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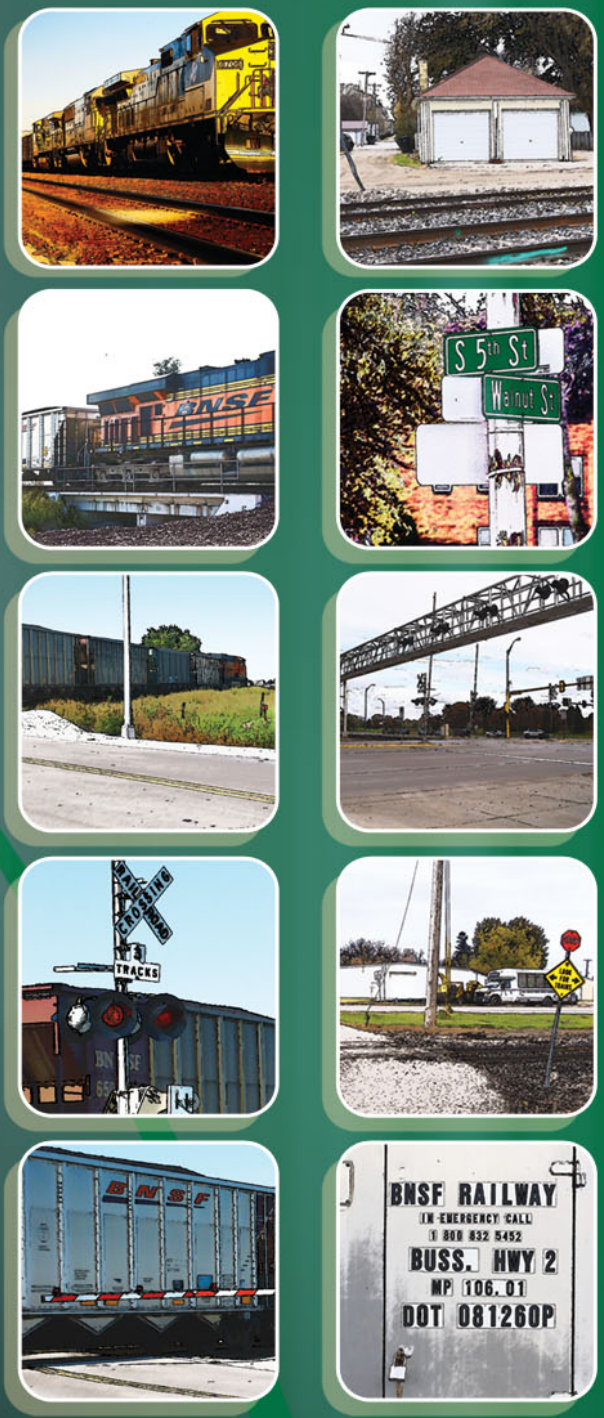
Grand Forks - East Grand Forks
Metropolitan Planning Organization

FINAL REPORT

May 24, 2016



OLSSON ASSOCIATES | SRF Consulting Group, Inc.

Table of Contents

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Executive Summary

As the City of Grand Forks has continued to expand to the west, traffic crossings through the Glasston Subdivision and rail traffic along the line have also increased. In addition, even more trains are expected in the near future as new industries and/or increased production from existing businesses utilize the line. This combination of factors has raised concerns about future traffic congestion, as well as safety in the area along the rail line. Of particular concern is the expected increase in unit trains travelling along the Glasston Subdivision, which cause longer queues and blockages at several crossings. Another concern is the potential closure of the BNSF Mill Spur and the impacts associated with shifting its current rail traffic to the Glasston Subdivision.

The purpose of this study is to document existing rail use along both the Glasston Subdivision and the Mill Spur line by users, as well as to determine options to mitigate traffic and safety impacts on or near the at-grade highway/rail crossings on the Glasston Subdivision from increases in unit trains, and rail traffic in general, in the future.

Project Background

In 2013, the GF-EGF MPO undertook a Freight Rail Access Study which examined available land parcels best suited to provide future industrial/commercial access to rail services from the BNSF Railway. Olsson Associates led the rail access study effort and identified approximately sixty (60) parcels suitable for rail access including several which could accommodate full unit train sidings. Three (3) of the parcels identified are currently being investigated for a potential unit grain unloading facility for the North Dakota State Mill. In addition, a unit train unloading facility is now under development along the Glasston Subdivision to serve the Northern Plains Nitrogen (NPN) plant. NPN officials have indicated that they expect construction on the fertilizer plant to begin sometime in 2018.

This study examines two (2) key alternatives: 1) Rail operations to continue on both the Mill Spur and Glasston Subdivision with identification of investments required along both corridors to improve safety and reduce at-grade crossing conflicts; and 2) Consolidation of the existing Mill Spur traffic onto the Glasston Subdivision to allow the Mill Spur south of Gateway Drive (US-2) to be abandoned and repurposed, and the addition of unit train movements to the Glasston Subdivision, with investment needs focused on Glasston Subdivision at-grade crossings.

Public Outreach

Olsson Associates initiated stakeholder outreach activities for the Glasston Subdivision Railroad Crossing Mitigation Study early in the project schedule through face-to-face interviews with selected key stakeholders as well as convening three (3) public meetings over the course of the project. These meetings occurred in July, September and November of 2015. Sixteen (16) stakeholder interviews were conducted with regional businesses, UND and others affected by rail crossings in the area to determine area crossing impacts on existing transportation operations. These stakeholders included businesses, UND, transit operations staff, the local Chamber of Commerce, and Grand Forks Foundation staff and others as noted.

The interviews were completed over a two (2) month period from July through August 2015. Most of the interviews were completed in-person or at participant offices in GF-EGF, while a few were completed via teleconference due to location or schedule issues.

Existing Street and Rail Networks

The BNSF Railway Company's Mill Spur has thirteen (13) public at-grade crossings from its junction with the BNSF Twin Cities Division--Grand Forks Subdivision main line to north of the North Dakota Mill in Grand Forks. Only the Gateway Drive (US-2) crossing has an active flashing light warning system with lights cantilevered over the traffic lanes. This highway/rail signal system is interconnected with the highway/highway traffic signal system for the Gateway Drive (US-2) intersection with North 5th Street and Mill Road via a simultaneous interconnect. The other twelve (12) public at-grade crossings have the required passive X-buck signing.

The Glasston Subdivision rail line has four (4) public at-grade crossings within this study area from its junction with the BNSF Twin Cities Division--Grand Forks Subdivision main line north to 27th Avenue North. All four (4) of these crossings have flashing light and gate active warning systems. Also the University Avenue and Gateway Drive (US-2) have simultaneous interconnects and 6th Avenue North has an advance interconnect with their adjacent highway/highway intersection's traffic signal systems.

Traffic Control Inventory

There are a total of twelve (12) at-grade public crossings on the Mill Spur that are signed with the passive X-buck signing, including Railroad Advance Warning signs and Railroad Crossing pavement markings where appropriate. This passive signing meets the requirements of the Manual on Uniform Traffic Control Devices (MUTCD). The Gateway Drive (US-2) at-grade public crossing on the Mill Spur has an active flashing light warning system with light cantilevered over the traffic lanes. This highway/rail signal system has a simultaneous interconnect with the highway/highway traffic signal system for the North 5th Street and Mill Road intersection with Gateway Drive (US-2).

The four (4) crossings on the Glasston Sub all have flashing light and gate active warning signal systems. University Avenue, 6th Avenue North, and Gateway Drive (US-2) all have lights cantilevered over the traffic lanes. 27th Avenue North has straight post flashing lights on the approach shoulders. There are three (3) crossings on the Glasston Sub that have an interconnection between the highway/highway traffic signal system and the highway/rail signal system--University Avenue and Gateway Drive (US-2) have simultaneous interconnects, while 6th Avenue North has an advance interconnect.

Railway Network

The BNSF Mill Spur is a 10 mph industrial track from the Twin Cities Division--Grand Forks Subdivision main line connection with the BNSF DeMers rail yard to just north of 27th Avenue North. There is an additional siding track from just north of 6th Avenue North to just south of Gateway Drive (US-2). There is a single line crossing Gateway Drive (US-2) and then there are multiple sets of track in the North Dakota State Mill facility. While this line previously had a northern connection with the Glasston Subdivision, it has been dead-ended just north of 27th Avenue North for a considerable length of time. As this is a dead-end industrial line all northbound manifest rail traffic from the DeMers rail yard will return back south to the DeMers rail yard

The BNSF Glasston Subdivision is a 25 mph branch rail line from the Twin Cities Division--Grand Forks Subdivision main line connection with the BNSF DeMers rail yard to northern terminals at Hannah, Walhalla, Glasston and Joliette, North Dakota. The connection with the Grand Forks Subdivision is via one (1) leg of a wye connection between the two (2) lines. The northwest leg of the wye has been removed and the subsequent development in this area and the skewed at-grade crossing that would be required to cross 42nd Street has greatly complicated any possibility of it being re-built. This leaves only the northeast leg of the wye, which limits rail freight movements from the DeMers rail yard to the north, and the return from the north to the DeMers rail yard. There are no connections to other through rail lines, so each unit or manifest train that heads north must return south.

Current/Future Travel Demand and Traffic Impacts

Glasston Subdivision

The Glasston Sub currently averages six (6) trains/day at a maximum speed of 25 mph. This includes a weekly one hundred twenty-three (123) car unit coal train to the American Crystal Sugar Company's Ardoch coal handling facility. It also includes monthly one hundred ten (110) unit grain train shipments from Gavilon Grain. The rest of the train traffic are manifest train loads handled through the BNSF DeMers rail yard for delivery and receipt of rail freight for the multiple customers on this rail line. This rail line has northern termini's at Joliette, Glasston, Walhalla, and Hannah, North Dakota with no connections to other through rail lines, therefore every train that heads north out of the DeMers rail yard will return to the DeMers rail yard

There are four (4) at-grade highway/rail crossings on the Glasston Sub within this study's area. All crossings have state of the art flashing light and gate signal systems. All except the northern crossing, 27th Avenue North are within a locomotive-horn Quiet Zone. The 27th Avenue North crossing serves industrial and agricultural land uses and has the lowest ADT of the four crossings. Gateway Drive (US-2) is the major east-west arterial serving Grand Forks is on the National Highway System and has an interchange with I-29 just to the west of the Glasston Sub highway/rail at-grade crossing. University Avenue is a minor arterial and 6th Avenue North is a collector, both of these two (2) routes connect North 42nd Street and developments to the west and to the east through the University of North Dakota. These two (2) crossings, in addition to the relatively high ADTs, have a significant number of transit, bicycle and pedestrian traffic.

Mill Spur

The Mill Spur serves the North Dakota State Mill and seven (7) other rail dependent businesses, all located to the north of Gateway Drive (US-2). This rail spur provides manifest rail service through the BNSF DeMers rail yard with two (2) to four (4) trains/day, averaging three (3) trains/day at a maximum speed of 10 mph.

Of the total thirteen (13) at-grade highway/rail crossings on the Mill Spur, all have passive X-buck warning systems with the exception of Gateway Drive (US-2) that has a flashing light warning system. The University Avenue crossing has the most significant number of transit vehicle crossings with fifty-one (51) per day. While there are no pedestrian counts available, it is a major safety and neighborhood connectivity issue due to the rail lines bisecting the Near North Neighborhood. This rail line has been evaluated for a locomotive-horn Quiet Zone with a significant estimate of costs to implement and currently no action has been taken to pursue the Quiet Zone. The ADTs on these thirteen (13) at-grade crossings vary from a high of twenty-one thousand seven hundred thirty-five (21,735) on Gateway Drive (US-2) to a low of fifty (50) on the public alley between University Avenue and 4th Avenue North. The total ADTs of all the crossings south of Gateway Drive (US-2) is twelve thousand seven hundred eighty-five (12,785) daily vehicle crossings of the Mill Spur, representing the significance of the connectivity and traffic circulation issues for the Near North Neighborhood.

Future Estimated Travel Demand

Glasston Subdivision

The table below lists both the current and projected future rail and vehicle traffic that will be crossing the four (4) at-grade highway/rail crossings. The projected 2040 traffic is from the traffic model for the 2040 Long Range Transportation Plan. The future trains/day is based on projected rail traffic for the Northern Plains Nitrogen (NPN) plant, the projected rail traffic for a North Dakota State Mill (NDSM) unit grain facility and the shift of rail traffic off the Mill Spur to the Glasston Subdivision. The rail traffic for NPN is projected to be one (1) to two (2) unit trains/week and two (2) manifest trains/day for an average of two and a half (2.5) trains/day. The rail traffic projections for both NDSM unit grain facility and the shift of the Mill Spur rail traffic will be one (1) to two (2) unit trains/week and two (2) to four(4) manifest trains/day for an average of three and a half (3.5) trains/day. Adding these rail traffic projections to the current rail traffic provides the future rail traffic of twelve (12) trains/day.

The Glasston Sub does not have connections with other rail lines, so all train traffic headed north must return via this same rail line, therefore each rail freight delivery accounts for two (2) crossings of each of the four (4) at- grade highway/rail crossings. The projected rail traffic may be reduced if the existing manifest rail traffic can accommodate the projected manifest rail traffic for both NPN and NDSM. Further, the unit train traffic for both NPN and NDSM may initially be fewer than used in the future projected train traffic. Based on the two above factors the projected volume of twelve (12) trains/day is on the high end of the potential rail traffic and was used to provide the most conservative estimate of potential impacts of the future rail traffic to the highway/rail crossings on the Glasston Sub. This conservative estimate of future train traffic also addresses the potential of future rail freight customers on the Glasston Sub.

Route	2013 ADT	2015 Trains/day	2015 Exposure	2040 Projected Traffic	Future Trains/day	Future Exposure
University Ave	7,800	6	46,800	14,500	12	174,000
6th Ave N	5,240	6	31,440	6,500	12	78,000
Gateway Drive	19,555	6	117,330	24,500	12	294,000
27th Ave N	1,200	6	7,200	1,000	12	12,000

Table A: Highway/Train Exposure for Glasston Subdivision

Gateway Drive (US-2) is on the National Highway System (NHS) and from I-29 to the Grand Forks AFB it is on the Strategic Highway Network (STRAHNET).

"Revised 2nd Edition, August 2007, Railroad-Highway Grade Crossing Handbook, USDT, FHWA", states that the project be economically justified based on fully allocated life-cycle costs and one (1) or more of twelve (12) conditions exist for the consideration of grade separating the rail line and the highway route. The conditions applicable to the Gateway Drive (US-2) crossing of the Glasston Sub are listed below:

- Gateway (US-2) is on the NHS
- The crossing exposure is less than the suggested Urban Area cut-off of 500,000, but greater than the rural area cut-off of 125,000
- Vehicle delay per day above 30 hours would suggest the consideration of a grade separation
- Twelve (12) trains/day at 25 mph and 1 mile in length would block the crossing for 2.4 minutes per train and with 30 seconds for signal activation, would lead to 34.8 minutes of crossing blockage per day. If you take the average hourly traffic of 1020, that would lead to 2.9/60 x 1020 = 50 vehicles delayed per train crossing, which would lead to 34.8 X 50/60 = 29 vehicle hours of delay

Mill Spur

The table below depicts the current and projected future rail and vehicle traffic that will be crossing the three (3) at-grade highway/rail crossings which are functionally classified other than local access streets on the Mill Spur. The future scenario of the Mill Spur remaining in service is based on the unit grain unloading facility not being built on the Glasston Sub. While there will be anticipated increases in grain received at the North Dakota State Mill (NDSM), it will not be as significant as with a unit grain unloading facility. Plans for improvements on the NDSM property are moving forward, and this improvement will add storage for an additional fifty-eight (58) rail cars and three thousand eight hundred (3800) feet of track. With additional rail car storage at the North Dakota State Mill there will be the opportunity for an increase in grain received via the Mill Spur rail line. The future trains/day is based on the existing highest train traffic of four (4) trains/day. The projected 2040 traffic is from the traffic model for the *2040 Long Range Transportation Plan*. The local functional classification streets do not have future projected traffic volumes and are not included in the table below.

Route	2013 ADT	2015 Trains/day	2015 Exposure	2040 Projected Traffic	Future Trains/day	Future Exposure
University Ave	4,920	3	14,760	5,500	4	22,000
8th Ave N	2,400	3	7,200	3,500	4	14,000
Gateway Drive	21,735	3	65,205	31,550	4	126,200

Table B: Highway/Train Exposure for the Mill Spur

Impacts on Quiet Zone Designations

Three (3) crossings along the Glasston Subdivision are part of a quiet zone (QZ), which means that trains are not required to sound the horn when approaching the crossing. The 2011 QZ Alternate Safety Measure (ASM) approval of this three (3) crossing QZ was based on three (3) trains/day. The current train traffic on the Glasston is six (6) trains/day. The maximum train traffic that can be expected from the Northern Plains Nitrogen rail traffic, the North Dakota State Mill unit unloading facility and the shift of all current Mill Spur rail traffic to the Glasston Spur would amount to a doubling of the current six (6) trains/day to twelve (12) trains/day. The ADTs used for the three (3) routes were the highest ADTs reported for these crossings.

The effectiveness rates for the current ASM safety measures are as approved by the Federal Railroad Administration (FRA). The table below depicts the Quiet Zone Risk index (QZRI) for the QZ of twelve thousand eight hundred ten (12,810), based on the projected number in the future of twelve (12) trains/day. The current National Significant Risk Threshold (NSRT) is fourteen thousand three hundred forty-seven (14,347). Therefore, it can be concluded that the Glasston Subdivision QZ's QZRI would still fall below the current NSRT despite the projected increase of future train traffic to twelve (12) trains/day, so it will continue as a viable QZ. The NSRT over the past ten (10) years has varied from a low of 13,722 to a high of 19,047. Based on the lowest NSRT the highway traffic growth that could be accommodated on the Glasston Sub Quiet Zone crossings would be 7.1%, and based on the highest NSRT the traffic growth that could be accommodated would be 48.7%.

Route	ADT	Trains/Day	Risk Index Without Horns	ASM Effective Rate	QZRI with ASM's
University Ave.	8075	12	22770	0.4	13362
6th Ave. N	5240	12	20568	0.47	10901
Gateway Drive	21045	12	34551	0.59	14166
				Average	**12810**

Table C: Glasston Sub Quiet Zone Analysis

A Quiet Zone Feasibility Study was completed on the Mill Spur and the cost to implement a quiet zone at this location was deemed prohibitive at the time of the study. The onboard locomotive-horns are currently activated in advance of approaching each of the thirteen (13) at-grade crossings along the Mill Spur.

Summary of Recommended Railroad Crossing Improvements from Previous Studies

As part of the Glasston Subdivision Railroad Crossing Mitigation Study, Olsson reviewed a number of previous regional rail and transportation studies completed for the Grand Forks-East Grand Forks MPO that include recommended improvements at railroad crossings on both the Glasston Subdivision and the Mill Spur within the City of Grand Forks. The reviewed studies include:

- Grand Forks Mill Spur Feasibility Study (2010)
- Quiet Zone Assessment (2010)
- Grand Forks – East Grand Forks Freight Rail Access Study (2013)
- 2040 Long Range Transportation Plan (2013)

Street and Rail Network Improvement Concepts

At-Grade Rail Crossing at Washington Street (US-81 Business)

The proposed unit grain unloading facility off the Glasston Subdivision will require a rail connection to the existing Mill Spur tracks located North of Gateway Drive (US-2). This rail connection will cross Washington Street (US-81 Business) via an at-grade crossing. The location for this crossing has not yet been determined, as it is dependent on the future site for the unit unloading facility. It is highly likely, however, that the unit unloading facility will most likely be located between Bacon Road on the south and Mill Road on the north. The cross section for Washington Street (US-81 Business) in this corridor is two (2) twelve (12) foot traffic lanes with eight (8) foot shoulders, for a total paved width of forty (40) feet.

This industrial rail track will be operated at a typical speed of 10 mph. Since there will not be high speed rail traffic, the train detection circuitry will not require Constant Warning Time (CWT) train detection. The crossing surface will require a high type, preferably a concrete crossing surface for the entire width of the pavement including shoulders. This crossing will be through a light industrial/business area and the use of on-board locomotive horns will have little impact on residential areas. For this reason, there are no additional QZ safety measures suggested, such as approach medians.

Future Use for an Abandoned Mill Spur

If the North Dakota State Mill (NDSM) builds a grain unit unloading facility with rail access from the Glasston Subdivision, there will not be a rail freight need for the Mill Spur tracks from the junction with the BNSF main line just south of the 2nd Avenue crossing north to and including the Gateway Drive (US-2) crossing. All entities in addition to the NDSM that currently receive rail freight off the Mill Spur will have their rail freight service switched to the Glasston Subdivision.

Taking this rail corridor out of rail operations from 2nd Avenue to Gateway Drive (US-2) provides the opportunity for alternate uses of this railroad right-of-way (ROW) for a length of approximately one (1) mile. This possibility has been discussed with Near North Neighborhood representatives and also has been an item of discussion at the first two (2) public meetings on this Glasston Subdivision Mitigation Study. It is understandable that the neighborhood and public are very supportive of alternate uses of this railroad corridor. The rail switching at the Mill may require train movements across Gateway Drive (US-2) and the crossing may have to remain in place.

Recommended Improvement Options

Option 1 (Figure ES-1) — Recommended Improvements

This option is based on the current and future Mill Spur rail freight traffic moving to the Glasston Sub. This option allows for the abandonment of the Mill Spur from its southern main line connection north through the Gateway Drive (US-2) crossing. To accommodate the increased train traffic on the Glasston Sub there is a proposed grade separation project at the Gateway Drive (US-2) crossing with the Glasston Sub just to the east of North 42nd Street. This concept lowers the Gateway Drive (US-2)/North 42nd Street intersection, and bridges the Glasston Sub over Gateway Drive (US-2) to provide a railroad over grade separation. The detailed estimate of costs for this grade separation concept is included in **Appendix B**. To enhance the safety of the significant number pedestrian/bicycle rail crossings traffic to and from the University of North Dakota, fencing is proposed from south of University Avenue to north of 6th Avenue North, along the railroad right-of-way line on both sides of the rail corridor. This fencing would tie into the proposed pedestrian fences at the pedestrian/bicycle sidewalk crossings.

Option 2 (Figure ES-2) — Recommended Improvements

This option is based on the Mill Spur current and future rail traffic remaining on the Mill Spur. The rail traffic on the Glasston Sub will increase but not to the level that requires consideration of a grade separation at the Gateway Drive (US-2) crossing. The improvements listed in the Long Range Transportation Plan for the Mill Spur are the major recommended rail corridor improvements. The fencing mentioned in **Option 1** is also included in this **Option 2** to enhance the safety pedestrian/bicycle rail crossings. While there currently have been excessive crossing delays experienced of up to thirty (30) minutes at the Gateway Drive (US-2) crossing with the Glasston Sub, a future grade separation may need to be investigated if delays of this magnitude are still experienced.

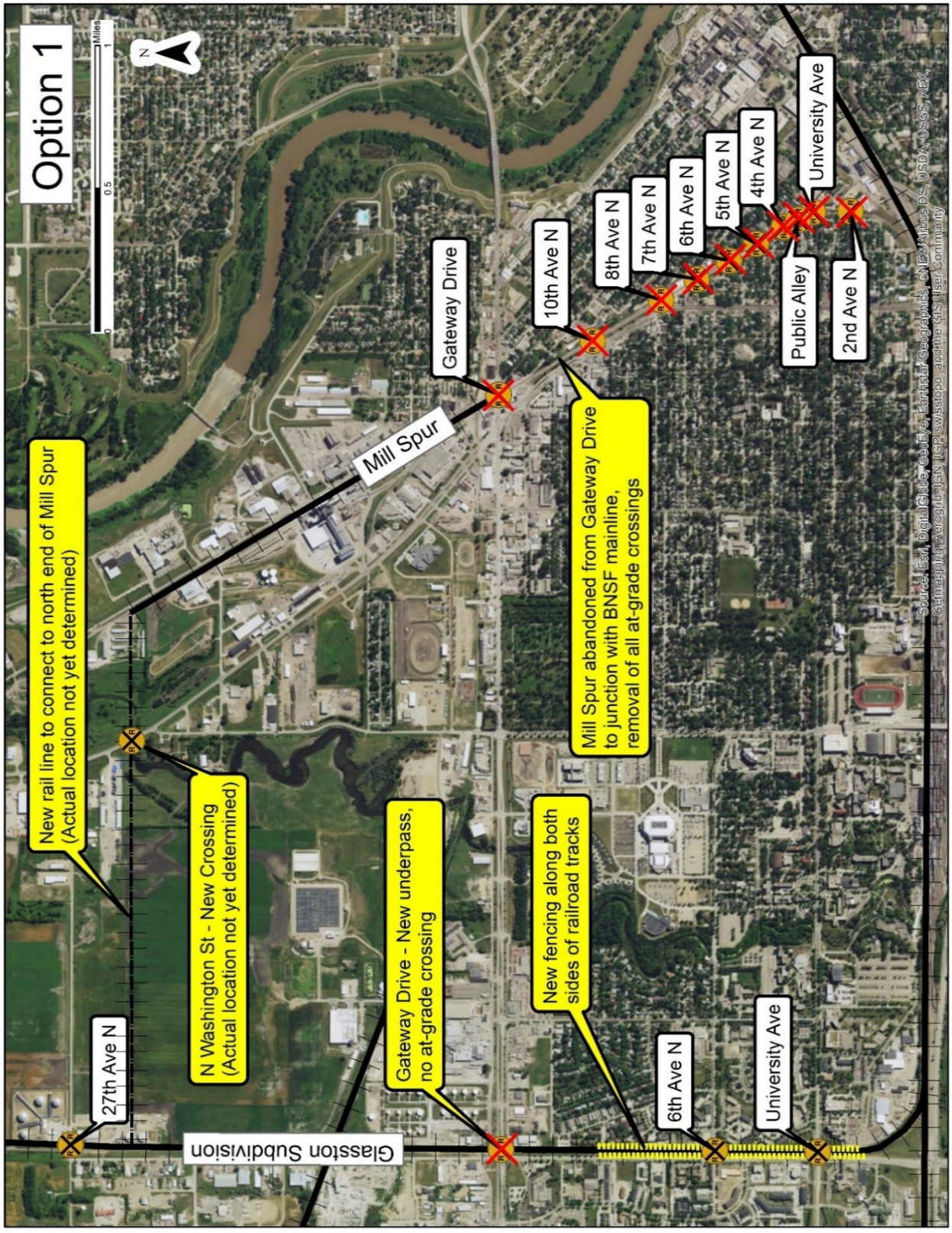

Figure ES-1: Option 1

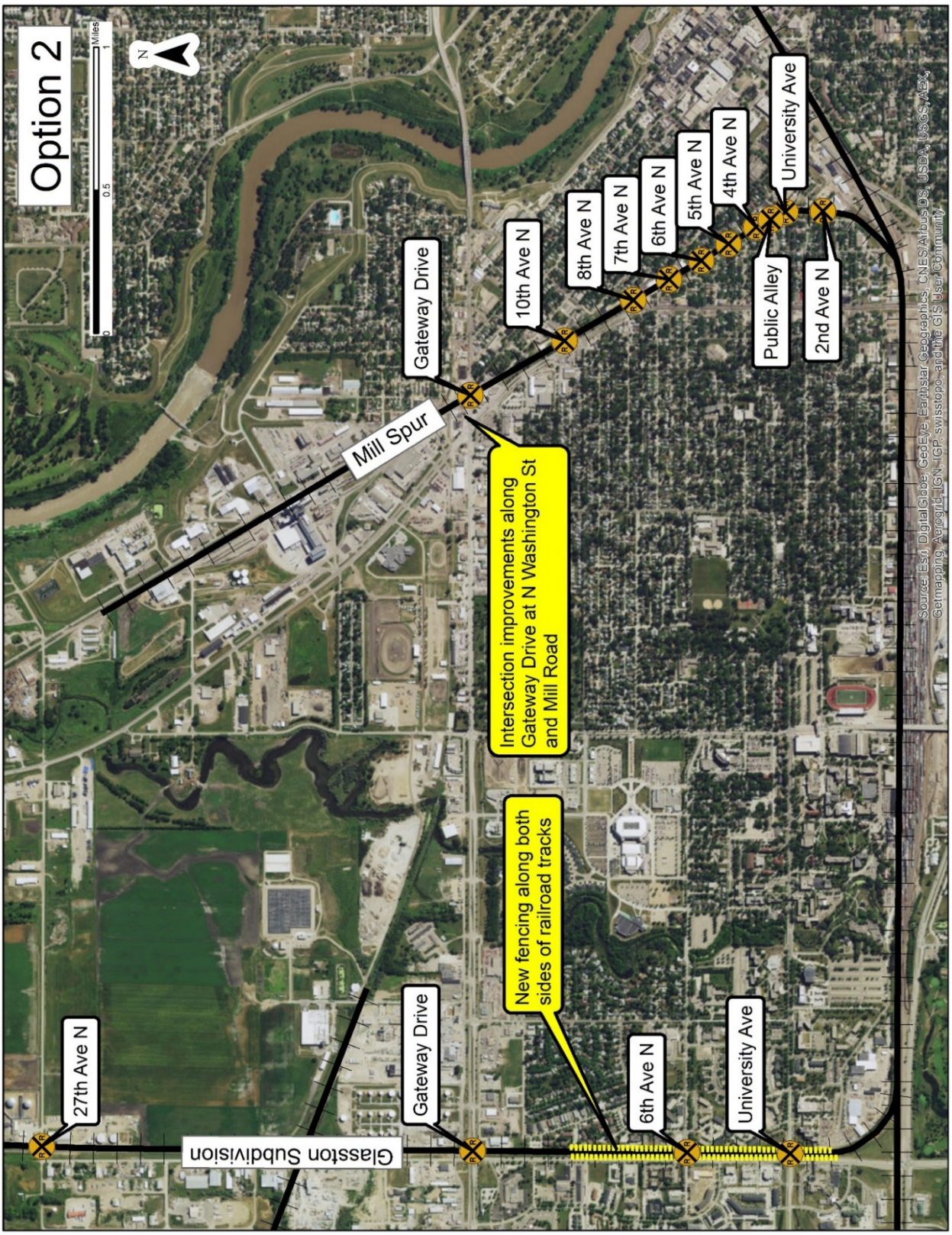

Figure ES-2: Option 2

Consideration for Emergency Services

The Grand Forks Public Safety Answering Point (PSAP) is the single point for 911 calls requesting Fire, Police, and Medical emergency services. The emergency service personnel answering these requests require expedited access across the numerous rail corridors in the metropolitan area on a daily basis. Grand Forks Traffic Engineering Staff have developed a solution to provide real time information on crossings being blocked by train traffic. A real time map, through CENTRACS, will be furnished to the PSAP center for their use. When a train is at a crossing the RXR icon will flash, there is also a verbal announcement and a text message. This map will also give the PSAP center staff the ability to see city-wide when emergency vehicles are preempting the signals ,signal power outages, signals in flash mode, etc.

This new development takes advantage of existing software, hardware and the city's intranet system. It answers the need for a train detection and information system that is a planned project in the current GF-EGF Regional ITS Architecture. They have had numerous requests to make this information available to the public and they are in the process of working out the details to share this information with the public. They are looking at text messaging and real time projection of the CENTRACS map via the city website.

Benefit/Cost Analysis

The following summarizes the results of the Benefit/Cost Analysis (BCA) developed for two alternative scenarios as described below. This analysis follows directives given by the Federal Railroad Administration (FRA) and U.S. Department of Transportation (USDOT) in required grant application instructions for several types of grant funding programs. Using a No-Build scenario as a baseline, the following information was calculated based on two (2) options for the Glasston Subdivision corridor. The analysis is done by comparing each investment option against the Baseline and discounting the costs and social benefits at a 3% and 7% discount rate. The timeframe for a BCA must include 20 years of activity post-investment. For this analysis, the timeline starts in 2015 moving forward 20 years past the completion of the last investment in each option.

Assumed Baseline: The Baseline for the BCA is a No Build Option

For this analysis two investment options have been chosen:

Option 1: Consolidation of the two rail lines on to Glasston Subdivision

This option will allow the Mill Spur south of Gateway Drive (US-2) to be abandoned and repurposed, with investment needs focused on the Glasston Subdivision proposed grade separation at North 42nd Street and Gateway Drive (US-2), and the fencing along BNSF row from south of North 6th Street to north of University Avenue. This scenario assumes that the NSDM unit train facility opens in 2018 as well as the NPN fertilizer facility also opens that same year. This being the case, an additional at-grade crossing will need to be built on Washington Street (US-81 Business) where the extended Mill Spur intersects with Washington Street (US-81 Business). (Note: The cost of this additional at-grade crossing is not in this BCA.)

This scenario will enable the removal of the track through the current at-grade crossing at Gateway Drive (US-2) and the removal of ten (10) at-grade crossings on the Mill Spur. The removal of the ten (10) at-grade crossings will improve east-west vehicle mobility on a 24/7/365 basis through the residential area that is currently bisected by the Mill Spur. This scenario assumes the switching of rail traffic at the Mill will not require the track to remain across Gateway Drive (US-2). The three crossings that will remain on the Mill Spur will be State Mill Road, Bacon Road, and 27th Avenue North.

IMPROVEMENTS SUMMARY TABLE OPTION 1

Crossing	Recommended Improvements	Estimated Cost (Year)	2018
Gateway Drive (US-2) & North 42nd Street	Underpass	$28 Million (2015)	$33 Million (4%/ yr. escalation)
Glasston Subdivision	Fencing on rail line south of University to north of 6th Avenue (½ mile in total)		$150,000 (2016)

Table D: Option 1 Improvements Summary

Option 2: Both the Glasston Subdivision and Mill Spur Rail Lines Remain Open

A grade separation will not be built at Gateway Drive (US-2) on the Glasston Subdivision, although reconstruction of the roadway and intersections will be completed to improve the roadway for vehicle mobility. Improvements included in this scenario are:

IMPROVEMENTS SUMMARY TABLE OPTION 2			
Crossing	**Recommended Improvements**	**Estimated Cost (Year)**	
Glasston Subdivision	Fencing on rail line south of University to north of 6th Avenue (½ mile in total)		$150,000 (2016)
Gateway Drive (US-2) (Illustrative Project) between Washington Street (US-81 Business) and Mill Road	Reconstruct roadway and intersections to accommodate additional turn lanes, remove/reduce skews at intersections and replace traffic signals	$25 million (2013)	$40 million (2025) (4% annual inflation) Build in 2025/2026

Table E: Option 2 Improvements Summary

Summary of BCA Findings

The Benefit/Cost Analysis (BCA) calculates the benefits and costs of implementing the project against the Base Case or No Build Alternative. The analysis estimates a project's discounted costs versus its discounted societal benefits against the current state (Base Case/ No Build Alternative). The benefits from a project are estimates of the monetized societal benefits achieved from implementing the project.

The monetized value of the societal benefits achieved from closing/reopening at-grade crossings include: livability, economic competiveness, environmental sustainability and safety.

The BCA only achieves a benefit to cost ratio exceeding 1.0 in **Option 1** at a 3% discount rate. In **Option 1** at 7% discount and in **Option 2** at both 3% and 7% the recommended improvements are larger than the discounted benefits. In the case of **Option 1**, at 3% discount the monetized benefits are slightly above the costs (Benefits being 120% of the costs). For **Option 2**, there are no positive societal benefits to offset the costs since the option assumes no crossings will be closed. Thus, there is no reduction in potential fatalities at the crossings, nor any reduction in idling time and the associated benefits of these anticipated events. Reduction in idling time generates three societal benefits: reduction of fuel usage, which also produces reduction in CO_2 and time saved by the driver of the vehicle by not having to stop.

Summary

The study has shown that the rail traffic on the Glasston Sub could double to twelve (12) trains/day if both unit unloading facilities are built and all current Mill Spur rail freight traffic is transferred to the Glasston Sub. The improvement concepts evaluated to mitigate traffic safety impacts are: the grade separation of the Gateway Drive (US-2)/Glasston Sub crossing near the North 42nd Street intersection, fencing paralleling the Glasston Sub from north of 6th Avenue North to south of University Avenue. There is a new system being implemented by the City of Grand Forks that recognizes highway/rail crossings blocked by train traffic and will be used to enhance the routing of emergency services.

1. Introduction

The Grand Forks – East Grand Forks Metropolitan Planning Organization (GF-EGF MPO) retained the services of Olsson Associates to conduct a study of railroad crossings along the BNSF Glasston Subdivision in Grand Forks. As the City has continued to expand to the west, traffic crossing the Glasston Subdivision has also increased. In addition, even more trains are expected in the near future as new industries and/or increased production from existing businesses utilize the line. This combination has raised concerns about future traffic congestion, as well as safety in the area along the rail line. Of particular concern is the expected increase in unit trains travelling along the Glasston Subdivision, which cause longer blockages at crossings. Another concern is the potential closure of the BNSF Mill Spur and shifting of its current rail traffic to the Glasston Subdivision.

The purpose of this study is to document existing rail use along both the Glasston Subdivision and the Mill Spur line by users, as well as to determine options to mitigate traffic and safety impacts on or near the at-grade highway/rail crossings on the Glasston Subdivision from increases in unit trains, and rail traffic in general, in the future.

2. Background

Railroads have had a vital impact on the Grand Forks Region since 1880, when rails first connected Grand Forks to the rest of the nation and the world. Today many businesses in Grand Forks continue to rely on rail services to move products important to regional industries. Grand Forks is built around the Grand Forks Subdivision of the BNSF Great Northern Corridor and intersected by the Hillsborough Subdivision running south to Fargo, and the Glasston Subdivision running north to Grafton and Drayton. In addition to the BNSF mainlines running through the area, an approximately 1.5 mile rail spur, called the Mill Spur, operates from the Grand Forks Subdivision near Washington Street (US-81 Business) and makes its way up along the west side of the Near North Neighborhood to the North Dakota Mill. While only a few trains traverse the Mill Spur each day at low speeds during daylight hours, the ten (10) at-grade street crossings, raise safety concerns. Only the Gateway Drive (US-2) crossing has an active flashing light warning system and all other crossings on this line have passive signing warning systems. While reported crash incidents have been minor and few, the presence of large train cars moving through a residential neighborhood presents a constant hazard. In addition, the North Dakota Mill has had a long record of growth operating as a value-added milling facility for wheat produced in North Dakota since 1922.

In 2013, the GF-EGF MPO undertook a *Freight Rail Access Study* which examined available land parcels best suited to provide future industrial/commercial access to rail services from the BNSF Railway. Olsson Associates led the rail access study effort and identified approximately 60 parcels suitable for rail access including several which could accommodate full unit train sidings. Three of the parcels identified are currently being investigated for a potential unit grain unloading facility for the North Dakota State Mill.

A unit train unloading facility is now under development along the Glasston Subdivision to serve the Northern Plains Nitrogen (NPN) plant. The total funding for this facility has yet to be finalized; however, NPN officials have indicated that they expect construction on the fertilizer plant to begin sometime in 2018.

This study examines two key alternatives: 1) Rail operations to continue on both the Mill Spur and Glasston Subdivision with identification of investments required along both corridors to improve safety and reduce at-grade crossing conflicts; and 2) Consolidation of the existing Mill Spur traffic onto the Glasston Subdivision to allow the Mill Spur south of Gateway Drive (US-2) to be abandoned and repurposed, and the addition of unit

train movements to the Glasston Subdivision, with investment needs focused on Glasston Subdivision at-grade crossings.

Data collected from traffic signals adjacent to the Gateway Drive (US 2) at-grade crossing indicate that individual unit trains on the Glasston Subdivision block the Gateway Drive (US-2) at-grade crossing for approximately five minutes on average per train. Information obtained from BNSF in 2013 for the Rail Access Study indicated that the Glasston Subdivision in Grand Forks currently experiences five trains per day on the line, resulting in nearly 30 minutes of closure per day at this at-grade crossing. Once the fertilizer plant opens (scheduled for 2018), it is anticipated that train traffic on the Glasston Subdivision will increase. The Glasston Subdivision crosses Gateway Drive (US-2) at-grade, a National Highway System Route and is identified in the North Dakota State Freight Plan as a Level 1 Strategic Highway. The Glasston Subdivision also crosses several other major thoroughfares at-grade in Grand Forks, including University Avenue, 6th Avenue North and 27th Avenue North.

3. Stakeholder Outreach

The goal of public involvement is to provide the community information about the study process and give stakeholders an opportunity to provide input to the study effort. For transportation planning activities such as this railroad crossing mitigation study, engaging the public, as well as private sector stakeholders is critical, and often requires non-traditional approaches to get stakeholder input.

Olsson Associates initiated stakeholder outreach activities for the Glasston Subdivision Railroad Crossing Mitigation Study early in the project schedule through face-to-face interviews with selected key stakeholders as well as convening three (3) public meetings over the course of the project. These meetings occurred in July, September and November of 2015. Eight (8) stakeholder interviews were conducted with regional businesses, UND and others affected by rail crossings in the area to determine area crossing impacts on existing transportation operations. These stakeholders included businesses, UND, transit operations staff, the local Chamber of Commerce, Grand Forks Foundation staff, and others as noted. Interview guides were developed in advance of all interviews and stakeholder responses were noted by interviewers. These responses are summarized within this document in more detail and collectively done to protect the anonymity of those who agreed to be interviewed by Olsson staff.

A total of nine (9) interviews were completed, with the majority taking place over a two month period from July through August 2015. Most of the interviews were completed in-person, at participant offices in GF-EGF, while a few were completed via teleconference due to location or schedule issues. Additionally, three (3) public meetings were held, taking place in July, September, and November of 2015.

3.1 Public Institutions/Agencies/Community Groups

The following is a list of the interviews completed with public institutions, agencies and nonprofits/community groups:

- University of North Dakota (UND), Facilities Management
- University of North Dakota (UND), Public Safety
- Grand Forks-East Grand Forks Chamber of Commerce
- Grand Forks-East Grand Forks Community Foundation

University of North Dakota (UND)

UND Facilities Management and Public Safety staff met with project consultants to discuss the Glasston Subdivision Railroad Crossings Mitigation Study in July 2015. UND officials said that much of their concerns focused upon crossing issues on the west side of the City, where crossing delays have a larger impact on fire and police calls (police go to fire calls also). The question was asked by UND officials about whether BNSF would notify emergency services if a crossing is blocked more than 10 minutes if the source of the blockage is something other than switching (an action that is required by state law). UND officials said that the only alternative is the Columbia Bypass in that case, which is not sufficient.

Other pedestrian concerns on the west side of the City were also discussed as they related to the Glasston Subdivision. One specific issue is that pedestrians are forced to take the skywalk over 42nd Street to move from Clifford to Ryan Hall if there are trains blocking intersections. In addition, new housing has been built west of 42nd Street and there is a need to build another walkway with outside access without having to go through buildings. UND officials said that they have personally observed students crawling over trains during switching and slow-moving train periods, which is an extreme and deadly safety hazard. To reduce this risk, UND has requested fencing for the affected areas.

UND Pedestrian Skywalk over 42nd Street, Grand Forks, ND

An additional concern raised by UND staff is that the UND Aviation School trains staff and pilots for major airlines, example being Air China. These students use the crossing between Ryan and Clifford Halls, and the concern UND officials have is if train traffic continues to increase on the Glasston Subdivision, this activity could cause crossing problems for these students.

Other concerns UND officials cited as part of this discussion:

- Longest waits appear to be at the intersection of DeMers and 42nd Street (observed but not timed)
- The Tech Accelerator (Laboratory for Life Sciences and Advance Technologies) is located at this intersection
- There is a Biological Safety Level 3 Lab located nearby which could create hazmat response issues
- 42nd Street overpass project has been identified as a needed project by the MPO
- Would like advance notice of train traffic (7:30 am/4:30-5:30 pm ties up traffic at busiest times)
- Emergency vehicles/mobile CAD—could train sits be linked in to show train blockage and alternate routes (option on traffic light override)
- Possibility of connected vehicles

Follow up conversations were held with staff from the City of Grand Forks Police and Fire departments. They deal with the issue of blocked crossings on a daily basis and have set alternate routes to avoid blocked crossings. They realize this is an issue and that increases in train traffic will potentially increase emergency service response times. The proposed grade separation at 42nd Street and DeMers will be a large benefit for emergency services. It was also mentioned any methods for Intelligent Transportation Systems (ITS) that could provide advance notice of blocked crossings would be of value in routing emergency service vehicles.

Grand Forks-East Grand Forks Chamber of Commerce

The DeMers and North 42nd Street intersection was the focus of the discussion with Chamber representatives. Several key considerations at this location were pointed out, including:

- There are several thousand additional apartment units south of this intersection at this time
- Chamber met with the Governor about this issue, brought up grade separation idea
- Most of the hotel rooms in this area are the “front door” to the entire Grand Forks community
- The report will be important as it will demonstrate how everything lines up
- Gateway Drive (US-2) separation probably 4-5 years out

Chamber representatives also talked about the fact that the region is looking at a cost of $750 million to move water from Missouri to Sheyenne and that consideration is just as critical with regard to how oil has changed the landscape in North Dakota and beyond. In the past, transportation would not be funded by the State and everyone had to wait on the Federal Government for funding, but there are now more funding options available.

The Chamber mentioned that there is a committee called "Team Grand Forks" composed of eight (8) members who are working on this issue and others of importance in the region. Some of the key considerations regarding investments in the rail area of Grand Forks/East Grand Forks are knowing the return of investment (ROI) for a five-to-seven year period and how rail fits in that picture, and the need for making recommendations that are based on true community needs rather than on budget limitations.

Grand Forks Community Foundation

Community Foundation members feel that the biggest area of concern with regard to train impacts is around the Gateway Drive (US-2) and University Avenue areas of the city. Bus Rapid Transit (BRT) was also mentioned as an option for consideration in rethinking how the current public transit routes operate in the community. Some key leaders support this concept, and a group are visiting Fort Collins, CO in September 2015 to see how it works there. Dyke Avenue was mentioned as a possible downtown BRT bus route for consideration. BRT is similar to light rail transit with multiple units, but uses modern rubber-tired vehicles.

The Foundation supports sharing information and people connectivity within the region, and to that end feels that not all community members are able to get access via the current transit system, including small businesses in key areas of the City. Also, apartment building developers and others who are constructing new buildings should be brought into the discussions on how transit can serve their developments. There is a public information office located at the City of Grand Forks and a letter to residents could be developed and sent out to get more information for this study's purpose if desired.

3.2 Businesses

Interviews were completed with businesses and other local entities involved with shipping and receiving goods by rail along the Glasston Sub or Mill Spur and who are affected by rail operations in the study area. The following is a list of those businesses which agreed to provide information to the Olsson team on operations related to the study area:

- **North Dakota Mill**
  - Wheat, flour milling
- **Strata Corporation**
  - Transportation/Highway construction business
- **Philadelphia Macaroni**
  - Process and ship noodles and some finished noodle products
- **JR Simplot Co.**
  - Process and ship potato products/French fries
- **Gavilon Grain** (formerly Peavey Grain)
  - Wheat and Soybean shipping
- **Reile's Transfer**
  - Service sugar enterprise and transload facility

North Dakota Mill

Next spring (2016), the Mill will have an additional 30% capacity expansion facility (cost $30 million) that will allow them to store more flour, include a new wheat cleaning facility and bring in equipment from Italy. At the present time they transport spring/durum wheat (both organic and white) over a total daily load of 17 cars all 7 days of the week. This includes an 11 bulk carload, 2.5 boxcars of flour and 3 feed cars.

The Mill shuts down only 3 times each year for 3 days at a time plus Christmas, for a total of 10 days off per year. They have 900 cars in the lease fleet, and have only one plant but are the 8th or 9th largest mill in the U.S. The Mill does a lot of trans-unloading to truckload carriers that travel to Chicago, Boston, Philadelphia and New York, where there are many bakeries which won't accept a carload at a time.

90% of the Mill's wheat comes in by truck, and 10% comes in by rail. There are about 140-150 trucks coming in each day, Monday through Friday. Any expansion in train traffic in the area will likely affect and impact truck delivery hours. The trucks go through North Dakota, Montana and Minnesota and there are no Canadian routes.

The Mill is currently investigating the development of a loop track, which would allow for unit grain delivery at a more advantageous freight rate than freight delivered in manifest train sets. The only sites available for this type of unit unloading facility will require rail access off the Glasston Sub. BNSF has allowed smaller 26-52 car sets off the shuttle so it may break off 26 cars at BNSF's Dilworth rail classification yard, but during the recent increased rail traffic the smaller sets of 26-52 was not working according to BNSF operations. So if the Mill desires to receive more rail traffic they are being forced to handle unit trains of 100-110 cars, which required more storage and bin space at the Mill.

The Mill's overall view of increased operations is that unit trains will not help the quality of their products.

Strata Corporation

Strata has a fleet of 500 rail cars which are used to transport construction materials, especially aggregates, as the company is in the transportation highway construction business. They are unsure of the number of car loads they ship and/or receive from the facility located along the Glasston Subdivision, but did state that rail access is critical to the success of their business.

Philadelphia Macaroni

A representative from the company said that they have not had any changes in rail traffic since the June 2013 interview they had with Olsson for the Rail Access Study. They receive 15 inbound rail car loads of flour per week and have no outbound rail freight shipments. Staff switches their own cars and can store up to ten (10) rail cars at their facility.

JR Simplot Company

A company representative said he was not aware of any rail traffic changes since June 2013. They receive about 5 to 6 rail cars a week with oil and have recently modified their tracks so they can store and hold a maximum of 8 rail cars at their facility. In 2013 they shipped out 7 to 10 refrigerated rail carloads of frozen French fries per week. They require BNSF rail service six times per week. They also ship out of Henningsen Cold Storage located at the southwest edge of Grand Forks with rail freight access to the BNSF Hillsboro Sub. They would ship more product out of their plant if they could add a parallel spur track. With the additional track they could ship out as many as 20-25 cars per week, according to the representative.

Gavilon Grain (formerly Peavey Grain)

The company currently ships unit train loads of wheat and soybeans, averaging one unit train load per month.

Reile's Transfer

Reile's has about 6-10 rail cars of traffic per day, as they are a service sugar enterprise. They also are a transload facility and Grand Forks Region Economic Development Corporation (EDC) is doing more market research in this area. The business is concerned that their future business plan for growth could be jeopardized by future

area development. Currently they have assured daily service of 1:00 a.m., but sometimes the crews show up with no cars and as late as 3 or 4 a.m.

The company representative said that the rail crossing at Gateway Drive (US-2) can hold up trucks for 30 minutes or more. He said they do 90% of their product shipping by rail, and bulk product is shipped by truck from factories from the east (Crookston) into town. He said they also might be interested in the development of a loop track south of Grand Forks. As an observation, he said he has seen as many as 40 trains per day coming out of the rail yard at Glasston and 42nd Street.

The representative also said that he has seen the Gateway Drive (US-2) crossing on the Mill Spur blocked "2 or 3 times per day" recently in order to build trains. Also stated that there are 7 other rail customers on Mill Spur which are already causing issues, including salvaged metal, 2 or 3 fertilizer plants, western polymers/potato starch and the Mill, which does about 90% of the traffic. His comment was that the Mill gets very good service on the Mill Spur and may not if abandonment occurs.

He also suggested selling off the Glasston Subdivision to the short line as one idea, or switching the operator on the Northside.

A map depicting the actual locations of each of these businesses interviewed for this study and located along the Glasston Subdivision is found below **(Figure 1).**

Figure 1: Current Glasston Subdivision Users

Mill Spur Users

There are presently seven (7) active companies located north of Gateway Drive (US-2) in addition to the North Dakota State Mill that have rail freight service via the Mill Spur. If the Mill builds a loop track and connection into the Mill Spur, all of these seven (7) companies would be able to then receive their rail traffic off the Glasston Sub. Please see the map on the next page for location information. There is one (1) company that has had rail service in the past, but is now in the process of closing their business and salvaging their facility, so no interview was conducted. The following is a list of the six (6) businesses which agreed to provide information to the Olsson team on their rail freight operations related to the study area:

- **Wilber-Ellis Fertilizer Company**
  - Dry fertilizer
- **Brown Corporation** (previously AGSCO Chemicals)
  - Caustic soda
- **Western Polymer**
  - Chemicals/Potato Starch
- **CHS Agricultural Services**
  - Dry and liquid fertilizer
- **JR Simplot Fertilizer**
  - Liquid fertilizer
- **Residual Materials**
  - Scrap metal/salvage

Wilber-Ellis Fertilizer Co., 2220 Bacon Road

In 2014 they received eighty (80) carloads of dry fertilizer. They were received in three (3) to six (6) cars at a time. They are currently limited to a maximum storage of six (6) rail cars.

Brown Corporation (previously AGSCO Chemicals), 2475 27th Avenue North

Brown Corporation receives caustic soda via rail shipments. Their business is seasonal and they can handle eight (8) rail cars at a time. They could not provide an annual number of carloads and stated that their business is expanding and that rail freight is critical to their business model.

Western Polymer, 2250 Mill Road

They handle six (6) rail cars per month, with a capacity of two (2) rail cars. They receive chemicals as in-bound rail freight and their out-bound rail freight is potato starch. Rail freight is critical to their business model as presently 95% of their out-bound product is by rail.

CHS Agricultural Services, 2002 N. Washington

Their rail traffic is seasonal, for 2014 car loads were one hundred fifty (150) car loads of dry fertilizer and ten (10) car loads of liquid fertilizer. They can handle a maximum storage of three (3) rail cars.

JR Simplot Fertilizer, north of the Mill on the south side of Bacon Road

They handle two hundred (200) to two hundred fifty (250) car loads of liquid fertilizer on an annual basis. They can store a maximum of sixteen (16) rail cars at their facility. They shared that rail service is key to their business

model. There are times that their rail service is delayed, as they only have rail service in conjunction with rail service to the mill. This can be a concern when the mill is out of production.

Residual Materials, 222 Red Dot Place

Rail service is critical to their scrap metal business. They have shipped out as many as twenty-five (25) rail cars a month, and over the year average shipping out eight (8) or nine (9) rail cars a month. They can handle the storage of four (4) or five (5) rail cars at their facility.

Figure 2: Current Mill Spur Users

Note: In the process of interviewing stakeholder businesses on the Mill Spur Line, Olsson staff attempted to contact the Agri Valley Bean Company. Olsson staff were told that the company is out of business and their facility is in the process of being salvaged. In addition, several attempts to reach someone at Associated Potato Growers, Inc., another Mill Spur Line stakeholder, were made but were ultimately unsuccessful in terms of obtaining a response from any company officials.

3.3 Neighborhood Groups

Near North Neighborhood Group

One (1) neighborhood group affected by the study area is the Near North Neighborhood. The boundaries for this group are the BNSF railroad tracks to the west, Gateway Drive (US 2) to the north, the Red River to the east, and BNSF railroad tracks/DeMers Avenue to the south.

In the interview conducted for this study, the Near North Neighborhood representative talked about how the association had come about, which was with funding from a McKnight Foundation grant in the past. Originally the group had some student involvement, and students previously have helped deliver flyers to the neighborhood and done other work on specific issues, but nothing recently. The group has previously discussed quiet zone issues in Grand Forks, and has also supported a bike path effort called Rails to Trails.

The group's representative said she was not aware of any improvements since the Grand Forks Quiet Zone Study but feels there is a general increase in train traffic in the area. She also mentioned that she has seen some "no trespass" signs put up recently along the rail corridors, and would favor abandonment of the Mill Spur if that was an outcome of the study effort. At this time the Near North Neighborhood is trying to establish a neighborhood website to provide more timely information on events to the community in that part of Grand Forks.

Towards the end of this project study, representatives of the Near North Neighborhood Association provided the following narrative on the Mill Spur:

> We are writing on behalf of the Near North Neighborhood Association (NNA) which represents approximately one thousand (1,000) people in the area, bounded by the Red River, Gateway Drive (US-2), North Washington Street (US-81 Business), and University Avenue. The Mill Spur runs for about fourteen blocks along the western edge of the neighborhood, with about two hundred (200) people living within two blocks of the Spur.
>
> Over the years we have received complaints from neighbors who work varied hours that their sleep has been interrupted by loud blasts form train horns using the Spur. Though the area has in the past been of mixed industrial use, it is losing industrial and commercial firms and rapidly seeing an increase in residential units and in residential density.
>
> An additional concern is the safety of elementary and middle school children who have to cross the tracks from the NNN at 4th, 5th, or 6th avenues to attend Winship and Valley Schools. If school-age children were to lose focus for a moment, crossing those tracks could lead to a tragic accident.
>
> Still another problem created by the Spur Line is the chance of vehicular-train collision at the fourteen (14) crossing points. There are twelve thousand (12,000) cars a day crossing the Mill Spur Line at residential streets. The most difficult crossing is at Gateway Drive (US-2) which is a heavily traveled state road which functions as if it were an interstate without the median and limited access. When a train crosses Gateway Drive (US-2), commercial truck traffic is held up for three (3) to seven (7) minutes.
>
> An added benefit of abandoning the Mill Spur might be that it could be turned into a bike path/walking path. It would turn a negative for the neighborhood into a positive amenity.
>
> We hope you will give strong consideration to abandoning the Mill Spur, which will remove the impact of the horns to homeowners living in close proximity to the rail line; twelve thousand (12,000) daily residential automobile crossings as well as twenty-one thousand (21,000) crossings along Gateway Drive (US-2); increasing residential and decreasing industrial density in the neighborhood; and safety and liability problems, especially for children at 4th, 5th, and 6th avenues.
>
> Thank you for your consideration.

3.4 Public Outreach

Three (3) public outreach meetings were scheduled during the Glasston Subdivision Railroad Crossings Mitigation Study in order to provide a venue for the general public and project stakeholders to learn about project findings and progress and to provide feedback to the consultants and Project Steering Committee members. Residents and stakeholders were able to ask questions and provide written comments at each of three (3) public meetings held between the hours of 5:00 pm to 7:30 pm on weekday evenings and advertised as an official meeting of the Grand Forks-East Grand Forks MPO in local newspapers. They were also invited to submit comments about the study directly to the MPO if so desired.

Project Kick-Off Meeting #1 (July 9, 2015)

At the July 9, 2015 meeting, approximately ten (10) members of the public were in attendance. After a brief overview presentation about the intent of the study by Olsson staff, those in attendance were asked to provide comments on potential improvements for the Glasston Sub and the Mill Spur Crossings. These comments are summarized on the following pages.

Question #1: The improvement on the Glasston Subdivision I would most like to see is:

- Underpass at the intersection of DeMers & 42nd Street (already has frequent, long wait times) Note: This underpass is not on the Glasston Sub.
- Underpass at the intersection of University Avenue & 42nd Street (not as bad as DeMers, but still frequent)
- Both would need pedestrian/bike walkways
- Switching of rail cars and very long unit trains cause the worst delays at DeMers & 42nd Street
- From business side – time is main concern. If scheduled times can be conscientious of high traffic times. At times of 8am, trains can take a long time or come through when people are trying to get through. Also can have several trains going through during certain hours
- Improve train cars – BNSF switches cars several times in the rail yard causing inconvenience

Priority on grade crossing separation:

- University Avenue – serious pedestrian issues with UND students, staff, and faculty
- Gateway Drive (US-2) – make more compatible to bicyclists and pedestrians
- 6th Avenue North – not as bad or so it seems as University Avenue

Question #2: My vision for the Mill Spur without rail traffic is:

- If the rail is left, it could possibly be used for public transportation (metro, trolley, etc.)
- If the rail is removed, it could be a walking/bike path
- Make a bike/walking trail
- An extension of the greenway with a walking/bicycle trail that emphasizes historic elements of the Near North Neighborhood. I would be willing to have undergrads and grad students help the consultants and the City of Grand Forks produce community mapping-style exhibits and info for any plaques or kiosks
- We would love to have this abandoned – we live at 1101 5th Ave N., there have been multiple accidents – rollovers, two trucks driven into our home. We would love a park, flowers, anything but the railroad! Our home shakes when the train goes by

Meeting participants were also asked to look at large maps that were set up on kiosks in the room and provide comments on post-it notes on the maps if they desired to do so. The following is a summary of posted comments on five separate maps.

Comments posted on Glasston Subdivision Map:

- If trains could have regular schedule and/or limit how many cars per "blocking"
- Sunken underpass at DeMers & 42nd St – not under and over confusing intersection
- DeMers & 42nd St – worst rail crossing in town as it relates to frequent, extended delays for traffic, pedestrians, and bikes

Comments posted on Mill Spur map:

- Suggestion – if any rail lines are relocated or closed, need greenway and bike/pedestrian paths
- Concern of closing of Mill would be increased rail traffic on Glasston/DeMers railway

Comments posted on aerial photo of University Avenue & N. 42nd St Intersection:

- Trains crossing often during high traffic times: 7:45am – 8:15am and 4:45pm – 5:30pm along with several times per hour
- Often delays for traffic and pedestrians
- Need pedestrian and bike access
- Not enough holding space for cars on long, slow trains; traffic backup can be both inconvenient and unsafe
- Main vein to connecting the university and community – must keep open
- Like the idea of some "over" or "under" for University to remain open for train traffic to be a non-issue

Comments posted on aerial photo of 6th Avenue & N. 42nd St intersection:

- Could hazardous or dangerous chemicals transported by rail be limited by a certain number of cars per train? Say limit of 6 or 10?

Comments posted on aerial photo of Gateway Drive (US-2) & N. 42nd St intersection:

- Avoid switching trains on busy intersection
- I always avoid this intersection – too congested with train stop at super busy intersection

Public Meeting #2 – September 15, 2015, Skalicky Hall, UND Campus, 5:30-7:30 p.m.

At the second project public meeting held on September 15, 2015 meeting, approximately fifteen (15) members of the public were in attendance. A brief overview presentation about study progress and findings was conducted by Olsson staff, and those in attendance were asked to provide comments about study findings and any other issues related to the project. These comments are summarized below.

Discussion/questions during consultant presentation from public:

- Is there a limit to the number of unit trains?
    - *Answer from Al Cathcart: There are currently 2+ unit trains/week and the limit on the number is based on number of customers and their demand for commodities shipped via unit trains*
- Increased development along 42nd St has led to more people crossing the tracks [of the Glasston Sub]

- Priority of the City of Grand Forks should be to protect safety; train traffic should not be increased within the city because this type of activity does not belong in an urban environment
- From Northern Plains Nitrogen: Plant will be hauling in some hazardous materials, but not a lot
- People in Grand Forks increasingly don't have a choice to live away from where hazardous materials are transported
- Any discussion of emergency vehicles being delayed by blocked crossings?
    - *Response from Chief Plummer: this was brought up earlier in the project*
- When was the last time a rail incident has happened in Grand Forks?
    - *Response from Al Cathcart: In the past 30 years, there have been 3 injury accidents, 40-50 property damage accidents, and 0 fatalities*
- Railroad building new training facility west of town for training crews in handling oil spills
- What about moving the Glasston Sub further west of town?
    - *Response from Al Cathcart: It is way too expensive to build rail on new alignments since there will be expensive right of way and environmental concerns*
- If there were an incident on the Glasston Sub, UND would sound the outdoor sirens (if needed), use the emergency text message system, send emails, and update the website
- From conversation with student attending the meeting:
    - Maintenance equipment on Glasston more of a nuisance than trains
    - Would use a pedestrian underpass to cross the Glasston to reach shuttle stops and believes other students would as well

Comments from public meeting comment cards

- Increased train traffic means that the rail infrastructure will become vulnerable more quickly. What sort of funding plan would be put in place to make sure that these issues are addressed? What additional restrictions or regulations would be set on rail providers and rail customers to make sure that these infrastructure issues are addressed?
- As a resident, I am concerned that the debate about increased freight load has centered on quality of life issues such as noise and traffic. I am <u>much</u> more interested in safety issues associated with an increase in volatile and flammable freight through an increasingly dense residential area. Why has there been limited/no research or discussion about the safety implications?

July 2015 Glasston Subdivision Study Public Meeting and Open House

3.5 Environmental Justice

The GF-EGF MPO's Environmental Justice Program Manual provides the following definition of environmental justice and the three fundamental questions to be addressed for the planning of public infrastructure improvements.

Environmental Justice refers to the "**fair treatment and meaningful involvement of people from all races, cultures, abilities and incomes** during the development of projects, laws, regulations, and policies."1 The concept of "environmental justice" has been entrenched in public affairs, community and environmental activism for the last four decades. The movement sparked from the confluence of environmentalism and Civil Rights movements that flourished in the 1960's and 1970's in the United States. Advocates demanded the right to participate as equal partners at every level of decision-making.

Figure 3 illustrates the Environmental Justice (EJ) areas within the Grand Forks-East Grand Forks MPO. The Glasston Sub rail corridor is located directly between two EJ areas: 1.) the first is bounded by N 42nd St on the east, DeMers Ave on the south, I-29 on the west and Gateway Drive (US-2) on the north; 2.) the second being essentially the University of North Dakota (UND) to the east of N 42nd St between 6th Ave N on the north and DeMers Ave on the south. The first area has both a minority population greater than 21.2% and a low-income population greater than 50%. The second area has a low-income population greater than 50%.

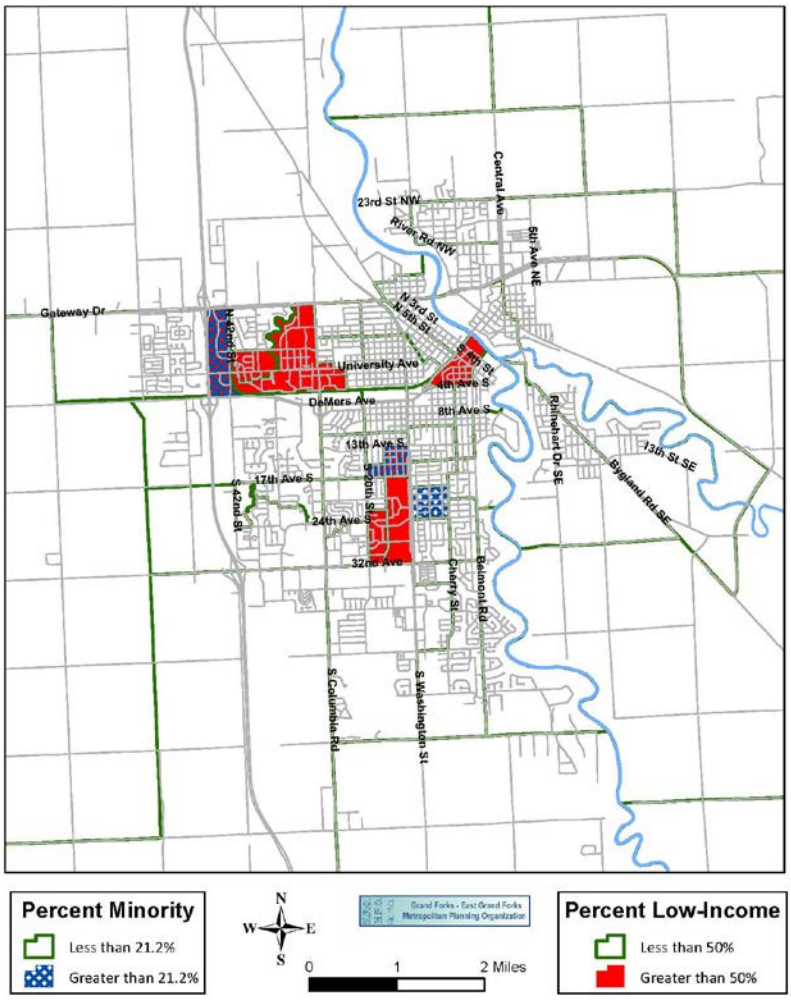

Figure 3: Combined Low-income and Minority Environmental Justice Areas

Following are the three fundamental EJ principles, and an analysis of the Glasston Sub Mitigation Study's impact on each principle:

• To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations. ------The Glasston Sub Mitigation Study's planned transportation infrastructure improvements do not require any additional right of way. The study demonstrates that the quality of life locomotive-horn ban (Quiet Zone) will continue its present operation, even with the predicted future train and highway traffic volumes. The total number of vehicle-hours of delay at the three crossings within the EJ areas (University Ave, 6th Ave N, and Gateway Drive) will be reduced in the future with the construction of the proposed grade separation with Gateway Drive (US-2).

Open House Participation Title VI Survey Summary							
Date	**Location**	**Percent Male**	**Percent Female**	**Average Age**	**Percent Racial Minority**	**Percent Disabled**	**Percent Public Assistance**
7/9/2015	GF's City Hall	56	44	55+	22	0	0
9/15/2015	Skalicky Hall-UND	80	20	35-54	0	0	0
11/17/2015	Skalicky Hall-UND	69	31	55+	13	13	0

Table 1: Open House Participation Title VI Survey Summary

• To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process. ------ Table 1 provides a summary of the public participation at the three public meetings on the Glasston Sub Mitigation project. All three meetings were publicized with special invitations for the last two to University of North Dakota staff and students. The last two meetings were held on the University of North Dakota campus.

• To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations. ------The public participation process was arranged to meet the requirements of the EJ process. The alternative options presented in this study are not expected to result in any denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

4. Existing Street and Rail Networks

4.1 Highway/Rail Crossing Inventory

The BNSF Railway Company's Mill Spur has thirteen (13) public at-grade crossings from its junction with the BNSF Twin Cities Division—Grand Forks Subdivision main line to north of the North Dakota Mill in Grand Forks. Only the Gateway Drive (US-2) crossing has an active flashing light warning system with lights cantilevered over the traffic lanes. This highway/rail signal system is interconnected with the highway/highway traffic signal system for the Gateway Drive (US-2) intersection with North 5th Street and Mill Road via a simultaneous interconnect (definition of this interconnect is included in the following section). The other twelve (12) public at-grade crossings have the required passive X-buck signing.

The Mill Spur's ten (10) public at-grade crossings from 2nd Avenue North to Gateway Drive (US-2) and the most recent Annual Average Daily Traffic (AADT) counts and number of traffic lanes (including turning lanes) through the crossing are shown in **Table 2** on the following page.

The Glasston Subdivision rail line has four (4) public at-grade crossings within this study area from its junction with the BNSF Twin Cities Division--Grand Forks Subdivision main line north to 27th Avenue North. All four (4) of these crossings have flashing light and gate active warning systems. Also the University Avenue and Gateway (US-2) have simultaneous interconnects and 6th Avenue North has an advance interconnect with their adjacent highway/highway intersection's traffic signal systems (definitions of these two interconnect systems will be in the next section).

The four (4) at-grade public crossings from north to south with their most recent Annual Average Daily Traffic (AADT) counts and number of traffic lanes (including turning lanes) through the crossing are shown in **Table 3** on the following page.

DOT Number	Route	Lanes	Daily Trains	AADT (year)	Daily Transit Crossings	Quiet Zone
081286S	2nd Avenue N	2	2	1125 (2013)	0	No
081287Y	University Avenue	2	2	4920 (2013)	51	No
081288F	Public Alley	N/A	2	50 (1988)	0	No
081289M	4th Avenue N	2	2	500 (2009)	0	No
081290G	5th Avenue N	2	2	1030 (2013)	12	No
081291N	6th Avenue N	2	2	820 (2009)	0	No
081292V	7th Avenue N	2	2	510 (2009)	1	No
081293C	8th Avenue N	2	2	2400 (2013)	1	No
081295R	10th Avenue N	2	2	1430 (2013)	0	No
081297E	Gateway Drive (US-2)	6	2	21735 (2013)	12	No

Table 2: Mill Spur Grade Crossings

Intersection of Gateway Drive (U.S. 2) and North 42nd Street (Glasston Subdivision), Grand Forks, ND.

DOT Number	Route	Lanes	Daily Trains	AADT (year)	Daily Transit Crossings	Quiet Zone	Daily Bike & Ped Crossings
062501A	University Avenue	4	6	7800 (2013)	103	Yes	214
062502G	6th Avenue N	4	6	5240 (2013)	76	Yes	183
062505C	Gateway Drive (US-2)	6	6	19555 (2013)	4	Yes	20
062506J	27th Avenue N	2	6	1200 (1988)	0	No	N/A

Table 3: Glasston Subdivision Grade Crossings

4.2 Traffic Control Inventory

There are a total of twelve (12) at-grade public crossings on the Mill Spur that are signed with the passive X-buck signing, including Railroad Advance Warning signs and Railroad Crossing pavement markings where appropriate. This passive signing meets the requirements of the Manual on Uniform Traffic Control Devices (MUTCD). The Gateway Drive (US-2) at-grade public crossing on the Mill Spur has an active flashing light warning system with light cantilevered over the traffic lanes. This highway/rail signal system has a simultaneous interconnect with the highway/highway traffic signal system for the North 5th Street and Mill Road intersection with Gateway Drive (US-2).

The interconnection between the highway/rail signal system and the adjacent highway/highway traffic signal system is designed to protect against vehicles becoming “trapped” in crossings when a train is approaching. Depending on the crossing, intersection geometrics and the maximum train speed, a determination is made on the appropriate type of interconnection. For a simultaneous interconnection, the highway/highway signal system is electronically notified over a hard-wired connection that the highway/rail warning system has been activated by the train’s approach. For an advance interconnection, the highway/highway traffic signal system is notified in advance of the highway/rail warning system via an extension of the train detection circuitry to provide additional time to clear the tracks of stopped or queued vehicles. For this type of interconnection, a hard wired connection between the signal systems also exists.

The four (4) crossings on the Glasston Sub all have flashing light and gate active warning signal systems. University Avenue, 6th Avenue North and Gateway Drive (US-2) all have lights cantilevered over the traffic lanes. 27th Avenue North has straight post flashing lights on the approach shoulders. There are three (3) crossings on the Glasston Sub that have an interconnection between the highway/highway traffic signal system and the highway/rail signal system--University Avenue and Gateway Drive (US-2) have simultaneous interconnects, while 6th Avenue North has an advance interconnect.

27th Avenue North Intersection Controls at Glasston Subdivision, Grand Forks, ND.

4.3 Railway Network

The BNSF Mill Spur is a 10 mph industrial track from the Twin Cities Division--Grand Forks Subdivision main line connection with the BNSF DeMers rail yard to just north of 27th Avenue North. There is an additional siding track from just north of 6th Avenue North to just south of Gateway Drive (US-2). There is a single line crossing Gateway Drive (US-2) and then there are multiple sets of track in the North Dakota State Mill facility. While this line previously had a northern connection with the Glasston Subdivision, it has been dead ended just north of 27th Avenue North for a considerable length of time. As this is a dead-end industrial line all northbound manifest rail traffic from the DeMers rail yard will return back south to the DeMers rail yard.

The BNSF Glasston Subdivision is a 25 mph branch rail line from the Twin Cities Division--Grand Forks Subdivision main line connection with the BNSF DeMers rail yard to northern terminals at Hannah, Walhalla, Glasston and Joliette, North Dakota. The connection with the Grand Forks Subdivision is via one (1) leg of a wye connection between the two (2) lines. The northwest leg of the wye has been removed and the subsequent development in this area and the skewed at-grade crossing that would be required to cross 42nd Street has greatly complicated any possibility of it being re-built. This leaves only the northeast leg of the wye, which limits rail freight movements from the DeMers rail yard to the north, and the return from the north to the DeMers rail yard. There are no connections to other through rail lines, so each unit or manifest train that heads north must return south.

5. Current/Future Travel Demand and Traffic Impacts

5.1 Current Rail and Vehicle Traffic Data by Crossing

Glasston Subdivision

The Glasston Sub currently averages six (6) trains/day at a maximum speed of 25 mph. This includes a weekly one hundred twenty-three (123) car unit coal train to the American Crystal Sugar Company's Ardoch coal handling facility. It also includes monthly one hundred ten (110) unit grain train shipments from Gavilon Grain. The rest of the train traffic are manifest train loads handled through the BNSF DeMers rail yard for delivery and receipt of rail freight for the multiple customers on this rail line. This rail line has northern termini's at Joliette, Glasston, Walhalla, and Hannah, North Dakota with no connections to other through rail lines, therefore every train that heads north out of the DeMers rail yard will return to the DeMers rail yard.

There are four (4) at-grade highway/rail crossings on the Glasston Sub within this study's area. Their location and operational characteristics are detailed in **Figure 4** on the following page. All crossings have state of the art flashing light and gate signal systems. All except the northern crossing, 27th Avenue North are within a locomotive-horn Quiet Zone. The 27th Avenue North crossing serves industrial and agricultural land uses and has the lowest ADT of the four crossings. Gateway Drive (US-2) is the major east-west arterial serving Grand Forks, is on the National Highway System and has an interchange with I-29 just to the west of the Glasston Sub highway/rail at-grade crossing. University Avenue is a minor arterial and 6th Avenue North is a collector with both routes connecting North 42nd Street and developments to the west to and through the University of North Dakota. These two (2) crossings in addition to the relatively high ADTs have both a significant number of transit, bicycle and pedestrian traffic.

Preemption Interconnect Data

Data for the highway traffic intersection signal system preemption interconnect with the adjacent highway/rail warning system provided insights into the number of trains/day, amount of time crossings are blocked by train traffic, and the time of day of the train traffic. This information was tabulated for the four (4) at-grade crossings with interconnects; Gateway Drive (US-2) on the Mill Spur and University Avenue, 6th Avenue North, and Gateway Drive (US-2) on the Glasston Subdivision. The data tabulated was from the June and August, 2015 time periods, and **Table 4** below details the average length of crossing blockage, the maximum time the crossing is blocked, and the average train traffic per day. **Figure 4** details the number of train crossings per five (5) significant daily time periods. It should be noted that there were reported problems with the University Avenue interconnect through the time period of the data collection. The tabulated data also reflects this problem as there are no rail customers with rail access from the DeMers Yard to north of Gateway Drive (US-2), so the trains/day is identical for the three crossings within these limits. It should be shared that the signal preemptions include more than just train traffic, as rail maintenance equipment can also activate the highway/rail signals.

	University & 42nd	6th Ave N & 42nd	Gateway Drive & 42nd	Gateway Drive & Washington (Mill Spur)
Average Time Crossing Blocked	0:04:33	0:03:53	0:03:59	0:03:10
Maximum Time Crossing Blocked	0:12:49	0:12:26	0:12:21	0:30:42
Average Times per Day that crossing is blocked	2.8	4.7	4.6	3.4

Table 4: Average Glasston Subdivision Crossing Blockage by Intersection

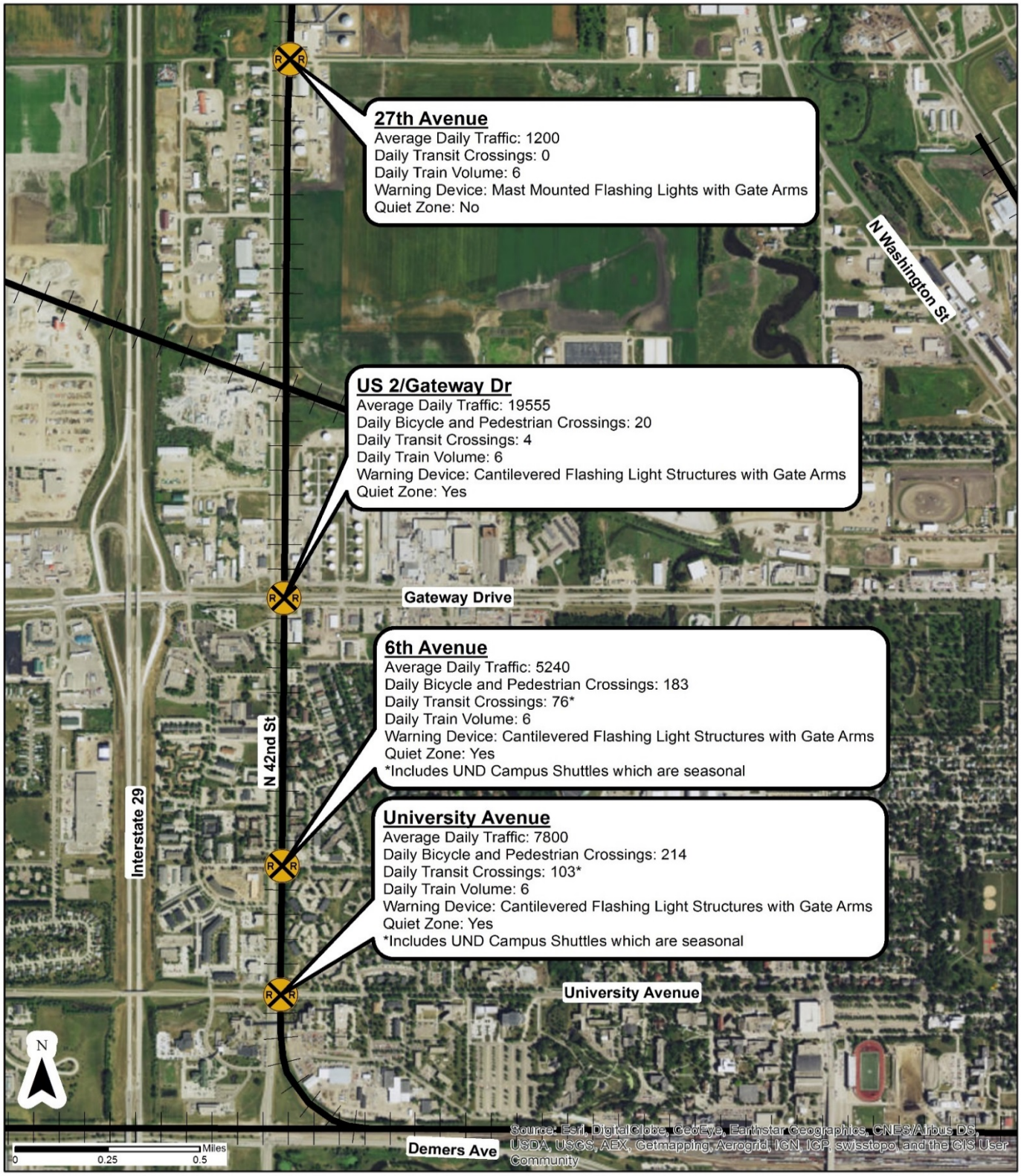

Figure 4: Glasston Subdivision Railroad Crossings

6th Avenue North Intersection at Glasston Subdivision, Grand Forks, ND.

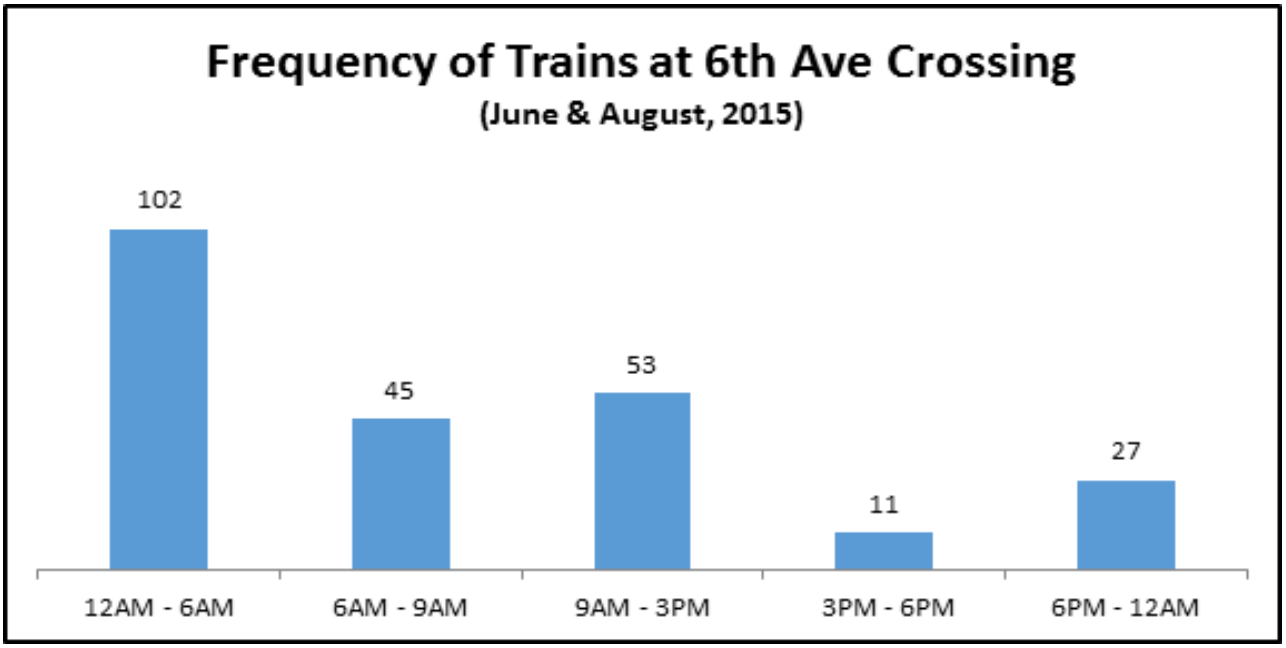

Figure 5: Frequency of 6th Avenue North Train Crossings (June and August 2015)

Mill Spur

The Mill Spur serves the North Dakota State Mill and seven (7) other rail dependent businesses, all located to the north of Gateway Drive (US-2). This rail spur provides manifest rail service through the BNSF DeMers rail yard with two (2) to four (4) trains/day, averaging three (3) trains/day at a maximum speed of 10 mph. In addition to the ten (10) at-grade crossings detailed in **Figure 6**, there are three (3) crossings north of Gateway Drive (US-2), State Mill Road with an ADT of 4125, Bacon Road with an ADT of 420 and 27th Avenue North with an ADT of 180.

Of the total thirteen (13) at-grade highway/rail crossings on the Mill Spur, all have passive X-buck warning systems with the exception of Gateway Drive (US-2) that has a flashing light warning system. The University Avenue crossing has the most significant number of transit vehicle crossings with fifty-one (51) per day. While there are no pedestrian counts available it is a major safety and neighborhood connectivity issue due to the rail lines bisecting the Near North Neighborhood. This rail line has been evaluated for a locomotive-horn Quiet Zone with a significant estimate of costs to implement and currently no action has been taken to pursue the Quiet Zone. The ADTs on these thirteen (13) at-grade crossings vary from a high of twenty-one thousand seven hundred thirty-five (21,735) on Gateway Drive (US-2) to a low of fifty (50) on the public alley between University Avenue and 4th Avenue North. The total ADTs of all the crossings south of Gateway Drive (US-2) represents twelve thousand seven hundred eighty-five (12,785) daily vehicle crossings of the Mill Spur which represents the significance of the connectivity and traffic circulation issues for the Near North Neighborhood.

Figure 6: Mill Spur Railroad Crossings

5.2 Future Estimated Travel Demand

Glasston Subdivision

Table 5 below lists both the current and projected future rail and vehicle traffic that will be crossing the four (4) at-grade highway/rail crossings. The projected '2040' traffic is from the traffic model for the '2040' Long Range Transportation Plan. The future trains/day is based on projected rail traffic for the Northern Plains Nitrogen (NPN) plant, the projected rail traffic for a North Dakota State Mill (NDSM) unit grain facility and the shift of rail traffic off the Mill Spur to the Glasston Subdivision. The rail traffic for NPN is projected to be one (1) to two (2) unit trains/week and two (2) manifest trains/day for an average of two and a half (2.5) trains/day. The rail traffic projections for both NDSM unit grain facility and the shift of the Mill Spur rail traffic will be one (1) to two (2) unit trains/week and two (2) to four(4) manifest trains/day for an average of three and a half (3.5) trains/day. Adding these rail traffic projections to the current rail traffic provides the future rail traffic of twelve (12) trains/day.

As described in Section 5.1, the Glasston Subdivision does not have connections with other rail lines, so all train traffic headed north must return via this rail line. The projected rail traffic may be reduced if the existing manifest rail traffic can accommodate the projected manifest rail traffic for both NPN and NDSM. Also the unit train traffic for both NPN and NDSM may initially be fewer than used in the future projected train traffic. Based on the two above factors the projected volume of twelve (12) trains/day is on the high end of the potential rail traffic and was used to provide the most conservative estimate of potential impacts of the future rail traffic to the highway/rail crossings on the Glasston Sub. This conservative estimate of future train traffic also addresses the potential of future rail freight customers on the Glasston Sub.

Route	2013 ADT	2015 Trains/day	2015 Exposure	2040 Projected Traffic	Future Trains/day	Future Exposure
University Ave	7,800	6	46,800	14,500	12	174,000
6th Ave N	5,240	6	31,440	6,500	12	78,000
Gateway Drive	19,555	6	117,330	24,500	12	294,000
27th Ave N	1,200	6	7,200	1,000	12	12,000

Table 5: Highway/Train Exposure for Glasston Subdivision

Gateway Drive (US-2) is on the National Highway System (NHS) and from I-29 to the Grand Forks AFB it is on the Strategic Highway Network (STRAHNET).

"Revised 2nd Edition, August 2007, Railroad-Highway Grade Crossing Handbook, USDT, FHWA", states that the project be economically justified based on fully allocated life-cycle costs and one or more of twelve conditions exist. The conditions applicable to the Gateway Drive (US-2) crossing of the Glasston Sub are listed below:

- Gateway Drive (US-2) is on the NHS
- The crossing exposure is less than the suggested Urban Area cut-off of 500,000, but greater than the rural area cut-off of 125,000
- Vehicle delay per day above 30 hours would suggest the consideration of a grade separation
- Twelve (12) trains/day at 25 mph and 1 mile in length would block the crossing for 2.4 minutes/train and with 30 seconds for signal activation, would lead to 34.8 minutes of crossing blockage per day. If you take the average hourly traffic of 1020, that would lead to 2.9/60 x

1020 = 50 vehicles delayed per train crossing., which would lead to 34.8 x 50/60 = 29 vehicle hours of delay.

Mill Spur

Table 6 below depicts the current and projected future rail and vehicle traffic that will be crossing the three (3) at-grade highway/rail crossings which are functionally classified other than local access streets on the Mill Spur. The future scenario of the Mill Spur remaining in service is based on the unit grain un-unloading facility not being built on the Glasston Sub. While there will be anticipated increases in grain received at the North Dakota State Mill (NDSM), it will not be as significant as with a unit grain un-unloading facility. Plans for improvements on the NDSM property are moving forward, and this improvement will add storage for an additional fifty-eight (58) rail cars and three thousand eight hundred (3800) feet of track. With additional rail car storage at the North Dakota State Mill there will be the opportunity for an increase in grain received via the Mill Spur rail line. The future trains/day is based on the existing highest train traffic of four (4) trains/day. The projected 2040 traffic is from the traffic model for the *2040 Long Range Transportation Plan*. The NDSM's 30% capacity expansion project is proceeding with the shell of the new building in place, and roofing to be the next item of construction. The new expansion project will increase the current daily semi-truck grain deliveries from the current number of one hundred thirty-five (135)/day to one hundred seventy-five (175)/day. The local functional classification streets do not have future projected traffic volumes and are not included in Table 6.

Route	2013 ADT	2015 Trains/day	2015 Exposure	2040 Projected Traffic	Future Trains/day	Future Exposure
University Ave	4,920	3	14,760	5,500	4	22,000
8th Ave N	2,400	3	7,200	3,500	4	14,000
Gateway Drive	21,735	3	65,205	31,550	4	126,200

Table 6: Highway/Train Exposure for the Mill Spur

5.3 Summary of Accident Statistics and Economic Impacts

Over the past 40 years, there have been relatively few automobile/train incidents at railroad crossings along the Glasston Subdivision and the Mill Spur. Most of the incidents have involved property damage only, and there have been a total of three (3) injury accidents and no fatality accidents. One injury has been reported on the Mill Spur, a relatively low figure considering the high number of relatively unprotected crossings. This is likely due to the low number of trains and low speeds of the train traffic on that line. For both the Glasston Subdivision and the Mill Spur, Gateway Drive (US-2) is the route that has had the most incidents. The high amount of traffic on this street likely contributes to this problem. See **Tables 7 and 8** on the following page for a summary of incidents by intersection on both the Mill Spur and the Glasston Subdivision.

Route	Fatalities	Injuries	Property Damage only	Total Incidents
2nd Ave N	0	0	4	4
University Ave	0	1	7	8
Public alley	0	0	1	1
4th Ave N	0	0	2	2
5th Ave N	0	0	0	0
6th Ave N	0	0	1	1
7th Ave N	0	0	2	2
8th Ave N	0	0	2	2
10th Ave N	0	0	1	1
Gateway Drive	0	0	12	12
Mill Spur Totals	**0**	**1**	**32**	**33**

Table 7: Mill Spur Accident/Incident History 1975 - 2015
Source: FRA Highway-Rail Grade Crossing Accident Reports

Route	Fatalities	Injuries	Property Damage only	Total Incidents
University Ave	0	0	4	4
6th Ave N	0	0	4	4
Gateway Drive	0	2	8	10
27th Ave N	0	0	3	3
Glasston Sub Totals	**0**	**2**	**19**	**21**

Table 8: Glasston Sub Accident/Incident History 1975 - 2015
Source: FRA Highway-Rail Grade Crossing Accident Reports

5.4 Impacts on Quiet Zone Designations

Three (3) crossings along the Glasston Subdivision are part of a quiet zone (QZ), which means that trains are not required to sound the horn when approaching the crossing. The 2011 QZ Alternate Safety Measure (ASM) approval of this three (3) crossing QZ was based on three (3) trains/day. The current train traffic on the Glasston is six (6) trains/day. The maximum train traffic that can be expected from the Northern Plains Nitrogen rail traffic, the North Dakota State Mill unit unloading facility and the shift of all current Mill Spur rail traffic to the Glasston Spur would amount to a doubling of the current six (6) trains/day to twelve (12) trains/day. The ADTs used for the three (3) routes were the highest ADTs reported for these crossings.

The effectiveness rates for the current ASM safety measures are as approved by the Federal Railroad Administration (FRA). **Table 9** below depicts the Quiet Zone Risk index (QZRI) for the QZ of twelve thousand eight hundred ten (12,810), based on the projected number in the future of twelve (12) trains/day. The current National Significant Risk Threshold (NSRT) is fourteen thousand three hundred forty-seven (14,347). Therefore, it can be concluded that the Glasston Subdivision QZ's QZRI would still fall below the current NSRT despite the projected increase of future train traffic to twelve (12) trains/day, so it will continue as a viable QZ until at some point in the distant future when train traffic increases along this line to a much higher ratio. The NSRT over the past ten (10) years has varied from a low of 13,722 to a high of 19,047. Based on the lowest NSRT the highway

traffic growth that could be accommodated on the Glasston Sub Quiet Zone crossings would be 7.1%, and based on the highest NSRT the traffic growth that could be accommodated would be 48.7%.

Route	ADT	Trains/Day	Risk Index Without Horns	ASM Effective Rate	QZRI with ASM's
University	8075	12	22770	0.4	13362
6th Avenue	5240	12	20568	0.47	10901
Gateway Dr.	21045	12	34551	0.59	14166
				Average	**12810**

Table 9: Glasston Sub Quiet Zone Analysis

University Avenue Intersection at Glasston Subdivision, Grand Forks, ND.

A Quiet Zone Feasibility Study was completed on the Mill Spur and the cost to implement a quiet zone at this location was deemed prohibitive at the time of the study. The onboard locomotive-horns are currently activated in advance of approaching each of the thirteen (13) at-grade crossings along the Mill Spur.

6. Summary of Recommended Railroad Crossing Improvements from Previous Studies

As part of the Glasston Subdivision Railroad Crossing Mitigation Study, Olsson reviewed a number of previous regional rail and transportation studies completed for the Grand Forks-East Grand Forks MPO that include recommended improvements at railroad crossings on both the Glasston Subdivision and the Mill Spur within the City of Grand Forks. The reviewed studies include:

- Grand Forks Mill Spur Feasibility Study (2010)
- Quiet Zone Assessment (2010)
- Grand Forks – East Grand Forks Freight Rail Access Study (2013)
- 2040 Long Range Transportation Plan (2013)
- US 2 Corridor Access Study (2014)

The following information provides a high level summary of recommended improvements, the current status of such and estimated costs of these improvements as originally recommended. Additional details of the recommended improvements at each crossing, including maps and drawings, can be found within each of the referenced study final report and/or on the Grand Forks-East Grand Forks MPO website.

Glasston Subdivision

Recommended improvements for railroad crossings located along the Glasston Subdivision come from the Quiet Zone Assessment completed in August 2010 by SRF Consulting. The assessment was performed in order to identify improvements needed at crossings to satisfy Federal Railroad Administration (FRA) requirements for establishing a quiet zone.

University Avenue

The Quiet Zone Assessment recommended improvements to install non-traversable medians extending one hundred (100) feet from the gate arm on the east side of the crossing, and ten (10) feet on the west side (due to proximity to the intersection with North 42nd Street). Pedestrian mazes were recommended for the sidewalk on either side of the crossing. There has been recent NDDOT approval of pedestrian gates for this crossing, rather than the pedestrian mazes. The estimated total cost for the medians was $30,800 (2010).

6th Avenue North

In the Quiet Zone Assessment, no improvements were proposed for the 6th Avenue North crossing, as it had already qualified for quiet zone approval. Pedestrian mazes were recommended for the sidewalk on either side of the crossing. There has been recent NDDOT approval of pedestrian gates for this crossing, rather than the pedestrian mazes. The City did ultimately install a non-traversable median in 2011.

Gateway Drive (US-2)

The crossing at Gateway Drive (US-2) already had medians in place when the Quiet Zone Assessment was completed. However, it was recommended that these medians be reconstructed to a minimum height of six (6) inches in order to receive credit as a quiet zone improvement. The median improvements were completed in 2011 by the City of Grand Forks. Pedestrian mazes were recommended for the sidewalk on either side of the crossing. There has been recent NDDOT approval of pedestrian gates for this crossing, rather than the pedestrian mazes. The estimated total cost for the median improvements was $24,800 (2010).

The US 2 Corridor Access Study briefly mentions this crossing as a major cause of gridlock for the I-29 interchange and suggests that a grade separation between the roadway and railroad may be required to mitigate this deficiency. However, because this crossing was out of scope for the Access Study, no in-depth analysis was undertaken and no cost estimates were developed for the completion of a grade separation. A similar project that may provide an estimate of the potential cost of a grade separation at the Gateway Drive (US-2) location is the 42nd Street & DeMers Grade Separation. Like Gateway Drive (US-2) & 42nd Street, this intersection has a busy rail line running adjacent and parallel to one of the roads. The estimated cost for the grade separation is between $28 million and $30 million (2012 dollars), depending on which alternative is chosen. Further analysis would need to be completed to in order to get an accurate cost of grade separation for Gateway Drive (US-2). Also, a grade separation at this intersection is not currently mentioned in the 2040 Long Range Transportation Plan, nor in any other transportation plan for this area.

27th Avenue North

This crossing was not included in the Quiet Zone Assessment, and has not been considered in any recommendations for improvement within other recent studies. It is currently operational utilizing mast-mounted flashing lights with vehicle gates.

Crossing	Recommended Improvements	Source	Estimated Cost (Year)
University Ave	• Non-traversable medians (Completed 2011) • Pedestrian mazes	Quiet Zone Assessment	$30,800 (2010)
6th Avenue N.	No recommendations[1]	Quiet Zone Assessment	$0
Gateway Drive (US-2)	• Increase height of non-traversable medians (Completed 2011) • Pedestrian mazes	Quiet Zone Assessment	$24,800 (2010)
27th Avenue N.	No recommendations		$0

(1) Even though no improvements were recommended in the Quiet Zone Assessment for this intersection, non-traversable medians were installed in 2011.

Table 10: Glasston Improvements Summary

Mill Spur

Most of the recommended improvements for railroad crossings along the Mill Spur come from the Grand Forks Mill Spur Feasibility Study, which was completed in August 2010. This study was conducted in order to identify overall safety and corridor aesthetics improvements, streamline traffic operations and plan for a future quiet zone. The 2040 Long Range Transportation Plan (LRTP) identifies implementation of recommendations from this study in the Illustrative Projects List within the document. Illustrative projects are those that are currently without reasonably expected funding from traditional sources. This means that although it has been identified as a need, current funding does not support its implementation in the near future. Also included in the 2040 LRTP list of Illustrative Projects is the reconstruction of Gateway Drive (US-2) between North Washington Street (US-81 Business) and Mill Road, which includes the Mill Spur railroad crossing. The Grand Forks – East Grand Forks

Freight Rail Access Study, completed in 2014, also recommends improvements for the Mill Spur, but only at the Gateway Drive (US-2) crossing.

2nd Avenue North

Recommended improvements for this crossing include the installation of two (2)-quadrant railroad vehicle gates, constant warning time, raised medians, pedestrian mazes, relocation of two (2) driveways, and the addition of fencing/plantings along the railroad corridor. The two (2) driveways are to be relocated so that in the future they are further away from the railroad crossing. The estimated cost for these improvements was $408,100 (2010).

University Avenue

Recommended improvements include the installation of two (2)-quadrant railroad vehicle gates, constant warning time, raised medians, pedestrian mazes, realignment of North 10th Street in the southwest quadrant, and the addition of fencing/plantings along the railroad corridor. The realignment of North 10th Street would allow for a more perpendicular angle with University Avenue. The estimated cost for these improvements was $383,900 (2010).

Public Alley Crossing

It is recommended that this crossing be closed to both vehicles and pedestrians. The addition of curbing along the parking lot in the northwest quadrant of the crossing is also recommended in order to keep vehicles from driving or parking too close to the railroad tracks. The estimated cost for closing this crossing was $17,800 (2010).

4th Avenue North

Recommended improvements include the installation of two (2)-quadrant railroad vehicle gates, constant warning time, raised medians, pedestrian mazes, and fencing/plantings along the railroad corridor. The estimated cost for these improvements was $382,200 (2010).

5th Avenue North

Recommended improvements include the installation of two (2)-quadrant railroad vehicle gates, constant warning time, raised medians, pedestrian mazes, the placement of curbing along 5th Avenue North, replacement of sidewalk leading up to crossing, and the addition of fencing/plantings along the railroad corridor. The new curb along 5th Avenue North will eliminate the alley access at this crossing, as this access is located very close to the railroad crossing. The estimated cost for these improvements was $394,100 (2010).

6th Avenue North

It is recommended that this crossing be closed to both vehicles and pedestrians and fencing/plantings be added along the railroad corridor. This crossing has a lower daily traffic volume than most of the other crossings along the Mill Spur and its closing should not substantially affect connectivity. Since it is currently a designated Safe Route to School for pedestrians, it is recommended that Safe Route to School maps change their routes from crossing at 6th Avenue North to crossing at 5th Avenue North. The estimated cost for closing this crossing was $23,500 (2010).

7th Avenue North

It is recommended that this crossing be closed to vehicles and pedestrians and fencing/plantings be added along the railroad corridor. This crossing has some of the lowest daily traffic volume of any on the Mill Spur and its

closing should have minimal impact on connectivity. School buses that use this crossing will have to modify their routes to a different crossing. The estimated cost for closing this crossing was $23,100 (2010).

8th Avenue North

Recommended improvements include the installation of two (2)-quadrant railroad vehicle gates, constant warning time, raised medians, pedestrian mazes, placing curb along 8th Avenue North, replacing sidewalk leading up to crossing, and adding fencing/plantings along the railroad corridor. The new curb will eliminate one (1) driveway access that is currently located very close to the crossing. However, this property has access available from another street. The estimated cost for these improvements was $397,900 (2010).

10th Avenue North

Recommended improvements include the installation of two (2)-quadrant railroad vehicle gates, constant warning time, raised medians, placing curb along 10th Avenue North, and adding fencing/plantings along the railroad corridor. The new curb will eliminate a driveway access that is very close to the crossing. However, this property has access available from another street. No pedestrian facilities currently exist at this crossing and it was decided during the course of the Feasibility Study through public and agency input that further study needed to be done to address pedestrian crossings in this area. Thus, the study did not provide any recommendations for pedestrian improvements. The estimated cost for these improvements was $372,300 (2010).

Gateway Drive (US-2)

Feasibility Study Recommended Alternative
The recommended alternative in the Mill Spur Feasibility Study for recommended improvements includes the installation of two (2)-quadrant railroad vehicle gates, constant warning time, active pedestrian gates, raised medians, placing curb along Gateway Drive, realignment of North 5th Street in the southeast quadrant of the crossing, removal of the channelization island at Gateway Drive (US-2) and Mill Road, relocation of the traffic signal from the channelization island, expansion of the curb in the northwest quadrant of the Gateway Drive (US-2)/Mill Road intersection to accommodate vehicle gates, and adding fencing/plantings along the railroad corridor. The raised median in this alternative includes one (1) on the west side of the crossing as well as a short one (1) on the east side of the crossing. In this alternative, the existing cantilever railroad signal is removed, as it is currently partially covered by the existing westbound traffic signal heads. The new curb along Gateway Drive (US-2) will eliminate one (1) driveway access; however, this property has an alternative access via Washington Street (US-81 Business). The estimated cost for these improvements was $498,800 (2010).

Concept Plan 3

Feasibility Study Recommended Alternative
Recommendations for improvements in Concept Plan 3 come from the Grand Forks – East Grand Forks Freight Rail Access Study. This concept involves building an overpass along Gateway Drive (US-2) over Washington Street (US-81 Business), Mill Spur, and 5th Avenue North/Mill Road. The bridge will be four (4) lanes and the approaches will be built with MSE walls to minimize right-of-way impacts. In order to connect Washington Street with Gateway Drive, a new roadway will be built from the intersection of 20th Street/Gateway Drive (US-2), extending northeast to Washington Street (US-81 Business). New traffic signals will be installed at both intersections. In order to connect North 5th Street/Mill Road with Gateway Drive, 11th Avenue North will be improved to handle additional truck traffic, and a new signalized intersection will be constructed at Gateway Drive (US-2)/11th Avenue North. Due to the bridge approach, North 4th Street at Gateway Drive will be closed and cul-de-sacs constructed on both sides. The total estimated cost for these improvements was $10,079,000 (2014). It should be noted that a Steering Committee member shared that a similar project was recently bid in Dickinson, ND at a cost of approximately $25 million.

Illustrative Project

The 2040 Long Range Transportation Plan lists improvements at this intersection in its Illustrative Projects list. These improvements include reconstructing the roadway and intersections, adding additional turn lanes, removing/reducing skews at intersections, and replacing traffic signals. No additional details are given about these planned improvements. The cost for these improvements is estimated to be $25,000,000 (2013).

Crossing	Recommended Improvements	Source	Estimated Cost (Year)
2nd Avenue N.	• Railroad vehicle gates • Constant warning time • Raised medians • Pedestrian mazes • Relocate two driveways • Fencing/plantings	Grand Forks Mill Spur Feasibility Study	$408,100 (2010)
University Avenue	• Railroad vehicle gates • Constant warning time • Raised medians • Pedestrian mazes • Realign roadway in southwest quadrant of crossing • Fencing/plantings	Grand Forks Mill Spur Feasibility Study	$383,900 (2010)
Public Alley Crossing (Between University and 4th Avenue)	• Close roadway and pedestrian crossing • Curbing along track (northwest of crossing)	Grand Forks Mill Spur Feasibility Study	$17,800 (2010)
4th Avenue N.	• Railroad vehicle gates • Constant warning time • Raised medians • Pedestrian mazes • Fencing/plantings	Grand Forks Mill Spur Feasibility Study	$382,200 (2010)
5th Avenue N.	• Railroad vehicle gates • Constant warning time • Raised medians • Pedestrian mazes • Curbing on 5th Ave N • Fencing/plantings	Grand Forks Mill Spur Feasibility Study	$394,100 (2010)
6th Avenue N.	• Close roadway and pedestrian crossing • Fencing/plantings	Grand Forks Mill Spur Feasibility Study	$23,500 (2010)
7th Avenue N.	• Close roadway and pedestrian crossing • Fencing/plantings	Grand Forks Mill Spur Feasibility Study	$23,100 (2010)
8th Avenue N.	• Railroad vehicle gates • Constant warning time • Raised medians • Pedestrian mazes • Curbing on 8th Ave N • Fencing/plantings	Grand Forks Mill Spur Feasibility Study	$397,900 (2010)

10th Avenue N.	• Railroad vehicle gates • Constant warning time • Raised medians • Curbing on 10th Ave N • Fencing/plantings	Grand Forks Mill Spur Feasibility Study	$372,300 (2010)
Gateway Drive (Feasibility Study Preferred Alternative)	• Railroad vehicle gates • Constant warning time • Raised medians (short median on east side of crossing) • Active pedestrian gates • Realign roadway in southeast quadrant of crossing • Curbing on Gateway Drive • Remove the channelization island/relocate traffic signal • Adjust north curb line (to accommodate 30 foot vehicle gates) • Fencing/plantings	Grand Forks Mill Spur Feasibility Study	$498,800 (2010)
Gateway Drive (Concept Plan 3)	• Construct overpass along Gateway Drive over N. Washington Street, Mill Spur, and Mill Road • Construct roadway connecting N. Washington Street with Gateway Drive at N. 20th Street • Install new traffic signals at Gateway Dr./N. 20th St and N. Washington Street/N. 20th Street • Improve 11th Avenue N. to allow for additional truck traffic and construct signalized intersection at Gateway Drive • Close N. 4th St intersection with Gateway Drive and install cul-de-sacs	Grand Forks - East Grand Forks Freight Rail Access Study	$10,079,000 (2014)
Gateway Drive (Illustrative Project)	• Reconstruct roadway and intersections • Add additional turn lanes • Remove/reduce skews at intersections • Replace traffic signals	2040 Long Range Transportation Plan	$25,000,000 (2013)

Table 11: Mill Spur Improvements Summary

7. Street and Rail Network Improvement Concepts

At-Grade Rail Crossing at Washington Street (US-81 Business)

The proposed unit grain unloading facility off the Glasston Subdivision will require a rail connection to the existing Mill Spur tracks located North of Gateway Drive (US-2). This rail connection will cross Washington Street (US-81 Business) via an at-grade crossing. The location for this crossing has not yet been determined, as it is dependent on the future site for the unit unloading facility. It is highly likely, however, that the unit unloading facility will be located between Bacon Road on the south and Mill Street on the north. The cross section for Washington Street (US-81 Business) in this corridor is two (2) twelve (12) foot traffic lanes with eight (8) foot shoulders, for a total paved width of forty (40) feet.

The 2013 ADT counts for Washington Street (US-81 Business) are four thousand five hundred eighty (4580) at Bacon Road, six thousand six hundred sixty-five (6665) at 27th Avenue North, and four thousand eight hundred eighty (4880) at Mill Street. The projected rail traffic for the proposed connecting track is six (6) trains/day. Using the traffic count at 27th Avenue North will lead to an exposure (product of trains/day and ADT) of thirty-nine thousand nine hundred ninety (39,990). The characteristics of this at-grade crossing with Washington Street (US-81 Business) warrant an active flashing light with gates warning system, as it meets several conditions listed in *"Table 42 –Guidelines for Active Devices"* from the *Revised Second Edition, August 2007, Railroad-Highway Grade Crossing Handbook, US Department of Transportation, Federal Highway Administration*. These guidelines suggest the flashing light with gate active warning systems if the route crossed is on the US highway system, if the ADT exceeds two thousand (2000), and if the crossing exposure exceeds five thousand 5,000 in an urban area. The proposed Washington St (US-81 Business) crossing meets all of the above requirements.

This industrial rail track will be operated at a typical speed of 10 mph. Since there will not be high speed rail traffic, the train detection circuitry will not require Constant Warning Time (CWT) train detection. The crossing surface will require a high type, preferably a concrete crossing surface for the entire width of the pavement including shoulders. This crossing will be through a light industrial/business area and the use of on-board locomotive horns will have little impact on residential areas. For this reason, there are no additional QZ safety measures suggested, such as approach medians.

The cost of the Washington Street (US-81 Business) crossing will be dependent upon the selected location, but for the purposes of this study the assumption used is a perpendicular crossing with no widening required for Washington Street (US-81 Business). For a single track crossing there would need to be forty (40) feet of high type crossing surface, estimated cost at approximately $1000/foot, with a total cost estimate of $40,000 for the crossing surface.

The estimated cost for a flashing light with gate signal system for this type of industrial trackage will be between $125,000 and $150,000. This will make the total estimated cost of the Washington Street (US-81 Business) crossing range between $165,000 and $190,000 (2015).

Future Use for an Abandoned Mill Spur

If the North Dakota State Mill (NDSM) builds a grain unit unloading facility with rail access from the Glasston Subdivision, there will not be a rail freight need for the Mill Spur tracks from the junction with the BNSF main line just south of the 2nd Avenue crossing north to and including the Gateway Drive (US-2) crossing. All entities in addition to the NDSM that currently receive rail freight off the Mill Spur could have their rail freight service switched to the Glasston Subdivision. The decision on the use, abandonment, or taking rail operations of the Mill Spur will be a business decision of the BNSF Railway Company.

If the decision is to take this rail corridor out of rail operations from 2nd Avenue to Gateway Drive (US-2) provides the opportunity for alternate uses of this railroad right-of-way (ROW) for a length of approximately one (1) mile. This possibility has been discussed with Near North Neighborhood representatives and also has been an item of discussion at the first two (2) public meetings on this Glasston Subdivision Mitigation Study. It is understandable that the neighborhood and public are very supportive of alternate uses of this railroad corridor. Following is a summary of the ideas received through outreach efforts to the Near North Neighborhood and the public:

- Public transportation trolley
- Walking/bike path
- Greenway with a walk/bike path emphasizing the historic elements of the Near North Neighborhood
- Linear park with low maintenance plantings

Figure 7: Example of Linear Park Situated Along Arterial

This BNSF right-of-way (ROW) for the Mill Spur was acquired in fee simple title and not as an easement for railroad purposes. This means the ROW is not reversionary and will not revert to adjoining property owners when its use as a railroad corridor has ceased. However "Rail Banking" is allowed under 49 CFR 268.1 Subpart A, this is a federal law that allows for alternate uses of railroad corridor ROW with the provision that when and if this corridor is required/desired for use as a railroad that it be used as a railroad corridor. A sponsor for this rail banking effort could be a governmental jurisdiction or a non-profit organization.

There are presently ten (10) public at-grade crossings on this rail corridor. The land use along the corridor varies from the south to the north. The southwest edge of the Grand Forks Central Business District is on the south and as the corridor heads north it passes through single family residences, businesses and light industry. The corridor is fairly narrow from 2nd Avenue north to 8th Avenue. The corridor widens out at 8th Avenue as the corridor parallels Washington Street (US-81 Business) on the west and continues this width north to Gateway Drive (US-2).

The number of at-grade street crossings detract from the corridor's attractiveness as a hike/bike trail, as ten (10) crossings within a mile would present too many points of conflict between trail users and the motoring public. The varying land uses along the corridor provide multiple opportunities to enhance these existing land uses. Examples of uses for the railroad ROW within select limits follow:

- *2nd Avenue to University Avenue*—adjacent to CBD and business development and could be a downtown green space development.
- *University Avenue to 4th Avenue*—residential on the west and business development on the east, could be a continuation of the previous green space and provide a buffer between the businesses and residences.
- *4th Avenue to 8th Avenue*—this part of the corridor has mainly single family residences with their backyards bordering the ROW, to avoid distractions and personal safety concerns for the residents there should be consideration of the property owners with low maintenance plantings that would shield their property in addition to a continuation of the green space concept.
- *8th Avenue to Gateway Drive (US-2)*—this part of the corridor is wider and would only have one (1) street crossing (10th Avenue) between 8th Avenue and Gateway Drive (US-2), providing the opportunity for this being a short walking path paralleling Washington Street (US-81 Business). This section could incorporate displays emphasizing the historic elements of the Near North Neighborhood. **Figure 6** represents an example of the type of development that could be used for this section of the Mill Spur row.

Option 1—Recommended Improvements

This option is based on the current and future Mill Spur rail freight traffic moving to the Glasston Sub. This option allows for the abandonment of the Mill Spur from its southern main line connection north through the Gateway Drive (US-2) crossing. To accommodate the increased train traffic on the Glasston Sub there is a proposed grade separation project at the Gateway Drive (US-2) crossing with the Glasston Sub just to the east of North 42nd Street. This concept, depicted on **Figure 7**, lowers the Gateway Drive (US-2)/North 42nd Street intersection, and bridges the Glasston Sub over Gateway Drive (US-2) to provide a railroad over grade separation. The detailed estimate of costs for this grade separation concept is included in the **Appendix B**. To enhance the safety of the significant number of pedestrian/bicycle rail crossings traffic to and from the University of North Dakota, fencing is proposed from south of University Avenue to north of 6th Avenue North, along the railroad right-of-way line on both sides of the rail corridor. This fencing would tie into the proposed pedestrian fences at the pedestrian/bicycle sidewalk crossings. There is an option to build a short stretch of connecting road to allow

the UND Transit system to avoid crossing the Glasston Sub on University Avenue and 6th Avenue North. The City Transit System currently crosses the Glasston Sub on both University Avenue and 6th Avenue North, and does incur delays from the train traffic.

There were discussions of grade separations for the pedestrian/bicycle traffic at both 6th Avenue North and University Avenue. With 42nd Street being so close to the tracks, structures under or over the railroad would also need to span 42nd Street. For a structure under the tracks, the bottom of the structure would be required fifteen (15) feet below the top of the rails to meet BNSF clearance requirements and provide a twelve (12) foot clear opening. To meet ADA requirements, this type of structure would be in the range of three hundred (300) feet in length. A structure over the tracks would need to provide a twenty-three and half (23.5) foot clearance over the tracks and would also be in the range of three hundred thirty (330) feet in length. It was generally felt by the project Steering Committee members that the limited use of either type of grade separation did not justify further investigation of grade separations for pedestrian/bicycle at University Avenue and 6th Avenue North.

The City of Grand Forks was recently awarded a North Dakota DOT project that includes the installation of manual swinging gates at all pedestrian crossings in their current quiet zones. This includes the Gateway Drive (US-2), 6th Avenue North and University Avenue pedestrian/bicyclist crossings on the Glasston Sub rail corridor. These gates are not barriers, but are a visual reminder for pedestrians and bicyclists to look both directions for trains before crossing the tracks. The gates will need to be pushed open before crossing providing a physical reminder of the railroad crossing. These can especially be helpful for pedestrians and bicyclist that are distracted or those with a visual impairment. The previous safety proposal for these crossings was a fencing maize. **Figure 8** is an example of the gate system.

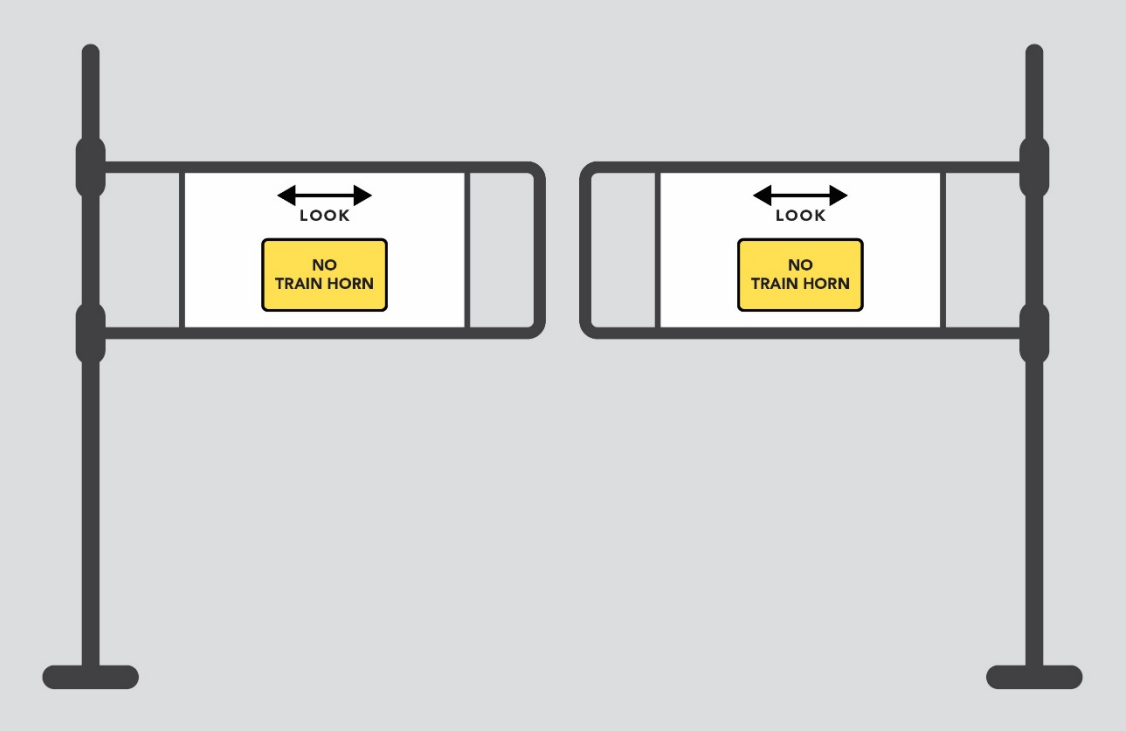

Figure 8: Example of Pedestrian/Bicyclist Gate System

Option 2—Recommended Improvements

This option is based on the Mill Spur current and future rail traffic remaining on the Mill Spur. The rail traffic on the Glasston Sub will increase but not to the level that requires consideration of a grade separation at the Gateway Drive (US-2) crossing. The improvements listed in the Long Range Transportation Plan for the Mill Spur are the major recommended rail corridor improvements. The fencing mentioned in **Option 1** is also included in this **Option 2** to enhance the safety pedestrian/bicycle rail crossings.

Consideration for Emergency Services

The Grand Forks Public Safety Answering Point (PSAP) is the single point for 911 calls requesting Fire, Police, and Medical emergency services. The emergency service personnel answering these requests require expedited access across the numerous rail corridors in the metropolitan area on a daily basis. Grand Forks Traffic Engineering Staff have developed a solution to provide real time information on crossings being blocked by train traffic. A real time map will be furnished to the PSAP center for their use. When a train is at a crossing the RXR icon will flash, there is also a verbal announcement and a text message. This map will also give the PSAP center staff the ability to see city-wide when emergency vehicles are preempting the signals ,signal power outages, signals in flash mode, etc.

This new development takes advantage of existing software, hardware and the city's intranet system. It answers the need for a train detection and information system that is a planned project in the current GF-EGF Regional ITS Architecture. They have had numerous requests to make this information available to the public and they are in the process of working out the details to share this information with the public. They are looking at text messaging and real time projection of the map via the city website.

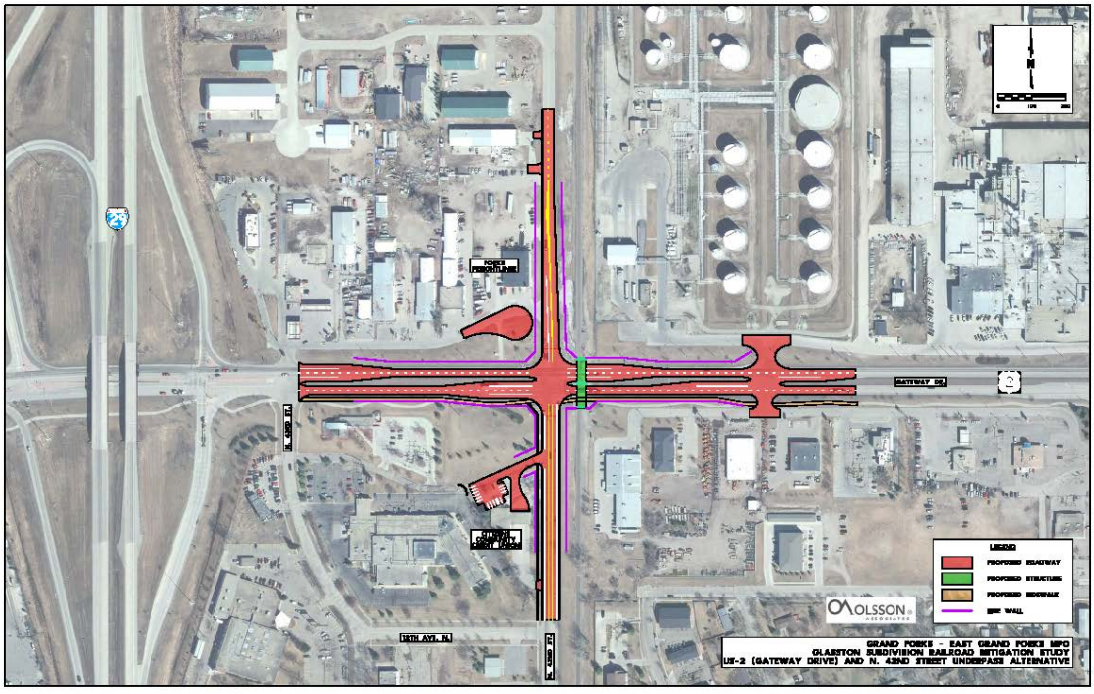

Figure 9: Option One Concept – Grade Separation at Gateway Drive (U.S. 2) and Glasston Sub

8. Benefit/Cost Analysis

The following summarizes the results of the Benefit/Cost Analysis (BCA) developed for two (2) alternative scenarios as described below. This analysis follows directives given by the Federal Railroad Administration (FRA) and U.S. Department of Transportation (USDOT) in required grant application instructions for several types of grant funding programs. Using a No-Build scenario as a baseline, the following information was calculated based on two (2) options for the Glasston Subdivision corridor. The analysis is done by comparing each investment option against the Baseline and discounting the costs and social benefits at a 3% and 7% discount rate. The timeframe for a BCA must include 20 years of activity post-investment. For this analysis, the timeline starts in 2015 moving forward 20 years past the completion of the last investment in each option.

Assumed Baseline: The Baseline for the BCA is a No Build Option

A BCA is built upon a comparison of a no build option or scenario against specific set of project investments. This enables the analysis to be an assessment of what the world would look like if the project investments do not occur. The Baseline attempts to represent the most accurate description of current traffic patterns of both trains and motorized vehicles. It starts with current actual data and projects these movements into the future.

For this analysis two (2) investment options have been chosen:

Option 1: Consolidation of the two (2) rail lines on to Glasston Subdivision

This option will allow the Mill Spur south of Gateway Drive (US-2) to be abandoned and repurposed, with investment needs focused on the Glasston Subdivision proposed grade separation at North 42nd Street and Gateway Drive (US-2). This scenario assumes that the NSDM unit train facility opens in 2018 as well as the NPN fertilizer facility also opens that same year. This being the case, an additional at-grade crossing will need to be built on Washington Street (US-81 Business) where the extended Mill Spur intersects with Washington Street (US-81 Business). (Note: The cost of this additional at-grade crossing is not in this BCA.)

This scenario will enable the removal of the track through the current at-grade crossing at Gateway Drive (US-2) and the removal of ten (10) at-grade crossings on the Mill Spur. The removal of the nine (9) Mill Spur at-grade crossings will improve east-west vehicle mobility on a 24/7/365 basis through the residential area that is currently bisected by the Mill Spur.

Assumptions under Option 1:

- Six (6) trains today, ten (10) trains by 2018 on Glasston Subdivision when the Fertilizer Plant and new unit unloading facility open in that year. Trains will increase to a total of twelve (12) trains in 2021 upon the opening of the new underpass. Trains on Mill Spur: three (3) trains today, dropping to zero (0) trains in 2021
- Removal of train traffic on southern portion of the Mill Spur, effectively closing ten (10) crossings on Mill Spur south of Gateway Drive (US-2)
- Crossing improvements include:
    - A new underpass at North 42nd Street and Gateway Drive (US-2) $28 million (2015), escalating to $33 million (2019) at a 4% annual inflation rate. It is estimated that the improvements will be built over a two (2) year period beginning in early 2019
    - There are no improvements to Mill Spur; instead, the ten (10) crossings at Gateway Drive (US-2) and south will re-open to unimpeded vehicle traffic flows. (Opening the nine (9) at-grade crossings on Mill Spur)
    - A new at-grade crossing at the intersection of the Mill Spur extension and Washington Street (US-81 Business). Estimated cost $190,000. This cost is not in the BCA, nor is the cost of the rail extension

IMPROVEMENTS SUMMARY TABLE OPTION 1			
Crossing	**Recommended Improvements**	**Estimated Cost (Year)**	**2019**
Gateway Drive (US-2) & North 42nd Street	Underpass	$28 Million (2015)	$33 Million (4%/ yr. escalation)
Glasston Subdivision	½ mile of fencing on both sides of rail line south of University to north of 6th (1 mile in total)		$150,000

Table 12: Option 1 Improvements Summary

Option 2: Both the Glasston Subdivision and Mill Spur Rail Lines Remain Open

A grade separation will not be built at Gateway Drive (US-2) on the Glasston Subdivision, although reconstruction of the roadway and intersections will be completed to improve the roadway for vehicle mobility. Improvements included in this scenario are:

IMPROVEMENTS SUMMARY TABLE OPTION 2			
Crossing	**Recommended Improvements**	**Estimated Cost (Year)**	
Glasston Subdivision	½ mile of fencing on both sides of rail line south of University Avenue to north of 6th Avenue North (1 mile in total)		$150,000 (2016)
Gateway Drive (US-2) (Illustrative Project) between Washington Street (US-81 Business) and Mill Rd	Reconstruct roadway and intersections to accommodate additional turn lanes, remove/reduce skews at intersections and replace traffic signals	$25 million (2013)	$40 million (2025) (4% annual inflation) Build in 2025/2026

Table 13: Option 2 Improvements Summary

This option notes a total investment of $0.15 million in fencing and other improvements on Glasston Subdivision and Mill Spur for a two year period starting in 2016. A second set of improvements, to be started in 2025 under this option, estimated to cost $40 million (2025$).

Assumptions under Option 2:

- Glasston Subdivision: Six (6) trains today, increase to eight (8) trains by 2018 when fertilizer plant opens
- Mill Spur: Three (3) trains today, continuing at three (3) trains in 2018 when the fertilizer plant opens
- No rail connection at the north of Glasston Subdivision to the north end of Mill Spur
- No rail crossings will be closed on Mill Spur nor on the Glasston Subdivision

Crossing Information used in this analysis:

Crossing	Road	City	Rank within City with 44 crossings*	Predictive Collision Rating	Train Speed	# Tracks	AADT
Mill Spur							
081286S	2nd Ave N	Grand Forks, ND	3	0.037182	20	1	1100
081287Y	University Ave	Grand Forks, ND	5	0.029795	10	1	4810
081288F	Public alley	Grand Forks, ND	40	0.000181	20	1	50
081289M	4th Ave N	Grand Forks, ND	26	0.007154	20	1	500
081290G	5th Ave N	Grand Forks, ND	12	0.017167	10	1	700
081291N	6th Ave N	Grand Forks, ND	11	0.018018	10	1	820
081292V	7th Ave N	Grand Forks, ND	15	0.015559	10	1	510
081293C	8th Ave N	Grand Forks, ND	7	0.023619	10	1	2055
081295R	10th Ave N	Grand Forks, ND	9	0.022832	10	1	1825
081297E	Gateway Dr.	Grand Forks, ND	14	0.016308	10	1	21115
062501A	University Ave	Grand Forks, ND	20	0.010573	25	1	6150
062502G	6th Ave N	Grand Forks, ND	21	0.010137	25	1	5240
062505C	Gateway Dr.	Grand Forks, ND	10	0.018034	25	1	19555
062506J	27th Ave N	Grand Forks, ND	27	0.006103	25	1	1200

Note: Rankings are based upon the FRA Predictive Collision Rating.

Table 14: Railroad Crossing Safety

Summary of BCA Findings

The Benefit/Cost Analysis (BCA) calculates the benefits and costs of implementing the project against the Base Case or No Build Alternative. The analysis estimates a project's discounted costs versus its discounted societal benefits against the current state (Base Case/ No Build Alternative). The benefits from a project are estimates of the monetized societal benefits achieved from implementing the project.

The monetized value of the societal benefits achieved from closing/ reopening at-grade crossings include: livability, economic competiveness, environmental sustainability and safety.

The BCA only achieves a benefit to cost ratio exceeding 1.0 in **Option 1** at a 3% discount rate. In **Option 1** at 7% discount and in **Option 2** at both 3% and 7% the recommended improvements are larger than the discounted benefits. In the case of **Option 1**, at 3 % discount the monetized benefits are slightly above the costs (Benefits being 120 % of the costs). For **Option 2**, there are no positive societal benefits to offset the costs since the option assumes no crossings will be closed. Thus, there is no reduction in potential fatalities at the crossings, nor any reduction in idling time and the associated benefits of these anticipated events. Reduction in idling time generates three societal benefits: reduction of fuel usage, which also produces reduction in CO_2 and time saved by the driver of the vehicle by not having to stop.

Glasston Sub Overpass Project Benefit to Cost Ratio Analysis								
			Option 1: Consoldation on Glasston Sub			Option 2: Mill Spur Remains Open		
Selection Criteria	Description	Inputs	Value	Monetized Value		Value	Monetized Value	
				Discount Rate 7%	Discount Rate 3%		Discount Rate 7%	Discount Rate 3%
Livability	Travel time saved	Reduction of idle time	685,252 hours saved by reduced idling at Xings	$ 1,684,754	$ 4,672,830	453,502 hours saved by reduced idling at Xings	$ (11,507,242)	$ (18,911,690)
Economic Competiveness	Fuel savings due to reduced idling time	Gallons of fuel saved	1,028,000 gallons of fuel saved by reducing idling	$ 129,596	$ 359,448	680,253 gallons of fuel saved by reducing idling	$ (885,172)	$ (1,454,745)
State of Good Repair	Reduction of maintenance at grade crossings that will be closed	# RR crossing closed	10 RR crossing closed	$ 1,239,644	$ 1,977,430	0 RR crossing closed	$ -	$ -
Environmental Sustainabilit	Environmental Benefits from Reduced Emissions	CO_2 cost savings	9,177 metric tons of CO_2 saved	$ 347,060	$ 347,060	6,074 metric tons of CO_2 saved	$ (1,215,231)	$ (1,215,231)
Safety	Reduced fatalities	Reduction of potential fatalities	$8.0 million saved	$ 4,746,872	$ 14,035,833	$3.3 million saved	$ -	$ -
Total Cost				($20,230,787)	($17,774,469)		$ (16,707,446)	$ (18,504,661)
Total Benefits				$ 8,041,290	$ 21,340,188		$ (13,607,645)	$ (21,581,666)
Net Present Value				**$ (12,189,497)**	**$ 3,565,719**		**$ (30,315,091)**	**$ (40,086,327)**
Benefit to Cost Ratio				**-0.4:1**	**1.2:1**		**-0.8:1**	**-1.2:1**

Table 15: Glasston Sub Overpass Benefit/Cost Ratio Analysis (Options 1 and 2)

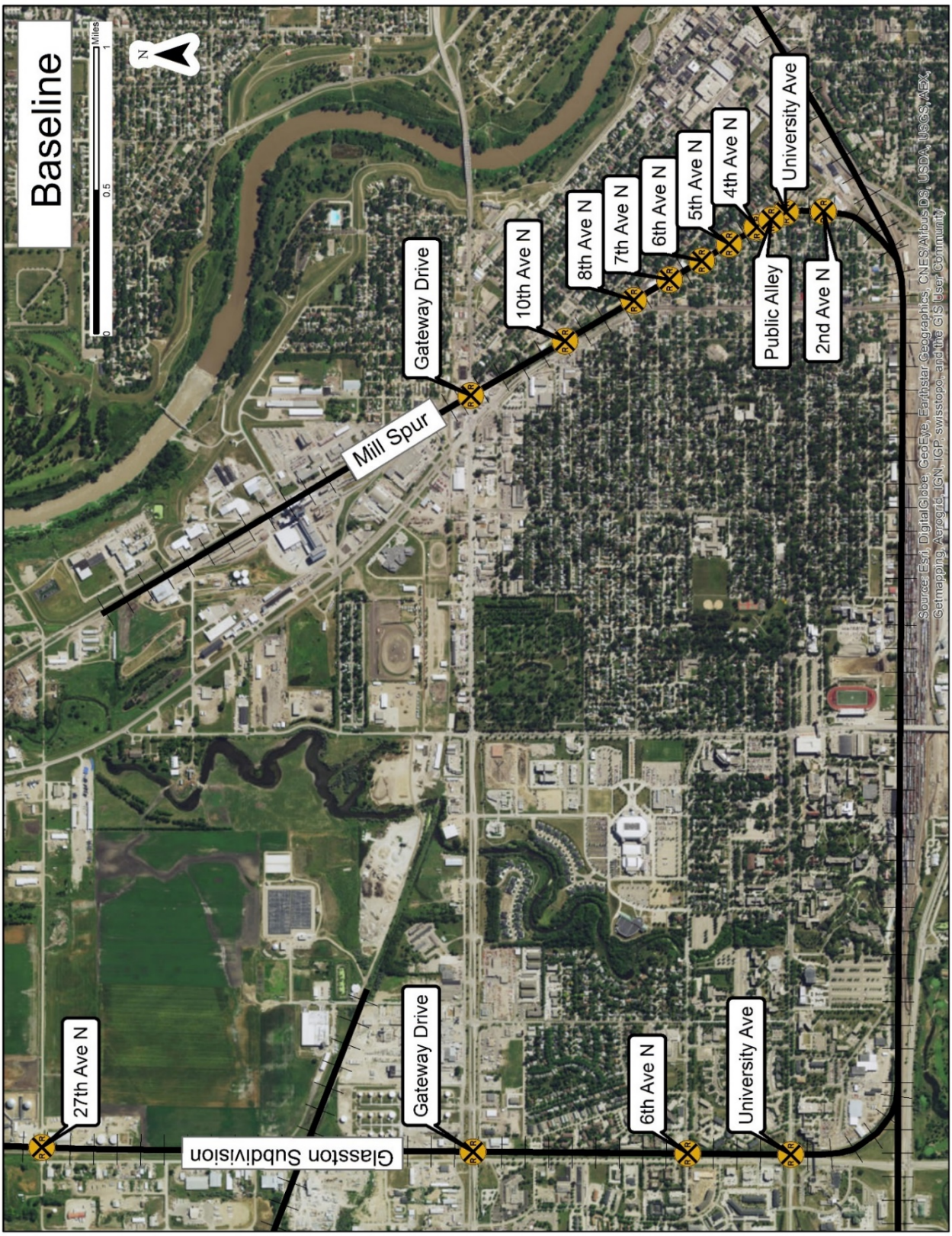

Figure 10: Baseline Option

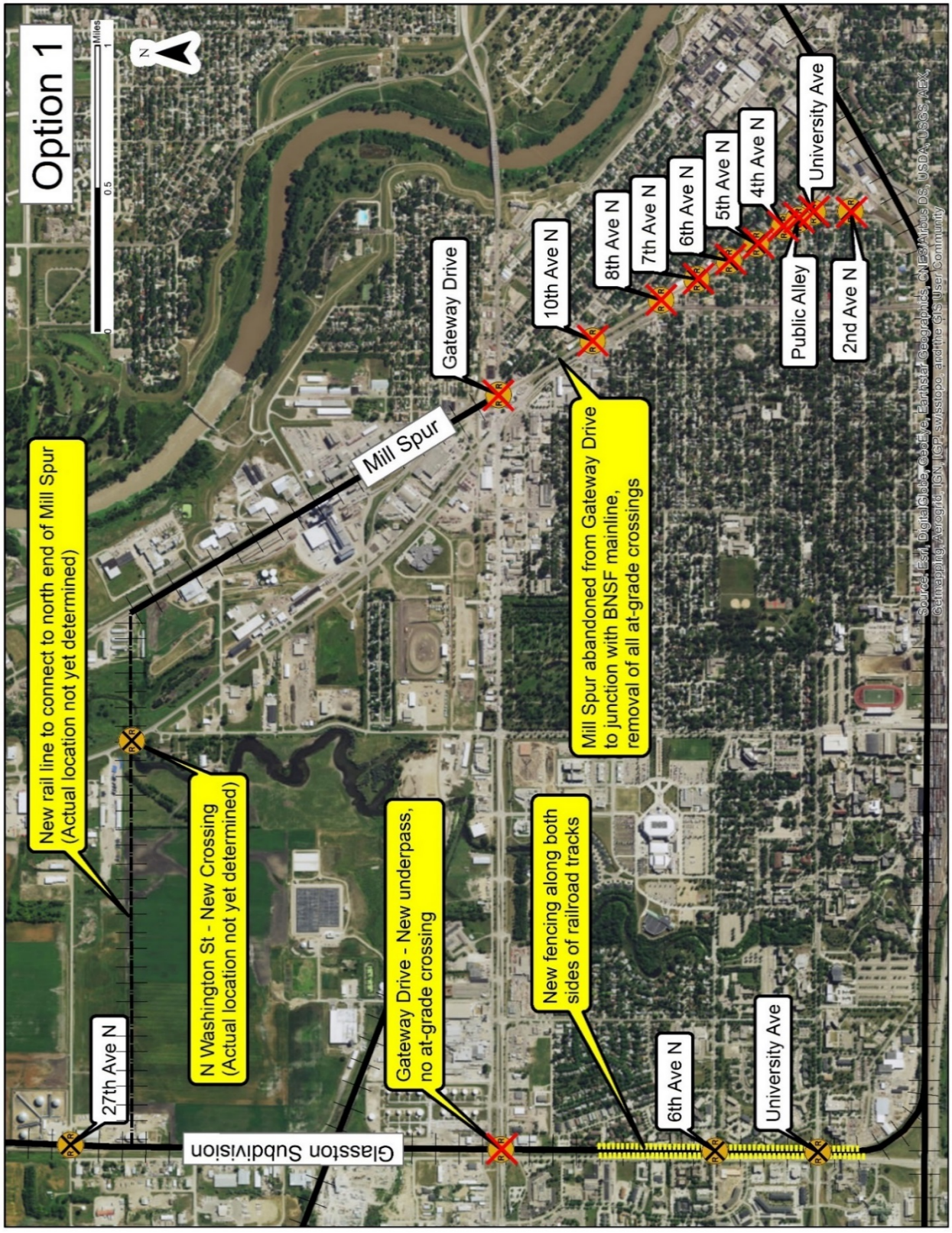

Figure 11: Option 1

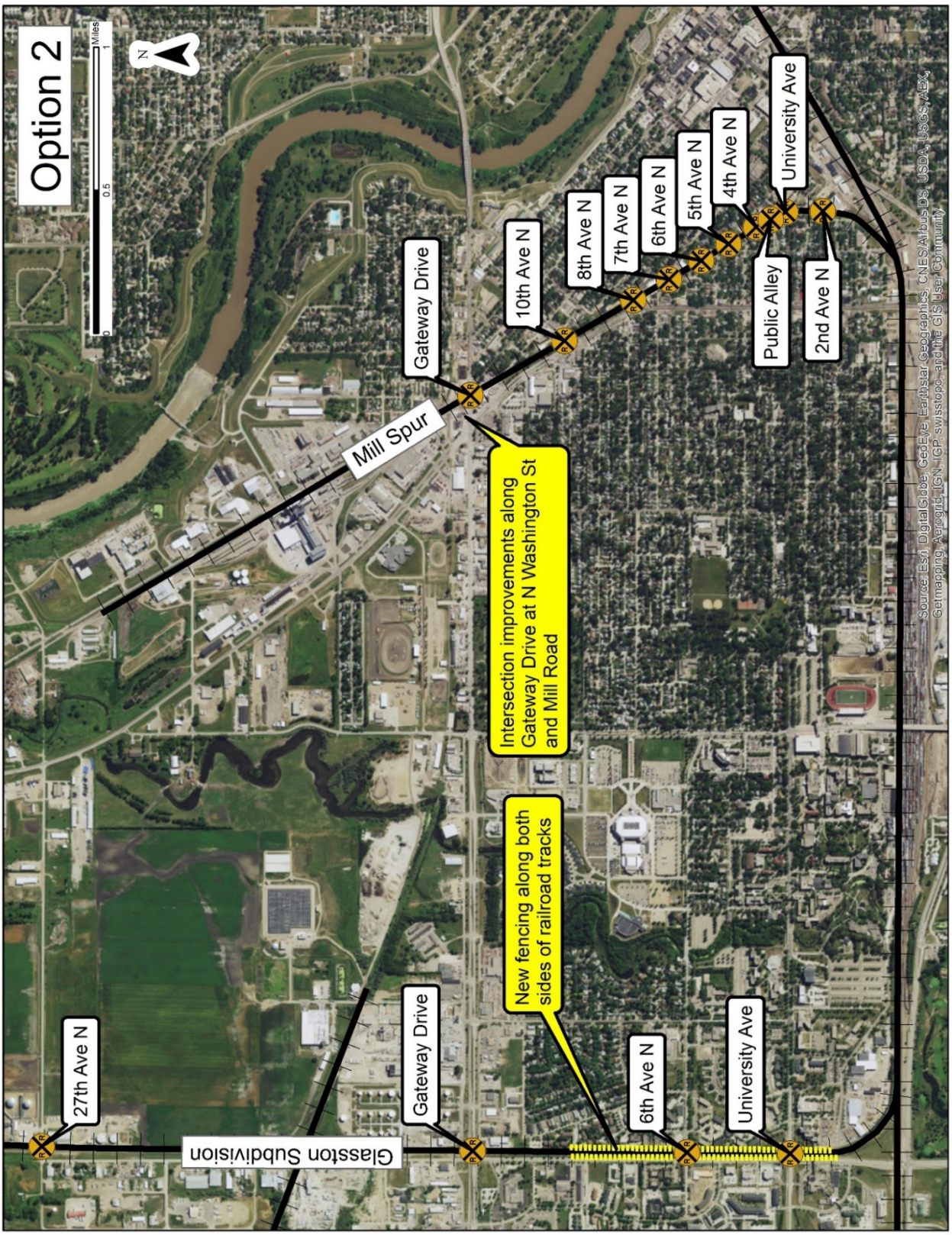

Figure 12: Option 2

9. Summary

This study has investigated the current and projected future traffic and rail network scenarios to measure the impacts and opportunities for both the BNSF Glasston Sub and Mill Spur. The traffic at the four crossings on the Glasston Sub has been reviewed by mode of travel, including considerations for transit, pedestrian and bicycle. The proposed unit unloading facilities for both the Northern Plains Nitrogen fertilizer plant and the North Dakota State Mill have required the evaluation of the increased rail traffic's impact on the Glasston Sub's at-grade crossings. The potential for all Mill Spur rail customers being serviced off the Glasston Sub has provided the opportunity to review future uses of this railroad right-of-way if it is no longer required for rail freight.
The study has shown that the rail traffic on the Glasston Sub could double to twelve (12) trains/day if both unit unloading facilities are built and all current Mill Spur rail freight traffic is transferred to the Glasston Sub. The improvement concepts evaluated to mitigate traffic safety impacts are: the grade separation of the Gateway Drive (US-2)/Glasston Sub crossing near the North 42nd Street intersection, fencing paralleling the Glasston Sub from north of 6th Avenue North to south of University Avenue, and there is a new system being implemented by the City of Grand Forks that recognizes highway/rail crossings blocked by train traffic and will be used to enhance the routing of emergency services.

The matrix below displays the Long Range Planning Goals against the Benefits achieved in the Glasston Subidvision Benefit Cost Analysis.

Street and Highway Plan Goals	Livability	Economic Competitiveness	State of Good Repair	Environmental Sustainability	Safety
Economic Vitality	●	●			
Security					
Accountability & Mobility	●	●			
Environmental/ Energy/ Quality of Life	●	●		●	
Efficient System Management					
Integration and Connectivity	●				
System Preservation			●		
Safety					●

Table 16: Glasston Improvements Benefit Cost Analysis

Appendix A: Glasston Subdivision Crossings Evaluation Project Outcomes as related to Grand Forks MPO and Regional Performance Measures and Targets

GOAL		Performance Measure	Performance Targets	Glasston Subdivision
Goal 1: Economic Vitality	Support the economic vitality through enhancing the economic competitiveness of the metropolitan area by giving people access to jobs, education services as well as giving business access to markets.	• Land use and economic development initiatives consistent with the LRTP and TIP projects	• Ninety percent (90%) land use and economic development initiatives consistent with the LRTP and TIP projects	✓
		• Communication /coordination improvement between freight operators and transportation officials	• Communication/coordination improvement between freight operators and transportation officials via minimum of semi-annual meetings	✓
Goal 2: Security	Increase security of the transportation system for motorized and non-motorized uses.	• Blockage of emergency transportation routes	• 75 percent of emergency transportation routes remain unblocked	✓
		• Incident clearance time	• Clearance time for federal aid eligible route incidents under three year average of 30 minutes	
Goal 3: Accessibility and Mobility	Increase the accessibility and mobility options for people and freight by providing more transportation choices.	• Vehicle hour delays along arterial streets with coordinated signal timing plans	• Reduce vehicle hour delays every year by improving signal coordination and timing plans	✓
		• Signalized intersection Level of Service (LOS)	• Maintain a LOS C on 90 percent or better of the signalized intersections throughout the metro area (Please note: Some intersections cannot be reasonably improved to a LOS C)	

GOAL		Performance Measure	Performance Targets	Glasston Subdivision
Goal 4: Environmental/ Energy/QOL	Protect and enhance the environment, promote energy conservation, and improve quality of life by valuing the unique qualities of all communities – whether urban, suburban, or rural.	• Transportation-related CO_2 emissions	• By 2040, reduce transportation-related CO2 emissions by 10 percent below 2007 levels. A reduction of 17,579 tons of transportation related CO_2 emissions is needed every five years	✓
		• Time/cost of project delivery	• Reduce the time/cost of project delivery by 20 percent	
		• Population characteristics such as low income, minority percentage, gender, disabled percentage and percentage having Limited English Proficiency (LEP)	• Maintain EJ, Title VI, LEP plans to ensure they reflect current and future demographics, as well as community needs	
Goal 5: Integration and Connectivity	Enhance the integration and connectivity of the transportation system, across and between modes for people and freight, and housing, particularly affordable housing located close to transit.	• Daily vehicle miles traveled	• By 2040, reduce daily vehicle miles traveled per capita by 10 percent below 2010 levels. A reduction of approximately 2,885 daily vehicle miles traveled is needed every year	

GOAL		Performance Measure	Performance Targets	Glasston Subdivision
Goal 6: Efficient System Management	Promote efficient system management and operation by increasing collaboration among federal, state, local government to better target investments and improve accountability.	• Comparison of programmed dollar amounts to actual obligated dollar amounts	• Have no greater than 25 percent variance when comparing programmed dollar amounts to the actual obligated dollar amounts for projects listed in the GF/EGF MPO TIP	
		• Public Participation Plan - attendance at meetings, prior notice, key points of decision	• Increase the effectiveness of the GF/EGF MPO Public Participation Plan in informing, education and engaging the public in transportation decisions	✓
Goal 7: System Preservation	Emphasize the preservation of the existing transportation system by first targeting federal funds towards existing infrastructure to spur revitalization, promote urban landscapes and protect rural landscapes.	• Condition of pavement	• Reduce percentage of pavements rated in “poor” condition	
		• Condition of bridges and bridge decks	• 85 percent of bridges rated as “good” and “satisfactory”	
		• Dollars of discretionary funds secured	• Increase the number of dollars of discretionary funds secured by the GF/EGF area	
		• Amount of federal funds towards existing infrastructure	• Track percentage of federal funds programmed towards existing infrastructure	

GOAL		Performance Measure	Performance Targets	Glasston Subdivision
Goal 8: Safety	Increase safety of the transportation system for motorized and non-motorized uses.	• Number of traffic fatalities and serious crashes	• Target zero traffic fatalities by the year 2040	✓
			• Reduce intersection crash frequency, with a focus on severe crashes, for all nodes with significant commuter and freight traffic volumes, and compare to critical crash rates	✓

Appendix B: Opinion of Cost

Grand Forks - East Grand Forks MPO

Glasston Subdivision Railroad Mitigation Study

US-2 (Gateway Drive) and N. 42nd Street Underpass Alternative

Opinion of Probable Cost

Roadway, Grading and Drainage Items for Gateway Drive and N. 42nd Street

Item Description	Unit	Quantity	Unit Price	Extension
Pavement and Sidewalk Removal	Cu. Yd.	6,750.00	25.00	168,750.00
Pavement Sawing	Lin. Ft.	500.00	4.50	2,250.00
General Clearing and Grubbing	Lump Sum	1.00	50,000.00	50,000.00
Excavation	Cu. Yd.	111,800.00	15.00	1,677,000.00
Aggregate Base Course	Ton	4,520.00	25.00	113,000.00
10" P.C. Concrete Pavement	Sq. Yd.	13,710.00	48.00	658,080.00
9" P.C. Concrete Pavement	Sq. Yd.	7,970.00	45.00	358,650.00
6" Concrete Driveway	Sq. Yd.	1,860.00	35.00	65,100.00
5" Concrete Bikeway	Sq. Ft.	15,125.00	4.50	68,062.50
4" Concrete Sidewalk	Sq. Ft.	2,975.00	4.00	11,900.00
Retaining Wall (Assume Soil Nail)	Sq. Ft.	60,036.00	50.00	3,001,800.00
Concrete Traffic Barrier	Lin. Ft.	2,000.00	300.00	600,000.00
Storm Sewer Inlets	Each	14.00	2,500.00	35,000.00
18" RCP Storm Sewer	Lin. Ft.	200.00	60.00	12,000.00
24" Storm Sewer	Lin. Ft.	1,000.00	80.00	80,000.00
48" Storm Sewer	Lin. Ft.	400.00	225.00	90,000.00
48" Storm Sewer w/Casing Jacked In Place	Lin. Ft.	150.00	1,000.00	150,000.00
Pump Station w/Discharge Piping & Wet Well	Lump Sum	1.00	6,150,000.00	6,150,000.00
Storm Sewer Manhole 60"	Each	5.00	6,000.00	30,000.00
Pavement Markings and Signing	Lump Sum	1.00	50,000.00	50,000.00
Erosion Control Items/Seeding	Lump Sum	1.00	100,000.00	100,000.00
Traffic Signal	Lump Sum	1.00	275,000.00	275,000.00
Roadway Lighting	Lump Sum	1.00	85,000.00	85,000.00
Traffic Control/Barricades	Lump Sum	1.00	100,000.00	100,000.00
Construction Staking (Total Project)	Lump Sum	1.00	120,000.00	120,000.00
Mobilization for Roadway & Grading	Lump Sum	1.00	1,400,000.00	1,400,000.00
		Roadway, Grading and Drainage Items =		**15,451,592.50**

Grand Forks - East Grand Forks MPO

Glasston Subdivision Railroad Mitigation Study

US-2 (Gateway Drive) and N. 42nd Street Underpass Alternative

Opinion of Probable Cost

Roadway, Grading and Drainage Items for 27th Avenue North from 42nd Street to Business 81

Item Description	Unit	Quantity	Unit Price	Extension
General Clearing and Grubbing	Lump Sum	1.00	15,000.00	15,000.00
Excavation	Cu. Yd.	2,500.00	15.00	37,500.00
Aggregate Base Course	Ton	2,531.00	25.00	63,275.00
8" P.C. Concrete Pavement	Sq. Yd.	12,150.00	44.00	534,600.00
6" Concrete Driveway	Sq. Yd.	2,000.00	35.00	70,000.00
24" Storm Sewer	Lin. Ft.	500.00	80.00	40,000.00
Pavement Markings and Signing	Lump Sum	1.00	10,000.00	10,000.00
Erosion Control Items/Seeding	Lump Sum	1.00	10,000.00	10,000.00
Traffic Control/Barricades	Lump Sum	1.00	10,000.00	10,000.00
Construction Staking (Total Project)	Lump Sum	1.00	10,000.00	10,000.00
Mobilization for Roadway & Grading	Lump Sum	1.00	90,000.00	90,000.00
		Roadway, Grading and Drainage Items =		**890,375.00**

Private Utility Relocations

Item Description	Unit	Quantity	Unit Price	Extension
BNSF Communication/Signal/Crossing Removal	Lump Sum	1.00	75,000.00	75,000.00
		Private Utility Relocations =		**75,000.00**

Water Main Relocations

Item Description	Unit	Quantity	Unit Price	Extension
8" PVC Water Main*	Lin. Ft.	750.00	75.00	56,250.00
12" PVC Water Main*	Lin. Ft.	600.00	110.00	66,000.00
16" PVC Water Main*	Lin. Ft.	1,550.00	150.00	232,500.00
Steel Casing Bored in Place	Lin. Ft.	400.00	250.00	100,000.00
Miscellaneous Water Items	Lump Sum	1.00	40,000.00	40,000.00
Mobilization for Water Main Work	Lump Sum	1.00	50,000.00	50,000.00
		Water Main Relocations =		**544,750.00**

Sanitary Sewer Relocations

Item Description	Unit	Quantity	Unit Price	Extension
8" VCP Sanitary Sewer	Lin. Ft.	2,150.00	90.00	193,500.00
Manhole	Each	8.00	6,500.00	52,000.00
Submersible Lift Station (240 gpm at 25 ft TDH)	Lump Sum	1.00	175,000.00	175,000.00
4" PVC Forcemain	Lin. Ft.	375.00	25.00	9,375.00
Steel Casing Bored in Place	Lin. Ft.	100.00	150.00	15,000.00
Miscellaneous Sanitary Items	Lump Sum	1.00	30,000.00	30,000.00
Mobilization for Sanitary Sewer Work	Lump Sum	1.00	50,000.00	50,000.00
		Sanitary Sewer Relocations =		**524,875.00**

Grand Forks - East Grand Forks MPO

Glasston Subdivision Railroad Mitigation Study

US-2 (Gateway Drive) and N. 42nd Street Underpass Alternative

Opinion of Probable Cost

Railroad Items

Item Description	Unit	Quantity	Unit Price	Extension
New RR Bridges at Gateway Dr.	Lin. Ft.	150.00	9,000.00	1,350,000.00
New RR Track Construction at Bridge	Lin. Ft.	300.00	350.00	105,000.00
Railroad Flagging	Cal. Day	240.00	900.00	216,000.00
Mobilization for Railroad Work	Lump Sum	1.00	200,000.00	200,000.00
			Railroad Items =	**1,871,000.00**

Subtotal Construction and Utility Relocations =	**19,357,593**
Contingencies (15%) =	**2,903,639**
Total Estimated Construction Cost (Includes Utility Relocations) =	**22,261,231**
Estimated Final Engineering Design Costs (10% of Construction) =	**2,226,123**
Estimated City Administrative Costs (2% of Construction) =	**445,225**
Construction Engineering, Testing & CO Allowance (15% of Construction) =	**3,339,185**
Total Opinion of Cost for Capital Improvement Program (2015 Dollars) =	**28,271,764**

Assuming Average Construction Inflation Rate =	6.00%
Projected Cost at 2016 =	31,766,154
Projected Cost at 2017 =	33,672,123
Projected Cost at 2018 =	35,692,450
Projected Cost at 2019 =	37,833,998
Projected Cost at 2020 =	40,104,037