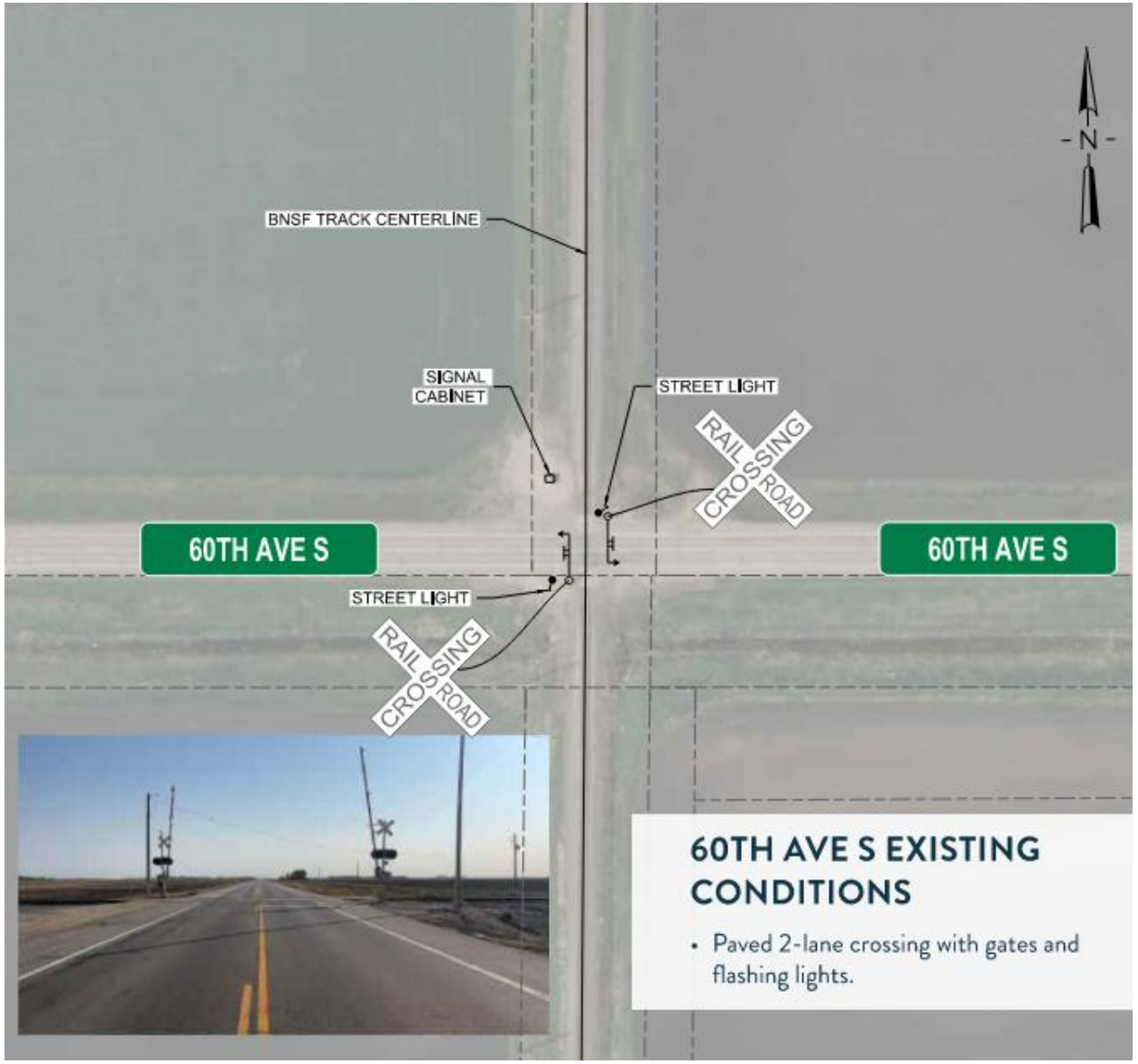

Figure 19-2: 60th Avenue S Existing Conditions

Proposed Mitigation

Option 1 – Upgrade to Quiet Zone Ready Configuration with Assumptions of Future Development

This option assumes future development in the area consistent with the 20th Street corridor located north of the existing 60th Avenue S crossing. As part of the proposed improvements, 20th Street would be extended southward to intersect with 60th Avenue S, which would also be extended eastward from the west. A new T-intersection between 20th Street S and 60th Avenue S would be constructed approximately 350 feet west of the existing BNSF mainline centerline, providing sufficient vehicle storage space and improving intersection spacing. Lane configurations would be consistent with the existing 20th Street section and the east leg of the roundabout at CR 75 and 60th Avenue S, located west of the project area.

The existing grade crossing would be upgraded to a quiet zone–ready configuration. Non-traversable medians would be constructed on both approaches to prevent unsafe vehicle maneuvers near the tracks. The existing two-quadrant crossing gates would be kept in place but upgraded with extended gate arms to fully cover both traffic lanes and provide enhanced stop control. Additionally, advanced warning signage would be installed in accordance with MUTCD guidelines to alert motorists to the upcoming crossing. Approximately 0.33 acres of new right-of-way would be required to accommodate these improvements.

The new T-intersection would include turning lanes and high-visibility pavement markings. A minimum 10-foot-wide shared-use path would be to support pedestrian and bicycle activity anticipated with future development. Raised medians on 20th Street would further separate traffic and offer additional safety benefits for non-motorized users.

Figure 19-3. Cross Section - 60th Avenue S Quiet Zone

Table 19-2. 60th Avenue S Estimated Costs - Option 1

CATEGORY	COST (2024 USD)
Roadway Items	$380,000
Railroad Items	$230,000.
Right-of-Way	$100,000
Survey, Design, Admin, etc.	$180,000
ROUNDED TOTAL COST	**$900,000**

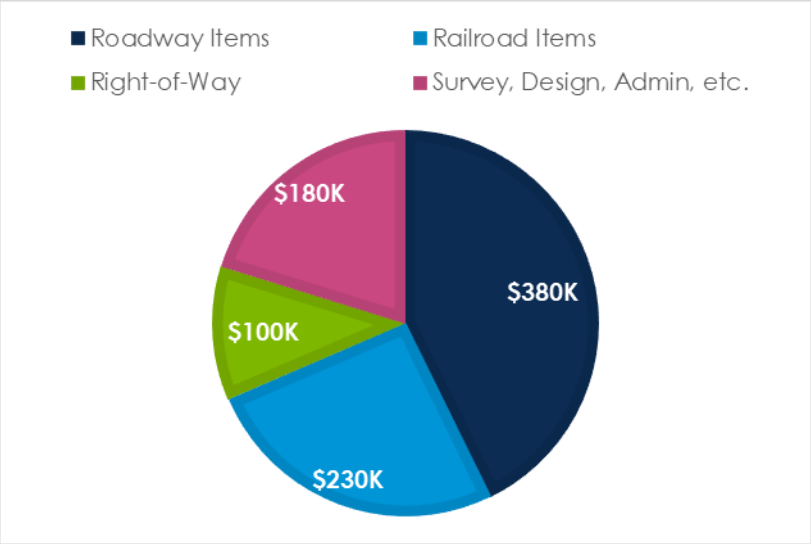

Figure 19-4. 60th Avenue S Cost Distribution - Option 1

Figure 19-5: 60th Avenue S Option 1

Option 2A – Construct Overpass

This option proposes the construction of a grade-separated overpass at the existing railroad crossing. All current railroad crossing devices would be removed. A new bridge approximately 220 feet long and 60 feet wide would be constructed, providing a minimum vertical clearance of 23 feet 6 inches from the top of rail to the bottom of the bridge superstructure.

The roadway would be upgraded to a four-lane section with a 10-foot-wide shared-use path along the south side to accommodate future pedestrian and bicycle activity. Approximately 800 feet of roadway would be regraded on each end of the bridge at a 4.5% slope. To minimize impacts on the south side, approximately 1,400 feet of retaining wall would be constructed. Both ends of the overpass would be designed to transition smoothly back to existing ground elevations. Street lighting would be installed along the corridor and overpass to improve nighttime visibility and enhance overall safety. An estimated 3.97 acres of additional right-of-way would be required to accommodate the proposed improvements.

This option eliminates all rail-vehicle conflict points, ensuring undisturbed train operations while significantly enhancing safety for motorists. The upgraded roadway and multimodal facilities support long-term growth and preserve the corridor for future development opportunities.

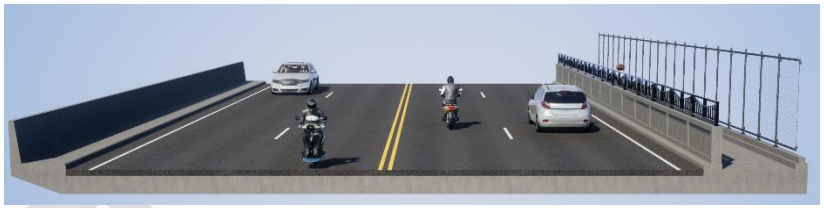

Figure 19-6. Cross Section - 60th Avenue S Overpass

Table 19-3. 60th Avenue S Estimated Costs - Option 2A

CATEGORY	COST (2024 USD)
Roadway Items	$1,370,000
Railroad Items	$410,000
Right-of-Way	$960,000
Structural Items	$12,710,000
Survey, Design, Admin, etc.	$3,860,000
ROUNDED TOTAL COST	**$20,000,000**

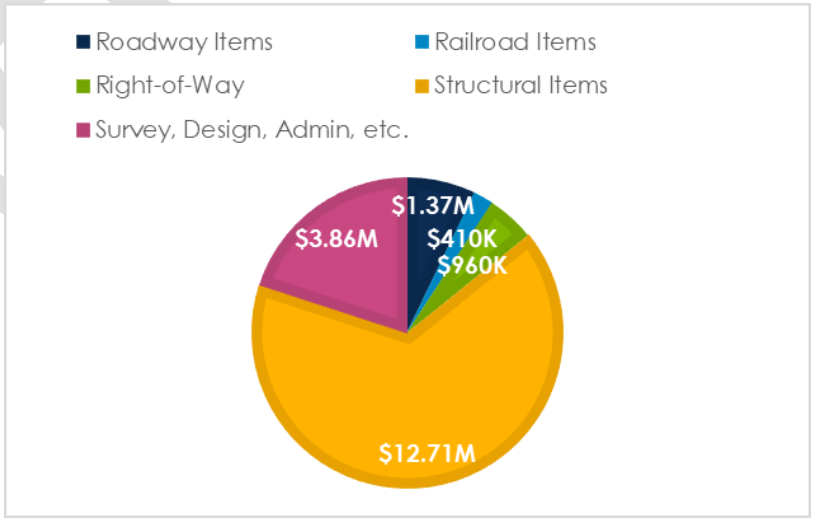

Figure 19-7. 60th Avenue S Cost Distribution - Option 2A

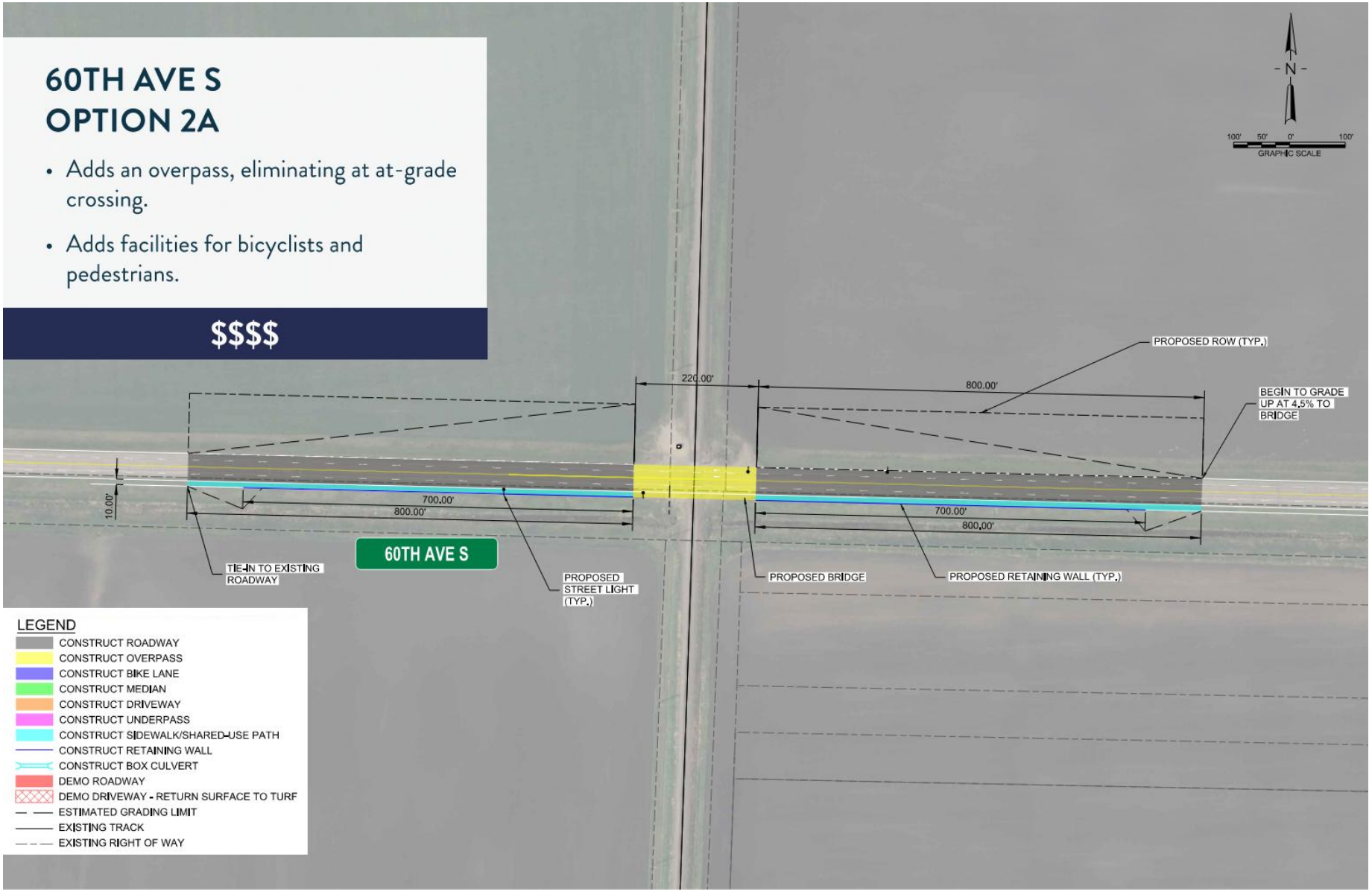

Figure 19-8: 60th Avenue S Option 2A

Option 2B – Construct Underpass

This option proposes constructing a roadway underpass beneath the existing BNSF track. A new 140-foot-long, 68-foot-wide rail bridge would be installed. To provide the required minimum vertical clearance of 16.5 feet from the finished roadway grade to the bottom of the railroad structure, approximately 500 feet of 60th Avenue S would be regraded on each side at a 4.5% slope.

The roadway would be upgraded to four traffic lanes with 10-foot-wide shared-use paths on both sides, accommodating future multimodal transportation needs. To minimize property impacts and preserve developable land along the corridor, approximately 2,000 feet of retaining walls would be constructed. Street lighting would be installed throughout the underpass to enhance nighttime visibility and safety for both motorists and pedestrians. A stormwater lift would be constructed to manage drainage within the underpass. Approximately 0.5 acres of additional right-of-way would be required to accommodate these improvements.

This option provides full grade separation between rail and vehicular traffic, effectively eliminating rail crossing conflicts while improving corridor safety and operational efficiency. The upgraded roadway design also supports anticipated long-term development and transportation demands in the area.

Figure 19-9. Cross Section - 60th Avenue S Near Underpass

Table 19-4. 60th Avenue S Estimated Costs - Option 2B

CATEGORY	COST (2024 USD)
Roadway Items	$1,540,000
Railroad Items	$1,930,000
Structural Items	$7,410,000
Survey, Design, Admin, etc.	$2,720,000
ROUNDED TOTAL COST	**$13,600,000**

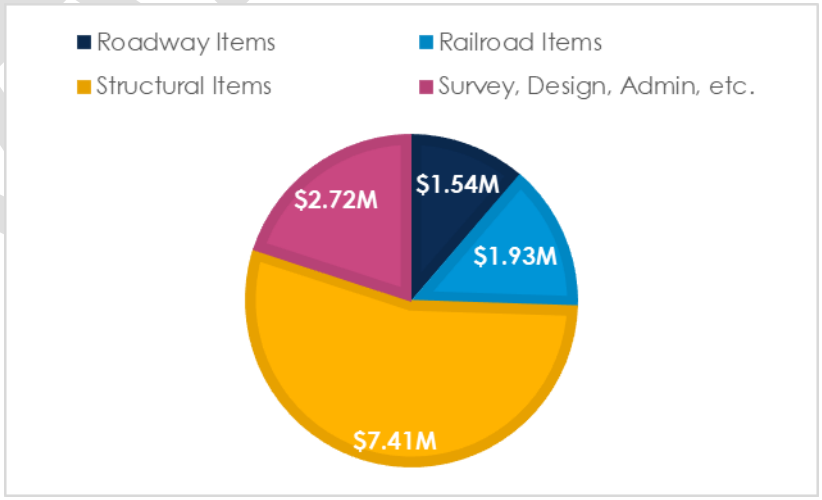

Figure 19-10. 60th Avenue S Cost Distribution - Option 2B

Figure 19-11: 60th Avenue S Option 2B

Benefit-Cost Analysis

Table 19-5 provides a full list of assumptions relevant to the crossing characteristics and traffic demand that were used for the BCA. While some options have assumed potential additional connections to 60th Ave, and thus increasing vehicle traffic on 60th Ave, as that information was unavailable during the development of the BCA, traffic levels only reflect existing infrastructure conditions.

Table 19-5: 60th Ave Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Grade Crossing ID	factor	062582C	FRA Grade Crossing Inventory.
Rail Assumptions			
Freight Trains per Day	trains/day	4	FRA Grade Crossing Inventory.
Passenger Trains per Day	trains/day	0	
Switching Trains per Day	trains/day	0	
Maximum Timetable Speed	miles/hour	60	
Number of Accidents (2020-2024)	accidents	0	
Current Crossing Type	factor	Gates	
Crossing Surface Material	factor	Concrete	
Roadway Assumptions			
AADT	vehicles/day	2189	FRA Grade Crossing Inventory.
Truck Share of Traffic	%	0%	
School Buses per Day	buses/day	6	
Traffic Year	year	2021	

Option 1

Option 1 proposes various roadway improvements around the 60th Ave crossing. While these improvements proposed within this alternative would likely generate some minor transportation benefits, these impacts are difficult to determine with industry standard approaches and data limitations.

Table 19-6: Option 1 Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$900,000	
Residual Value	2024$	$82,500	
Useful Life of Asset	years	20	Reasoned Assumption

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 1 is expected to generate over $45,000 in discounted benefits while costing over $547,000 (discounted). This translates to a net present value (NPV) of over -$502,000 and a benefit-cost ratio of 0.08.

Option 2A

Option 2A proposes to grade separate the 60th Ave crossing with a roadway overpass. By separating the grade crossing, the alternative is expected to eliminate the likelihood of vehicle-train crashes and vehicle idling time. This is expected to translate into improved transportation safety, as well as reduced travel time, vehicle operating costs, and emissions.

Table 19-7: Option 2A Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$20,000,000	
Residual Value	2024$	$13,497,000	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	55	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	55	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 2A is expected to generate $1.39 million in discounted benefits while costing $12.16 million (discounted). This translates to a net present value (NPV) of -$10.77 million and a benefit-cost ratio of 0.11.

Option 2B

Option 2B would impose a similar solution to Option 2A, with the slight variation of a roadway underpass instead of a roadway overpass. The improvements are expected to translate into improved transportation safety, as well as reduced travel time, vehicle operating costs, and emissions.

Table 19-8: Option 2B Assumptions

Variable Name	Unit	Value	Source
General Assumptions			
Final Year of Construction	year	2030	Metro Railroad Needs Study. Alternative Development. April 2025.
Total Project Cost	2024$	$13,600,000	
Residual Value	2024$	$7,410,000	
Useful Life of Asset	years	50	Reasoned Assumption
Existing Speed Limit	miles/hour	55	Metro Railroad Needs Study. Alternative Development. April 2025.
Future Speed Limit	miles/hour	55	

Based on the assumptions and a 7 percent discount rate for all future impacts, Option 2B is expected to provide over $765,000 in discounted benefits while costing $8.27 million (discounted). This translates to a net present value (NPV) of -$7.50 million and a benefit-cost ratio of 0.09.

Environmental Permitting

An aquatic resource delineation and potential permitting under Section 404 of the Clean Water Act (CWA) may be required.

Draft Purpose & Need Discussion

Purpose

The purpose of the 60th Avenue S Railroad Crossing improvement project is to enhance safety, improve traffic operations, and support future development at the existing grade crossing of the BNSF railroad. The project aims to reduce crash risk, improve visibility and warning systems, and support multimodal transportation in a developing corridor.

Need

This project is needed to address several deficiencies and emerging demands at the crossing. The following factors demonstrate the need for improvements:

- **Limited Sight Distance**: Surrounding farmland and seasonal crop growth obstructs visibility for motorists approaching the crossing, increasing the risk of collisions.
- **Crash History**: Three recorded crashes since 1988 indicate a need for enhanced safety measures.
- **High Traffic Volume**: The crossing accommodates an Average Annual Daily Traffic (AADT) of 2,189 vehicles (2021) and approximately 8 train movements per day, resulting in frequent vehicle-rail interactions.

- **Future Development Potential**: Anticipated residential and commercial growth similar to nearby corridors such as 20th Street South would increase traffic demand and necessitate improved infrastructure to support safe and efficient movement.

Preferred Option

For 60th Avenue South, Option 2A is preferred. This option removes the at-grade crossing and adds an overpass. While there is little development in the area, this would be less disruptive than in the future. If development in the area were to come prior to this crossing being upgraded, the at-grade quiet zone in Option 1, may be preferred due to the smaller construction impact overall.

20 Additional Locations of Interest

Though not included in the scope of this study, for full analysis, the study team is aware of several locations worth mentioning and documenting. These locations were identified through the course of the research and coordination completed for the Metro Railroad Needs Study.

County Road 22 – Harwood, ND

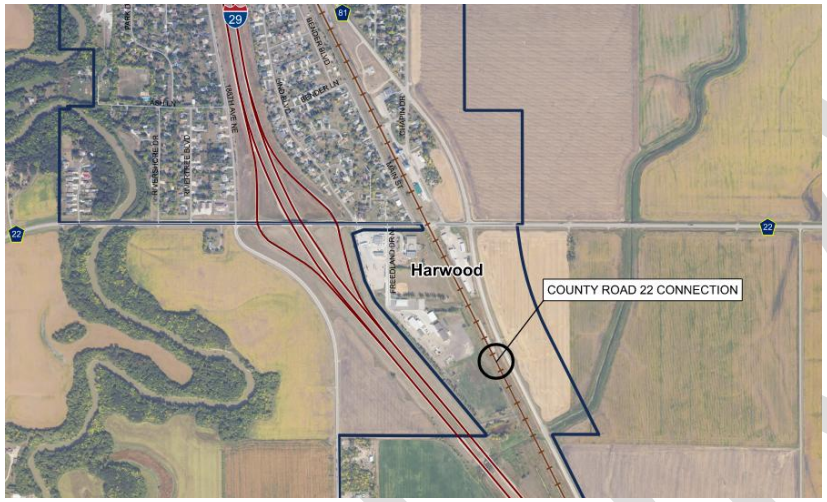

Figure 20-1. Harwood Location of Interest

The West Metro Perimeter Highway Study, currently being conducted by FM Metro COG, developed a conceptual realignment of Cass County Road 22 with a revised I-29 interchange configuration shown in **Figure 20-2**. The realignment of County Road 22 provides an opportunity for a grade separated railroad crossing that can reduce non-local truck traffic within Harwood. This is particularly notable due to the proximity of Harwood Elementary School to both the current alignment of County Road 22 and the existing grade crossing. The structure would also provide a grade-separated crossing with County Road 81, which runs adjacent to and parallel with the railroad tracks.

Figure 20-2: Harwood Split Diamond Interchange Concept from West Metro Perimeter Highway Study

Figure 20-3: Realigned County Road 22 Overpass Concept

Pedestrian Crossing – Hawley, MN

Crossing Number 062894K

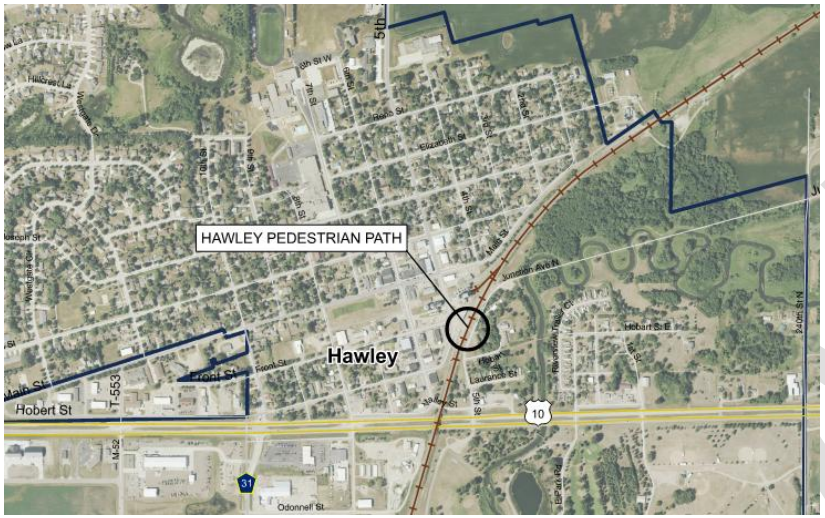

Figure 20-4. Hawley Location of Interest

The Regional Railroad Crossing Safety Study completed by FM Metro COG in 2017 identified this crossing as a candidate for improvements. This dedicated pedestrian crossing near the intersection of Front Street and Hobart Street/5th Street has limited safety devices and crosses three sets of railroad tracks. It is the only pedestrian crossing in Hawley. The 2017 study identified a pedestrian maze as a potential improvement, with an estimated cost in 2017 being $66,000 if active warning devices were excluded. The layout for this improvement is shown in **Figure 20-5**.

The 2018 Hawley Safe Routes to School Plan noted that grade separated pedestrian crossing options should be explored, including both improvements to the existing crossing and potential relocation of the crossing. The study additionally mentions investigating the installation of fencing along the rail corridor upon completion of potential improvements. The study also notes that students living on the east side of the railroad tracks are currently bused to school for safety reasons, so they do not have to use the existing pedestrian crossing.

A new grade-separated crossing is a potential solution to maintain a pedestrian crossing in Hawley. A less expensive alternative would be similar to the improvements proposed in the 2017 Regional Railroad Crossing Safety Study.

Figure 20-5. Hawley Pedestrian Path Improvements from 2017 Regional Railroad Crossing Safety Study

21 Discretionary Funding Potential

This section presents some relevant public funding opportunities in which the evaluated alternatives / options could be eligible. However, this section does not provide an exhaustive list of potential funding opportunities.

Railroad Crossing Elimination Program

The Railroad Crossing Elimination (RCE) Program is a funding program offered by the Federal Railroad Administration (FRA) focused on providing funding for highway-rail or pathway-rail grade crossing improvement projects that focus on improving the safety and mobility of people and goods.[5] Generally, the type of projects that are eligible under the RCE Program include:

- Grade separation or closure;
- Track relocation;
- Improvement or installation of protective devices, signals, signs, or other;
- Measures to improve safety related to a separation, closure, or track relocation project;
- Other means to improve the safety if related in the mobility of people and goods at highway-rail grade crossings (including technological solutions);
- The planning, environmental review, and design of an eligible project type.

One advantage of the RCE Program is that while quantitative assessments of the improved safety would increase the likelihood of success, historically, the RCE Program does not require a BCA as an evaluation criterion.

Options, or projects, that may have some potential under the RCE Program include, but not limited to:

- 26th Street – Options 1 and 2
- 18th Street Pedestrian Crossing – Options 1, 2, and 3
- 7th Ave – Options 1 and 2
- Main Street & 14th Street Grade Separation – Option 1

Consolidated Rail Infrastructure and Safety Improvements Program

The Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program is a funding program offered by the FRA focused on improving the safety, efficiency, and reliability of intercity passenger and freight rail.[6]

While the CRISI Program considers a wider range of eligible projects, one requirement of the CRISI Program is that applicants must submit a BCA in support of their application.

[5] Federal Railroad Administration. Railroad Crossing Elimination Grant Program. Updated: January 21, 2025. Accessed: September 19, 2025.

[6] Federal Railroad Administration. Consolidated Rail Infrastructure and Safety Improvement (CRISI) Program. Updated: July 31, 2025. Accessed: September 19, 2025

Though historically, the BCA has not necessarily been an evaluation criterion, a BCA with results indicating that the potential benefits are unlikely to exceed their costs (i.e., a benefit-cost ratio below 1.0) would not aid an application's likelihood of success.

Options, or projects, that may have some potential under the CRISI Program include, but not limited to:

- 9th Street – Option 1
- Center Street – Option 1
- 26th Street – Options 1 and 2
- 18th Street Pedestrian Crossing – Options 1, 2, and 3
- 7th Ave – Options 1 and 2
- Main Street & 14th Street Grade Separation – Option 1

Better Utilizing Investments to Leverage Development Grant Program

The Better Utilizing Investments to Leverage Development (BUILD) Grant Program is a U.S. Department of Transportation (U.S. DOT) program that provides grants for surface transportation infrastructure projects. The BUILD program requires a BCA in support of the application, and the BCA results must indicate that the project's benefits would likely exceed its costs (i.e., a BCR greater than 1.0).

Most of the assessed options, based on a high-level BCA, would not fare well under the BUILD Program. However, some of the options may become more competitive from a BCA perspective under a more detailed assessment. Moreover, as the BUILD Program attracts a wide range of projects, it may not necessarily be the most competitive funding opportunity for the assessed options.

Infrastructure for Rebuilding America

The Infrastructure for Rebuilding America (INFRA) program is a U.S. Department of Transportation (U.S. DOT) program that provides grants for surface transportation infrastructure projects. Similar to the BUILD Program, the INFRA program requires a BCA in support of the application, and the BCA results must indicate that the project's benefits would likely exceed its costs (i.e., a BCR greater than 1.0).

As the INFRA program is similar to the BUILD Program, the assessed options may not be competitive in the INFRA program based on the high-level BCA conducted. As such, some options may be more competitive under a more detailed assessment.

Other Potential Funding Opportunities

Flexible Transportation Fund Program

The Flexible Transportation Fund Program (Flex Fund) is a North Dakota public funding program. In particular, the Flex Fund funds projects that reduce long-term maintenance and

operation costs and improve the connectivity, efficiency, and safety of the North Dakota transportation network.[7]

Rail Crossing Program

The Rail Crossing Program is a funding program offered by the North Dakota Department of Transportation (NDDOT) through federal funds. Eligible projects include new signal installations, signal upgrades, signal relocation, surface rehabilitation and crossing closures. Additionally, for crossing closures, railroad companies offer money to the road authority for the closure and NDDOT can match those funds up to $7,500.[8]

Urban Grant Program

The Urban Grant Program is an NDDOT funding opportunity that proposes to fund projects that look to improve pedestrian, bicycle, and other multimodal facilities to enhance the downtown areas within cities that have over 5,000 in population.[9]

This opportunity could provide potential funding for the 18th Street Pedestrian project, as well as other initiatives aimed at improving active transportation infrastructure.

Multiple Account Evaluation Results

Based on all the information collected, the BCA, and an assessment of the various options based on the criteria under the MAE framework, the **Table 21-1** highlights the results of MAE scoring by option. Meanwhile, **Table 21-2** presents the overall summary of the analysis, presenting the results by MAE score and other metrics. Finally, **Figure 21-1** presents the range of MAE scores by location.

Table 21-1: Multiple Account Evaluation Analysis Results

Project Name	MAE Score	BCR	PV Costs	PV Benefits
26th Street NW – Option 2	3.73	0.09	$24,114,000	$2,121,000
14th Street – Option 1	3.59	0.06	$19,997,000	$1,184,000
60th Ave – Option 2A	3.36	0.11	$12,161,000	$1,389,000
60th Ave – Option 2B	3.25	0.09	$8,269,000	$765,000
26th Street NW – Option 1	3.25	0.09	$13,377,000	$1,173,000
7th Ave – Option 1	3.24	0.13	$13,985,000	$1,777,000
50th Ave – Option 2	2.76	0.02	$10,945,000	$247,000
Center Street – Option 1	2.54	0.19	$10,884,000	$2,085,000
Center Street – Option 2	2.48	0.18	$12,161,000	$2,143,000
9th Street NW – Option 2	2.48	0.15	$15,201,000	$2,295,000
9th Street NW – Option 1	2.37	0.18	$11,006,000	$1,996,000
60th Ave – Option 1	2.21	0.08	$547,000	$45,000
40th Ave S – Option 1B	2.14	0.05	$730,000	$38,000
40th Ave S – Option 2A	2.12	0.17	$109,000	$19,000
19th Ave – Option 1A	1.98	0.28	$1,763,000	$500,000
50th Ave – Option 1	1.93	0.07	$790,000	$53,000
18th Street Pedestrian Crossing – Option 1	1.83	0.37	$4,135,000	$1,511,000
19th Ave – Option 1B	1.82	0.31	$1,581,000	$482,000
10th Bridge – Option 1	1.76	0.19	$12,161,000	$2,276,000
18th Street Pedestrian Crossing – Option 3	1.76	0.40	$3,283,000	$1,299,000
15th Street – Option 1	1.74	0.09	$17,025,000	$1,514,000
7th Ave – Option 2	1.74	0.18	$426,000	$77,000
University Bridge – Option 1	1.72	0.16	$10,398,000	$1,675,000
18th Street Pedestrian Crossing – Option 2	1.69	0.41	$3,405,000	$1,386,000
40th Ave S – Option 1A	1.57	0.03	$219,000	$7,000
40th Ave and 93rd Street – Option 1	1.25	0.05	$486,000	$23,000
34th Street – Option 1	1.22	0.04	$1,642,000	$71,000
40th Ave and 93rd Street – Option 2	0.89	-0.02	$2,858,000	-$51,000

[7] North Dakota Department of Transportation. State Grants. Accessed: September 19, 2025.

[8] Ibid.

[9] Ibid.

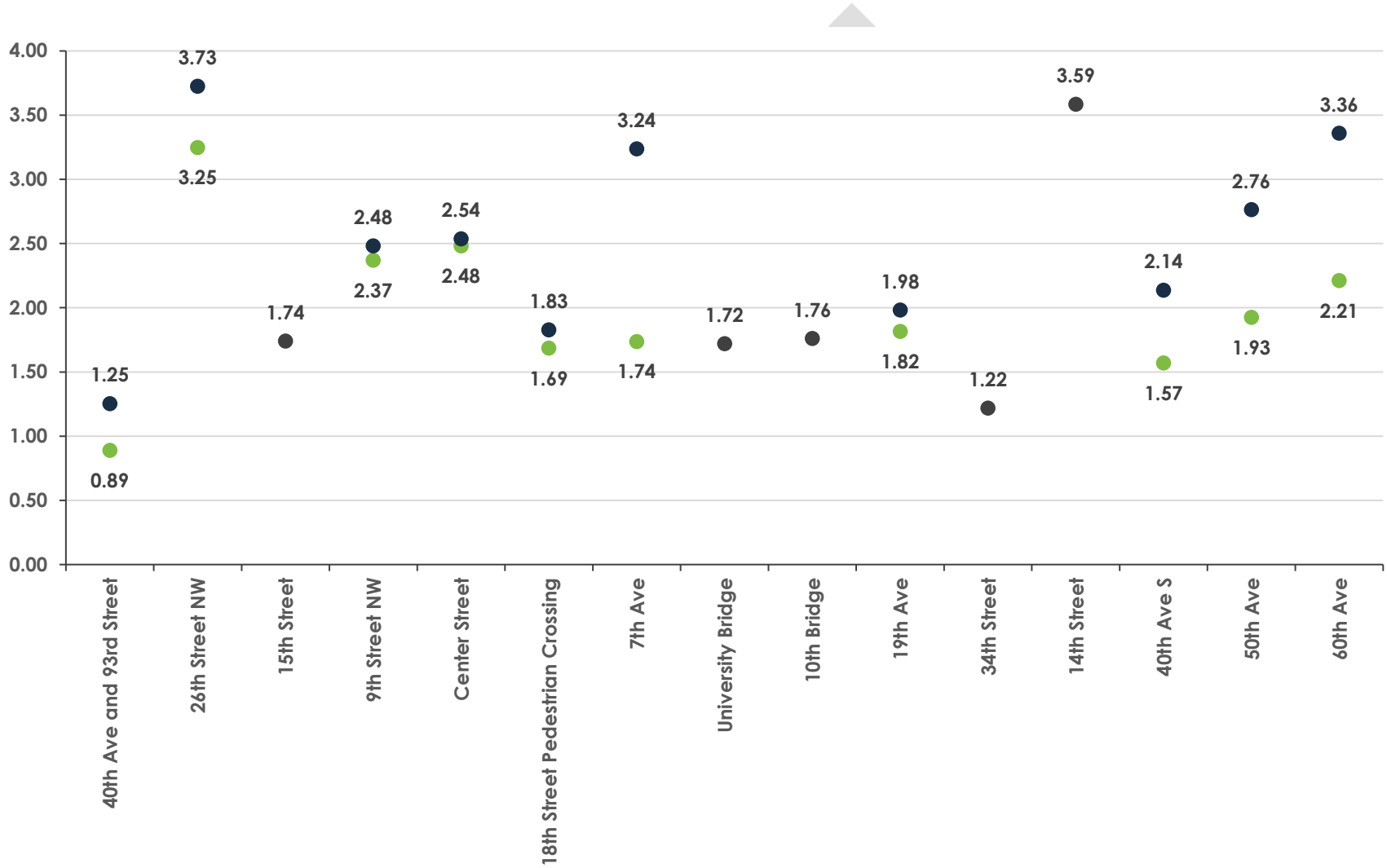

Figure 21-1. Multiple Account Evaluation Ranges by Location

Table 21-2: Multiple Account Evaluation Scoring Results

Alternative	Magnitude of Project Benefits	Magnitude of Project Costs	Emergency Service Access	Railroad Support	Train Traffic	Discretionary Funding Potential	Multimodal Mobility & Active Transportation	Community Impacts	School Bus Traffic	Total Score
	16.7%	12.6%	16.1%	7.1%	7.5%	10.1%	8.8%	13.3%	7.8%	
40th Ave N & 93rd St N – Option 1	1	5	0	5	0	1	0	0	0	1.3
40th Ave N & 93rd St N – Option 2	0	4	0	4	0	1	0	0	0	0.9
26th St NW – Option 1	4	1	5	4	5	2	0	3	5	3.2
26th St NW – Option 2	5	0	5	4	5	2	5	3	5	3.7
15th St Overpass – Option 1	4	1	5	2	0	0	0	0	0	1.7
9th St NW Underpass – Option 1	4	2	0	3	4	1	5	3	0	2.4
9th St NW Underpass – Option 2	5	1	0	4	4	1	5	3	0	2.5
Center St Underpass – Option 1	5	2	0	3	4	1	5	3	0	2.5
Center St Underpass – Option 2	5	1	0	4	4	1	5	3	0	2.5
18th St Pedestrian Crossing – Option 1	4	3	0	2	0	2	5	0	0	1.8
18th St Pedestrian Crossing – Option 2	4	3	0	0	0	2	5	0	0	1.7
18th St Pedestrian Crossing – Option 3	4	3	0	1	0	2	5	0	0	1.8
7th Ave – Option 1	4	1	5	4	3	2	3	5	0	3.2
7th Ave – Option 2	1	5	0	3	3	1	0	3	0	1.7
University Near 7th Underpass – Option 1	4	2	0	3	3	1	3	0	0	1.7
10th Near 7th Underpass – Option 1	5	1	0	3	3	1	3	0	0	1.8
19th Ave N – Option 1A	3	4	0	3	3	1	5	0	0	2.0
19th Ave N – Option 1B	2	4	0	3	3	1	5	0	0	1.8
34th St Underpass – Option 1	1	4	0	1	1	0	0	3	0	1.2
Main St & 14th St Grade Separation – Option 1	4	0	5	5	5	2	5	5	1	3.6
40th Ave S – Option 1A	0	5	0	3	1	0	3	0	5	1.6
40th Ave S – Option 1B	1	5	0	3	1	0	3	3	5	2.1
40th Ave S – Option 2A	1	5	0	5	1	1	0	3	5	2.1
50th Ave S – Option 1	1	5	0	3	2	1	3	3	0	1.9
50th Ave S – Option 2	2	2	5	4	2	1	5	3	0	2.8
60th Ave S – Option 1	1	5	0	3	2	0	3	3	5	2.2
60th Ave S – Option 2A	4	1	5	4	2	1	5	3	5	3.4
60th Ave S – Option 2B	3	2	5	3	2	1	5	3	5	3.2

22 Supplemental Tables

Idling Vehicle Emissions

Table 22-1. Idling Passenger Vehicle Emission Factors

Year	Idling Passenger Vehicle Emissions (grams/hr)			Source
	NO_X	$PM_{2.5}$	SO_2	
2024	0.456	0.018	0.026	Based on MOVES emission factors for personal vehicles in Cass County in North Dakota. Assuming idling vehicle emissions are equivalent to vehicles traveling 2.5 mph. MOVES model run in March 2025.
2025	0.399	0.018	0.025	
2026	0.342	0.017	0.025	
2027	0.285	0.017	0.024	
2028	0.228	0.016	0.023	
2029	0.170	0.016	0.023	
2030	0.113	0.015	0.022	
2031	0.104	0.015	0.022	
2032	0.095	0.015	0.022	
2033	0.085	0.015	0.022	
2034	0.076	0.014	0.021	
2035	0.067	0.014	0.021	
2036	0.058	0.014	0.021	
2037	0.048	0.014	0.021	
2038	0.039	0.014	0.020	
2039	0.030	0.013	0.020	
2040	0.020	0.013	0.020	
2041	0.020	0.013	0.020	
2042	0.019	0.013	0.020	
2043	0.018	0.013	0.020	
2044	0.017	0.013	0.020	
2045	0.017	0.013	0.020	
2046	0.016	0.013	0.020	
2047	0.015	0.013	0.020	
2048	0.014	0.013	0.020	
2049	0.013	0.013	0.020	
2050	0.013	0.013	0.020	
2051	0.012	0.013	0.020	

Table 22-2. Idling Truck Emission Factors

Year	Idling Truck Emission (grams/hr)			Source
	NO_X	$PM_{2.5}$	SO_2	
2024	64.716	0.000	0.000	Based on MOVES emission factors for trucks in Cass County in North Dakota. Assuming idling vehicle emissions are equivalent to vehicles traveling 2.5 mph. MOVES model run in March 2025.
2025	63.297	0.000	0.000	
2026	61.878	0.000	0.000	
2027	60.458	0.000	0.000	
2028	59.039	0.000	0.000	
2029	57.620	0.000	0.000	
2030	56.200	0.000	0.000	
2031	55.948	0.000	0.000	
2032	55.696	0.000	0.000	
2033	55.444	0.000	0.000	
2034	55.193	0.000	0.000	
2035	54.941	0.000	0.000	
2036	54.689	0.000	0.000	
2037	54.437	0.000	0.000	
2038	54.185	0.000	0.000	
2039	53.933	0.000	0.000	
2040	53.681	0.000	0.000	
2041	53.639	0.000	0.000	
2042	53.596	0.000	0.000	
2043	53.554	0.000	0.000	
2044	53.512	0.000	0.000	
2045	53.469	0.000	0.000	
2046	53.427	0.000	0.000	
2047	53.384	0.000	0.000	
2048	53.342	0.000	0.000	
2049	53.300	0.000	0.000	
2050	53.257	0.000	0.000	
2051	53.233	0.000	0.000	

Table 22-3. Idling Bus Emission Factors

Year	Idling Bus Emission (grams/hr)			Source
	NO_X	$PM_{2.5}$	SO_2	
2024	57.155	1.695	0.044	Based on MOVES emission factors for buses in Cass County in North Dakota. Assuming idling vehicle emissions are equivalent to vehicles traveling 2.5 mph. MOVES model run in March 2025.
2025	54.690	1.502	0.043	
2026	52.226	1.308	0.042	
2027	49.761	1.115	0.041	
2028	47.297	0.922	0.040	
2029	44.832	0.728	0.039	
2030	42.367	0.535	0.038	
2031	41.819	0.494	0.038	
2032	41.271	0.454	0.037	
2033	40.722	0.414	0.037	
2034	40.174	0.374	0.036	
2035	39.625	0.334	0.036	
2036	39.077	0.294	0.035	
2037	38.529	0.254	0.035	
2038	37.980	0.213	0.034	
2039	37.432	0.173	0.034	
2040	36.883	0.133	0.034	
2041	36.856	0.131	0.033	
2042	36.829	0.129	0.033	
2043	36.802	0.126	0.033	
2044	36.775	0.124	0.033	
2045	36.748	0.122	0.033	
2046	36.721	0.120	0.033	
2047	36.693	0.118	0.033	
2048	36.666	0.115	0.033	
2049	36.639	0.113	0.033	
2050	36.612	0.111	0.033	
2051	36.613	0.111	0.033	

Moving Vehicle Emission Factor

Table 22-4. Moving Passenger Vehicle Emission Factors

Year	Passenger Vehicle Emissions (grams/mile)			Source
	NO_X	$PM_{2.5}$	SO_2	
2024	0.094	0.002	0.002	Based on MOVES emission factors for personal vehicles in Cass County in North Dakota. MOVES model run in March 2025.
2025	0.083	0.002	0.002	
2026	0.071	0.001	0.002	
2027	0.060	0.001	0.002	
2028	0.049	0.001	0.002	
2029	0.038	0.001	0.002	
2030	0.026	0.001	0.002	
2031	0.024	0.001	0.002	
2032	0.022	0.001	0.002	
2033	0.020	0.001	0.002	
2034	0.018	0.001	0.002	
2035	0.016	0.001	0.002	
2036	0.013	0.001	0.002	
2037	0.011	0.001	0.001	
2038	0.009	0.001	0.001	
2039	0.007	0.001	0.001	
2040	0.005	0.001	0.001	
2041	0.005	0.001	0.001	
2042	0.004	0.001	0.001	
2043	0.004	0.001	0.001	
2044	0.004	0.001	0.001	
2045	0.004	0.001	0.001	
2046	0.004	0.001	0.001	
2047	0.003	0.001	0.001	
2048	0.003	0.001	0.001	
2049	0.003	0.001	0.001	
2050	0.003	0.001	0.001	
2051	0.003	0.001	0.001	

Table 22-5. Moving Truck Emission Factors

Year	Truck Emission (grams/mile)			Source
	NO_X	$PM_{2.5}$	SO_2	
2024	4.150	0.002	0.002	Based on MOVES emission factors for trucks in Cass County in North Dakota. MOVES model run in March 2025.
2025	4.001	0.002	0.002	
2026	3.852	0.001	0.002	
2027	3.703	0.001	0.002	
2028	3.554	0.001	0.002	
2029	3.405	0.001	0.002	
2030	3.256	0.001	0.002	
2031	3.230	0.001	0.002	
2032	3.205	0.001	0.002	
2033	3.180	0.001	0.002	
2034	3.155	0.001	0.002	
2035	3.130	0.001	0.002	
2036	3.105	0.001	0.002	
2037	3.080	0.001	0.001	
2038	3.055	0.001	0.001	
2039	3.030	0.001	0.001	
2040	3.005	0.001	0.001	
2041	3.000	0.001	0.001	
2042	2.996	0.001	0.001	
2043	2.992	0.001	0.001	
2044	2.988	0.001	0.001	
2045	2.983	0.001	0.001	
2046	2.979	0.001	0.001	
2047	2.975	0.001	0.001	
2048	2.971	0.001	0.001	
2049	2.966	0.001	0.001	
2050	2.962	0.001	0.001	
2051	2.960	0.001	0.001	

Table 22-6. Moving Bus Emission Factors

Year	Bus Emission (grams/mile)			Source
	NO_X	$PM_{2.5}$	SO_2	
2024	3.303	0.097	0.004	Based on MOVES emission factors for buses in Cass County in North Dakota. MOVES model run in March 2025.
2025	3.124	0.087	0.004	
2026	2.944	0.077	0.004	
2027	2.765	0.066	0.004	
2028	2.585	0.056	0.004	
2029	2.406	0.045	0.004	
2030	2.226	0.035	0.004	
2031	2.186	0.033	0.004	
2032	2.146	0.031	0.004	
2033	2.106	0.029	0.004	
2034	2.066	0.027	0.004	
2035	2.026	0.025	0.004	
2036	1.986	0.023	0.004	
2037	1.946	0.021	0.004	
2038	1.906	0.019	0.004	
2039	1.866	0.017	0.004	
2040	1.826	0.014	0.004	
2041	1.824	0.014	0.004	
2042	1.821	0.014	0.004	
2043	1.819	0.014	0.004	
2044	1.817	0.014	0.004	
2045	1.815	0.014	0.004	
2046	1.813	0.014	0.004	
2047	1.811	0.014	0.004	
2048	1.809	0.014	0.004	
2049	1.807	0.014	0.004	
2050	1.805	0.014	0.004	
2051	1.805	0.014	0.004	