EAST GRAND FORKS NORTHWEST STREET NETWORK STUDY

FINAL REPORT
FEBRUARY 23, 2012

Prepared for:

Grand Forks - East Grand Forks Metropolitan Planning Organization

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Acknowledgements

Alliant acknowledges and thanks the members of the Study Review Committee for their participation in the study process. Their involvement provided valuable insight and was important to the successful completion of the study.

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Executive Summary

This study will assist the City of East Grand Forks, the GF-EGF MPO and MnDOT in determining whether the planned improvement of the reconstruction of the US Highway 2/5th Ave NW to a full access with traffic signalization should remain in the LRTP or if another geometric alternative is more appropriate. Feasible alternatives for this intersection will be presented in this study.

This study will also consider other components that play a role in north-south traffic flow in the northwest area of East Grand Forks. The River Road NW and 17th St NW/12th Ave NW intersection is one of the components. This intersection has received many complaints due to perceived safety issues and right-of-way confusion. As a result, this study will highlight feasible alternatives for this intersection. This study will also consider the future multi-use trail connection from the existing trail head on 12th St NW to the existing US Highway 2 multi-use trail underpass and the possibility of closing the US Highway 2 Off-Ramp to 8th Ave NW.

On behalf of the Grand Forks – East Grand Forks Metropolitan Planning Organizations (GF-EGF MPO), Alliant Engineering, Inc. completed the East Grand Forks Northwest Street Network Study.

Study Purpose

The purpose of the study is to preserve and possibly enhance the north – south traffic flow in the northwest area of East Grand Forks. In particular, this study will highlight the following four transportation components in this area:

- Alternatives for the US Highway 2/5th Ave NW intersection.
- Alternatives for the River Road NW and 17th St NW/12th Ave NW intersection.
- Future multi-use trail connection from the trail head on 12th St NW, along 8th Ave NW to 10th St NW, and connection to the existing underpass.
- The possibility of closing the Westbound US Highway 2 Off-Ramp to 8th Ave NW.

A detailed set of feasible improvement alternatives for the transportation components will be presented in this report.

Public Involvement

The public involvement process included Study Review Committee (SRC) meetings. The SRC met four times throughout the study process and provided review and guiding direction for the study. Additionally, three public open houses were held to encourage citizen participation in the study.

A website was established at the beginning of the project to provide another way for the general public to be informed about the project status and to disseminate information. The URL for the site is http://www.theforksmpo.org/.

Technical Analysis

A detailed technical analysis was completed to evaluate the existing and future (year 2035) roadway and multimodal facilities. Key elements include; roadway/intersection safety, land use, planned infrastructure, programmed improvements, forecast traffic volumes and traffic operations analysis. Identification of roadway/intersection deficiencies, gaps in pedestrian/bicycle trail connections and future transportation needs as it relates to both motor vehicle traffic and multimodal facilities are documented.

Evaluation of Recommended Alternatives

Base on review and feedback from the SRC and the public on the potential feasible alternatives, detailed recommended improvement alternatives were identified for the four studied transportation components. For the US Highway 2/5th Ave NW intersection, interconnect and timing improvements to the study area signal system network is recommended for the existing conditions and the short-term timeframe (0 to 5 years). For long-term conditions (15 to 25 years), a full access signalized intersection is recommended. A signal warrant analysis estimates that a traffic signal will be warrant in year 2018 based on projected traffic volumes. A traffic signal should be installed if and when it is warranted based on congestion levels. This intersection should be monitored in the future to determine if a signal is needed in year 2018 or at some point after. It is noted that a MnDOT Intersection Control Evaluation (ICE) report will be needed to show that a signal is warranted at this location before this recommendation can be implemented. Accordingly, this recommendation of a full signalized intersection for the long-term time frame should be preserved in the LRTP. Figures ES-1 and ES-2 illustrate these recommendations. Figure ES-3 shows the recommended improvement of realigning River Road NW and creating a typical right-angle stop-controlled intersection for the River Road NW and 17th St NW/12th Ave NW intersection. Figure ES-4 details the recommended multi-use trail connection from the trail head on 12th St NW, along 8th Ave NW to 10th St NW, and connection to the existing underpass. Detailed discussion and description of each recommended alternative are discussed in Section 5.0.

Recommended Implementation Plan

Recommendations were developed based on input from the SRC, public open houses and the results of the technical analysis completed as part of the study process. An implementation plan has been developed to provide a schedule of priority for the infrastructure and multimodal recommendations and to denote the anticipated timeline and associated “triggers” of when the improvements might be necessary.

The implementation plan provides the GF-EGF MPO with guidance and serves as a planning tool to develop a prioritized set of transportation improvements. The implementation plan is not contractual and could be subject to change based on actual development plans, market conditions or other unforeseen traffic changes that may occur in the future.

Preliminary costs were developed for the recommended alternatives. The costs are high level planning estimates and should be applied/utilized in that regard. The improvement costs are based on estimated year 2010 construction costs with a 4% annual increase and include surface level features only. A detailed cost estimate breakdown for each alternative is included in Appendix C.

The implementation plan and preliminary cost estimates are highlighted in Table ES-1.

Funding Sources

To support the implementation of the recommended alternatives, the GF-EGF MPO may seek support from available funding sources. Key funding sources include:

- Mn/DOT District 2 Area-wide Transportation Partnership (ATP) City Sub-Target funds and East Grand Forks funds for the US Highway 2/5th Ave NW intersection.
- The Mn/DOT ATP Sub-Target funds or State funds for the US Highway 2 Corridor and Central Avenue Corridor signal interconnect and coordination plans.
- ATP City Sub-Target funds, East Grand Forks funds and State Aid funds for the River Road &17th Ave NW/17th St NW intersection.
- Transportation Enhancement (TE) funds for the Multi-Use Trail Connection.
- Highway Safety Improvement Program (HSIP) funding may be available for the recommended alternatives.
- Federal Aid opportunities may be available.

EXISTING TRAFFIC SIGNAL

INTERCONNECT

SIGNAL TIMING PLANS WILL NEED TO BE DEVELOPED & IMPLEMENTED FOR:
- NORMAL CONDITIONS
- FLOOD CONDITIONS (ALREADY DEVELOPED IN ATAC BRIDGE CLOSURE STUDY. NEED TO BE REVIEWED & UPDATED, IF NEEDED.)

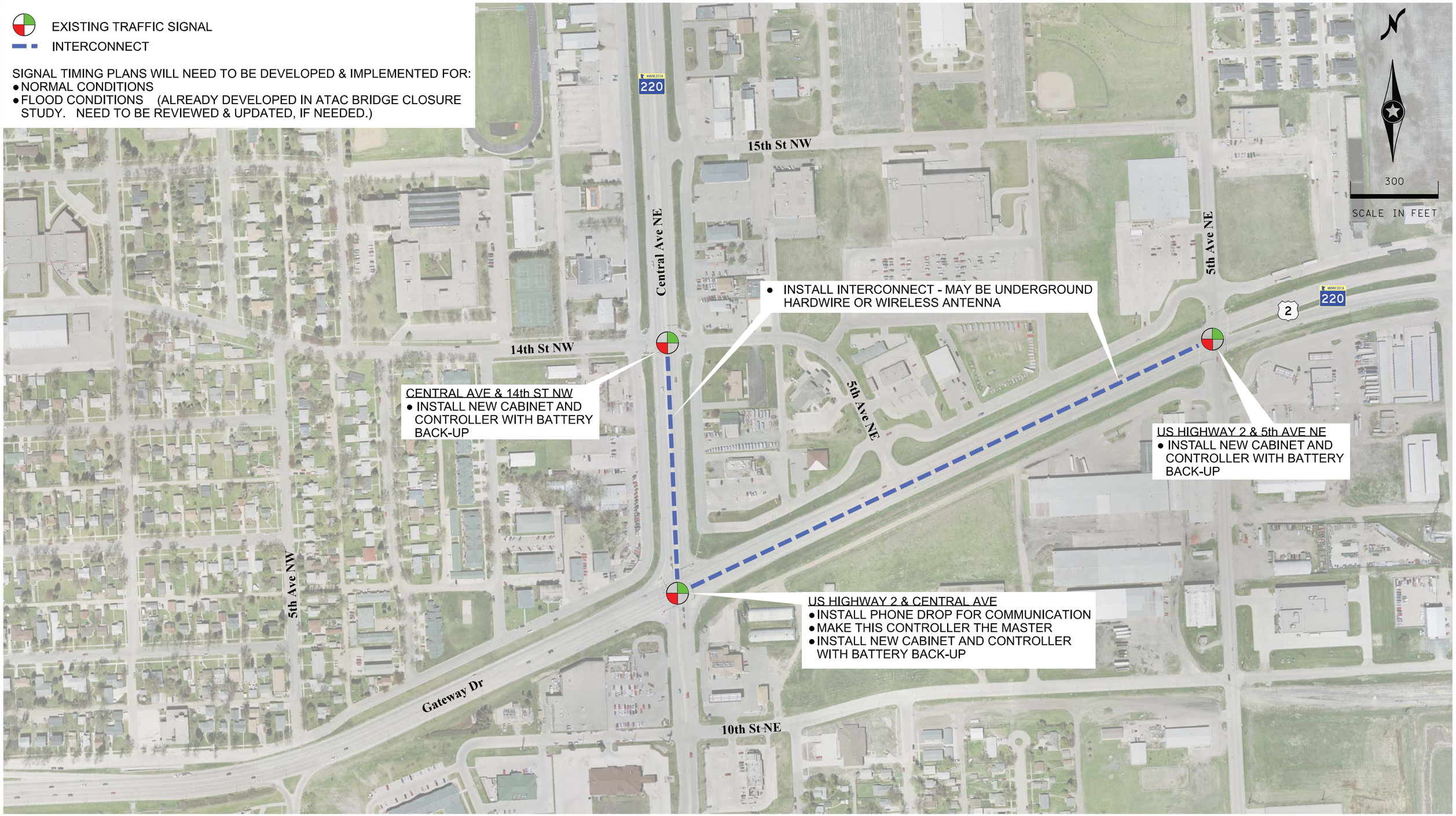
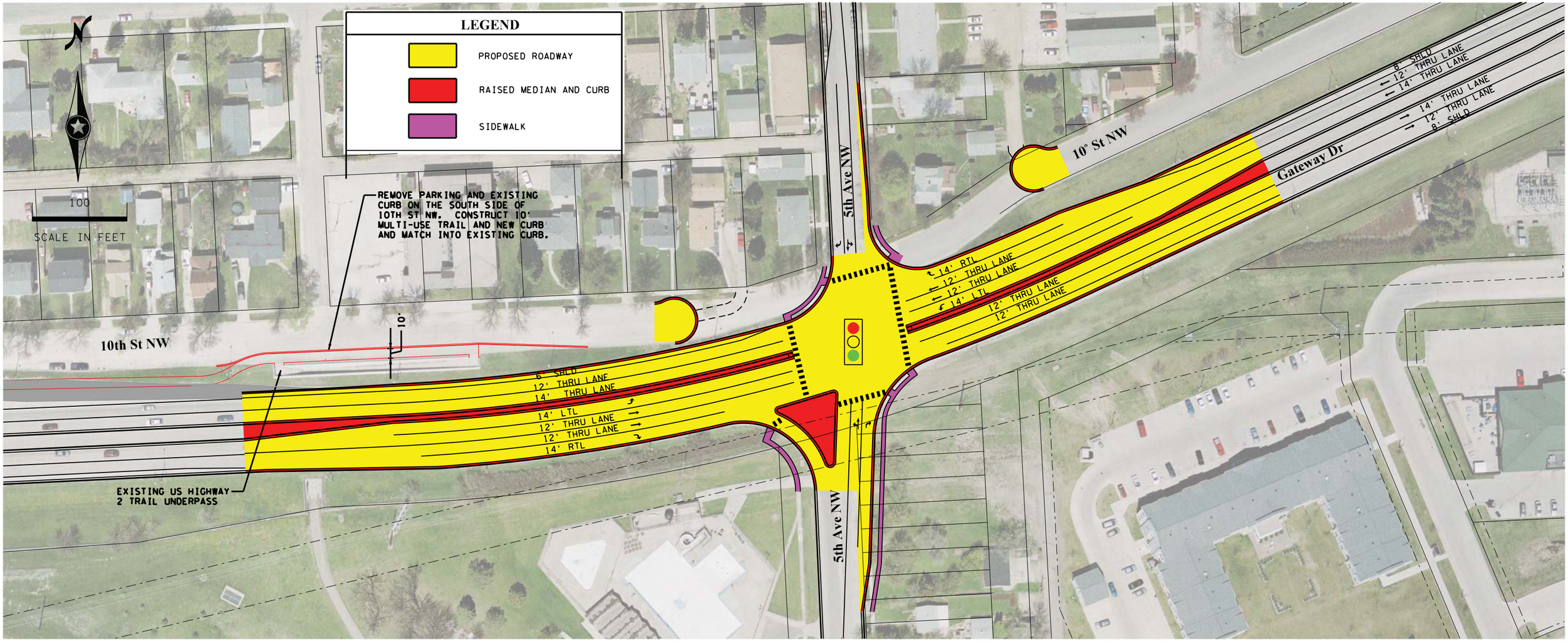


FIGURE ES-1
DO NOTHING WITH SIGNAL IMPROVEMENTS ALTERNATIVE



SIGNALIZED FULL ACCESS INTERSECTION

(1) TRAFFIC OPERATIONS:

- Acceptable 2035 AM & PM peak hour operations for the study area network. This assumes interconnect and coordination of study area traffic signals.
- During flood conditions downtown and neighborhood full access will be available.
- On-street parking on the north and south legs of 5th Ave NW near the intersection will be prohibited.

(2) MULTIMODAL (PED, BIKE & TRANSIT):

- The removal of the WB US 2 Off-Ramp is assumed with this option. A future 10' multi-use trail can be constructed in the area of the removed WB US 2 Off-Ramp. The multi-use trail would connect the existing underpass to the trail head at 12th St NW.
- Ped/Bike crossing of US 2 would be via at-grade crosswalks at the signal. The signal will have marked crosswalks, pedestrian crossing push-buttons and crossing countdown timers.
- This alternative would be beneficial to transit operations. The black line could cross US 2 at 5th Ave NW instead of Central Ave.

(3) SAFETY:

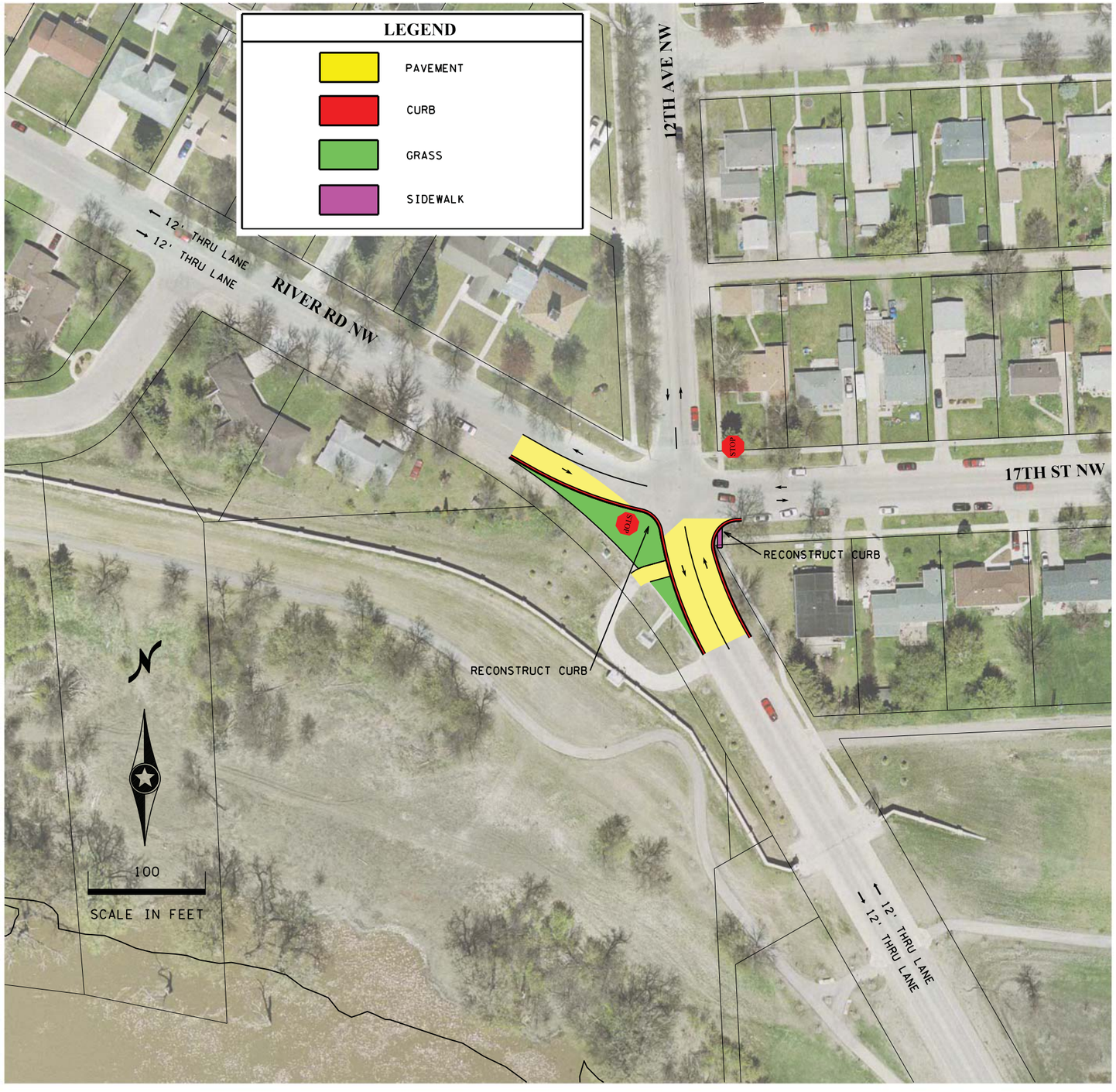
- The crash potential at traffic signals is higher than stop-controlled intersections, but the severity of the crashes is lower. The addition of a traffic signal will result in more crashes than the other alternatives, particularly rear-end crashes. Optimal signal timing could reduce the potential of rear-end crashes.

(4) ACCESS / CONNECTIVITY (DOWNTOWN & NEIGHBORHOOD):

- All intersection movements are allowed with a traffic signal. Neighborhood and downtown access will be improved. Traffic will increase on neighborhood roads (5th Avenue NW and 14th St NW).

(5) COST:

- Cost is ~$1.8 million.
- The north leg of the intersection will need to be constructed as well as cul-de-sacs on 10th St NW. US 2 will need to be widened to provide turn lanes. The pork chop on south leg will need to be reconstructed. Signal hardware and interconnect will need to be provided. Additionally, grade issues through the intersection will need to be corrected.



REALIGNED INTERSECTION

(1) SAFETY:

- Traffic from 12th Ave NW and the south leg of River Rd will be free-flowing as these approach have higher traffic volumes.
- Right-of-way confusion will be eliminated with the new right-angle geometry and standard side-street stop control.
- This alternative could be tested and be temporarily constructed with temporary striping and use of some type of barrier or barrels for the southwest curb.

(2) COST:

- Cost is ~$105,000.
- Curb reconstruction, striping and signing will be rquired.

FIGURE ES-3
RIVER RD REALIGNMENT ALTERNATIVE
RIVER RD NW& 17th ST NW / 12th AVE NW

CONSTRUCT 10' MULTI-USE TRAIL TO CONNECT TO EXISTING TRAIL

INSTALL CROSSWALK

MATCH TO EXISTING CONCRETE PAD

CONSTRUCT 10' MULTI-USE TRAIL (EXACT LAYOUT TBD WITH FINAL ENGINEERING DESIGN)

12th St NW

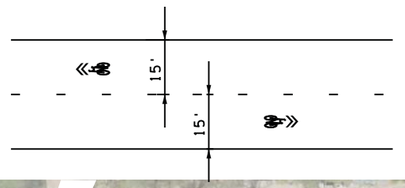
8th Ave NW

100

SCALE IN FEET

SHARROW (SHARED LANE) MARKINGS

- PLACED IN THE CENTER OF THE TRAVEL LANE SO THERE WILL NOT BE CONFLICTS WITH PARKED VEHICLES
- ASSISTS MOTORIST & BICYCLES TO SHARE THE ENTIRE LANE
- SPACE SHARROW ~200' IN EACH TRAVEL DIRECTION



PLACE ADVANCED WARNING SIGNAGE FOR TRAIL CROSSING

AHEAD
TRAIL XING

PLACE SIGNAGE DIRECTING PEDS TO USE 10TH ST NW TO ACCESS THE UNDERPASS

PARKING WILL BE REMOVED ON BOTH THE NORTH AND SOUTH SIDES OF 10TH ST NW FOR APPROXIMATELY 300' FROM 8TH AVE NW TO THE EAST

10th St NW

46'

PLACE SIGNAGE DIRECTING PEDS TO USE 10TH ST NW TO ACCESS THE TRAIL

EXISTING UNDERPASS STAIRS & RAMP

INSTALL CROSSWALK AND CURB CUT

30'

US 2 Off-Ramp

INSTALL CURB CUT

River Rd NW

TRAIL XING AHEAD

PLACE ADVANCED WARNING SIGNAGE FOR TRAIL CROSSING

2

Gateway Dr

EAST GRAND FORKS NORTHWEST STREET NETWORK STUDY

Alliant Engineering

EXHIBIT ES-4
MULTI-USE TRAIL CONNECTION-ALTERNATIVE 3
WITH PAVEMENT MARKINGS ON 10th ST
(TRANSPORTATION ENHANCEMENT PROJECT)

Table ES-1. Recommended Implementation Plan

Study Components	Improvement Measure Description	Improvement Figure	Priority	Implementation Trigger	Responsible Agency	Preliminary Cost Estimate	Notes
US Highway 2 Corridor	1. Improve existing traffic signal operations by interconnecting existing traffic signals in the study area and implementing new timing plans for existing and flood conditions. This will improve traffic flow along the corridor for both existing and flood conditions.	5.2	Short-Term	Currently warranted.	Mn/DOT	$100,000	Each existing signal cabinet will need to be replaced and have batter back-up. A master controller with a phone drop will need to be assigned.
	2. Interconnect and implement timing plans for the signals along US Highway 2. For flood conditions the timing plans in the ATAC Bridge Closure Study should be reviewed, updated (if needed) and implemented. For non-flood conditions timing plans should be developed and implemented.	NA	Long-Term	Warranted when congestion increases and traffic operations deteriorate below acceptable thresholds on the US Highway 2 Corridor between GF and EGF.	Mn/DOT	TBD	The MPO should consider completing a study to analyze the possibility of coordinating all the signals on US Highway 2 (in both GF and EGF). The study should also consider the possibility of one lead agency to control the US Highway 2 signals.
	3. Install advanced directional signage on westbound US Highway 2 directing travelers to the EGF Downtown Business District and the Campground/Recreational Area. The signage will need to be installed before Central Avenue as this is where access will occur. This improvement is currently underway or occurring in the near future per the City's Trail Blazing Study.	NA	Short-Term	Currently warranted.	City of EGF	$2,000	There is currently a Trail Blazing Study for the City. This plan should be investigated and amended to include this additional signage if needed.
US Highway 2 & 5th Avenue NW Intersection	1. Construction the full access signalized intersection alternative with pedestrian crossings. As a result of providing access to the north, the US Highway 2 westbound off-ramp will be removed if and when a traffic signal is installed.	5.5	Long-Term	A signal warrant analysis estimates that a traffic signal will be warrant in year 2018 based on projected traffic volumes. A traffic signal should be installed if and when warranted based on congestion levels. This intersection should be monitored in the future to determine if a signal is needed in year 2018 or at some point after.	Mn/DOT & City of EGF	$1.8 Million	This signal will be interconnected to the traffic signal system and will be included in optimized timing plans.
River Rd & 17th ST NW/12th Avenue NW Intersection	1. Construct the river road realignment alternative. This alternative could be temporarily constructed with temporary striping and use of some type of barrier or barrels for the southwest curb.	5.7	Short-Term	Currently warranted based on safety and driver right-of-way confusion.	City of EGF	$105,000	Stopping SB River Rd could act traffic calming measuring for River Rd.
Multi-Use Trail Connection	1. Construct a multi-use trail from the existing trailhead on 12th Street NW to the existing US Highway 2 underpass. An off-street 10' multi-use trail will be constructed near the toe of the floodwall between 12th Street NW to 10th Street NW. On 10th Street NW on-street sharrows or shared lane pavement markings will be installed from 8th Avenue NW to the underpass. Appropriate signage will also be installed.	5.10	Short-Term	Currently warranted. Transportation Enhancement Funds are dedicated and currently available for this connection. Final engineering plans will be completed in winter 2012.	City of EGF	$145,000	If a full access signal at US Highway 2/5th Avenue NW is installed in the future, it is recommended that the US Highway 2 WB Off-Ramp be removed and a 10' off-street multi-use trail be constructed (This is not included in the cost estimate).

Short-Term = Expected necessary within 0-5 years
Mid-Term = Expected necessary within 5-15 years
Long-Term = Expected necessary within 15-25 years
Note: Cost estimates are design and construction costs and include preliminary and final engineering design service fees and contingencies. Detailed cost estimates are located in Appendix C.

1.0 Introduction

One of the major goals of the Grand Forks-East Grand Forks Metropolitan Planning Organization (GF-EGF MPO) is to preserve the ability to travel across the Grand Forks – East Grand Forks MPO area. In particular, the north – south traffic flow in the northwest area of East Grand Forks is one of the main areas of concern, especially during flood conditions. The Grand Forks-East Grand Forks 2035 Long Range Transportation Plan (LRTP) has identified a major investment to improve traffic flow in this area. The planned investment includes the reconstruction of the US Highway 2/5th Ave NW intersection to a full access with traffic signalization to provide north-south connectivity across US Highway 2 and to provide alternative routes during flood conditions.

The US Highway 2/5th Ave NW intersection has a history of different geometrics and recommendations. Currently, the US Highway 2/5th Ave NW intersection is configured as a right-in/right-out only intersection for eastbound US Highway 2. There is no access or connection for westbound US Highway 2 to 5th Ave NW. The City of East Grand Forks reconstructed this intersection to this configuration after the flood in 1997. Before the reconstruction in 1997, there was no access on US Highway 2 at 5th Avenue NW. In a recent 2006 study, the *US Highway 2 Access Management Study*, access recommendations for the US Highway 2 corridor were explored and a full signalized access at 5th Ave NW was recommended, primarily to address neighborhood and downtown access issues when the River Road was closed due to flooding. Recently, the need for full access at 5th Ave NW has been questioned by the City of East Grand Forks due to potential impacts to the neighborhood, and because the flooding impacts are only short-term. At other times of the year, River Road provides access to the neighborhood, northwest area and acts as a secondary route to downtown.

This study will assist the City of East Grand Forks, the GF-EGF MPO and MnDOT in determining whether the planned improvement of the reconstruction of the US Highway 2/5th Ave NW to a full access with traffic signalization should remain in the LRTP or if another geometric alternative is more appropriate. Feasible alternatives for this intersection will be presented in this study.

This study will also consider other components that play a role in north-south traffic flow in the northwest area of East Grand Forks. The River Road NW and 17th St NW/12th Ave NW intersection is one of the components. This intersection has received many complaints due to perceived safety issues and right-of-way confusion. As a result, this study will highlight feasible alternatives for this intersection. This study will also consider the future multi-use trail connection from the existing trail head on 12th St NW to the existing US Highway 2 multi-use trail underpass and the possibility of closing the US Highway 2 Off-Ramp to 8th Ave NW. There is currently Transportation Enhancement (TE) grant funding available to construct this connection in the next couple of years. This trail connection and potential closure of the US Highway 2 Off-Ramp will be explored as they relate to the feasible intersection alternatives.

On behalf of the Grand Forks – East Grand Forks Metropolitan Planning Organizations (GF-EGF MPO), Alliant Engineering, Inc. completed the East Grand Forks Northwest Street Network Study.

1.1 Project Location

The area included in this study is the northwest area of East Grand Forks bordered by River Rd and 4th St NW on the west, Demers Ave on the south, Central Ave on the east and 23rd St NW on the north. As part of the study, the following intersections were evaluated:

- River Road & 12th Ave NW/17th St NW
- River Road & 12th St NW
- River Road & WB US Highway 2 On-Ramp
- River Road & EB US Highway 2 Off-Ramp
- 4th St NW & 5th Ave NW
- 4th St NW & Demers Ave
- 5th Ave NW & 14th St NW
- 5th Ave NW & 12th St NW
- US Highway 2 & 5th Ave NW
- US Highway 2 & Central Ave
- Central Ave & 14th St NW
- Central Ave & 15th St NW
- Central Ave & 17th St NW
- Central Ave & 20th St NW
- Central Ave & 23rd St NW

Figure 1.1 illustrates the study area and intersections in the northwest portion of the City of East Grand Forks.

1.2 Study Purpose

The purpose of the study is to preserve and possibly enhance the north – south traffic flow in the northwest area of East Grand Forks. In particular, this study will highlight the following four transportation components in this area:

- Alternatives for the US Highway 2/5th Ave NW intersection.
- Alternatives for the River Road NW and 17th St NW/12th Ave NW intersection.
- Future multi-use trail connection from the trail head on 12th St NW, along 8th Ave NW to 10th St NW, and connection to the existing underpass.
- The possibility of closing the Westbound US Highway 2 Off-Ramp to 8th Ave NW.

As these four transportation components are analyzed, recommendations made in previous studies for the area (*US Highway 2 Access Management Study* and the *Central Avenue Corridor Study)* will be reviewed to determine if they are still valid. A detailed set of feasible improvement alternatives for the transportation components will be presented in this report.

1.3 Stakeholder and Public Involvement

A key part to the completion of the study is the stakeholder and public involvement process, which included the following:

- Study Review Committee (SRC)
- Public Meetings
- Project Website

1.3.1 Study Review Committee

The SRC consisted of members of the East Grand Forks School District, East Grand Fork Police and Fire Department, local businesses, local neighborhood, Cites Area Transit, East Grand Forks Engineering, Public Works – Streets, Planning and the MPO. The SRC was at the center of the public involvement process and provided review and guiding direction for the study. The East Grand Forks Northwest Street Network Study was completed under the direction of the following SRC members:

- Nancy Ellis, GF-EGF MPO Senior Planner
- Brad Bail, FS Engineering
- Brian Loer, East Grand Forks School District
- Craig Buckalew, Local Business Owner and East Grand Forks City Council
- Jim Richter, EGF EDHA
- Joe McKinnon, Mn/DOT District 2
- John Wachter, East Grand Forks Public Works
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- Niel McWalter, East Grand Forks Planning Commission
- Randy Gust, East Grand Forks Fire/Emergency Response
- Scott Huizenga, City Administrator for City of East Grand Forks
- Steve Gander, Local Business Owner
- Teri Kouba, Cities Area Transit
- Jeff Parent, Local Neighborhood Representative

The SRC met four times over the course of the study and was an integral part in determining recommendations for the study area. Minutes for the SCR meetings are included in Appendix A.

1.3.2 Public Meetings

Three public open houses were held to encourage citizen participation in the study. The goal of the public open houses is to provide a forum that allows interested citizens the opportunity to:

- Be actively engaged in the planning process
- Provide comment and express ideas
- Distribute and present information

- Serve as listening sessions for the project team

The public open houses were advertised through a press release and the MPO website. The following provides details of each meeting:

- **1st Public Open House** – Held on Thursday, August 11th, 6:30 PM at East Grand Forks Campbell Library. The existing conditions and deficiencies of the study area were presented.

- **2nd Public Open House** – Held on Thursday, September 29th, 5:30 PM at East Grand Forks Senior High School Library. The Future Conditions and potential feasible alternative of the study were presented.

- **3rd Public Open House** – Held on Thursday, November 10th, 5:30 PM at East Grand Forks City Hall. The refined feasible alternatives and associated cost estimates of the study were presented.

Questions and comments from the Public Meetings are included in Appendix B.

1.3.3 Project Website

A website was established at the beginning of the project. The URL for the site is http://www.theforksmpo.org/Pages/Projects.htm. The purpose of the website is to provide another way for the general public to be informed about the project status and to disseminate information. All documents prepared for the project and public meetings have been posted to the website.

1.4 Previous Studies Completed for the Area

Many component of this study area built from information presented in previous studies completed for the area. The following list the previous studies that apply:

- *1994 US Highway 2 Corridor Study*[1]
- *US Highway 2 Access Management Study*[2]
- *Central Avenue Corridor Study*[3]
- *The GF-EGF LRTP*[4]
- *ATAC Bridge Closure Study*[5]
- *Downtown Trailblazing Study*[6]

[1] *US Highway 2 Corridor Study,* February 1994, prepared by Barton-Aschman Associates, Inc
[2] *US Highway 2 Access Management Study,* February 28, 2006, prepared by HDR Engineering & Floan-Sanders, Inc.
[3] *Central Avenue Corridor Study*, December 2007, prepared by JLG Architects
[4] *Grand Forks-East Grand Forks Long Range Transportation Plan Update*, Street & Highway Element, January 2008
[5] *ATAC Bridge Closure Study*, 2007 and revised in 2008.
[6] *Downtown Trailblazing Study*

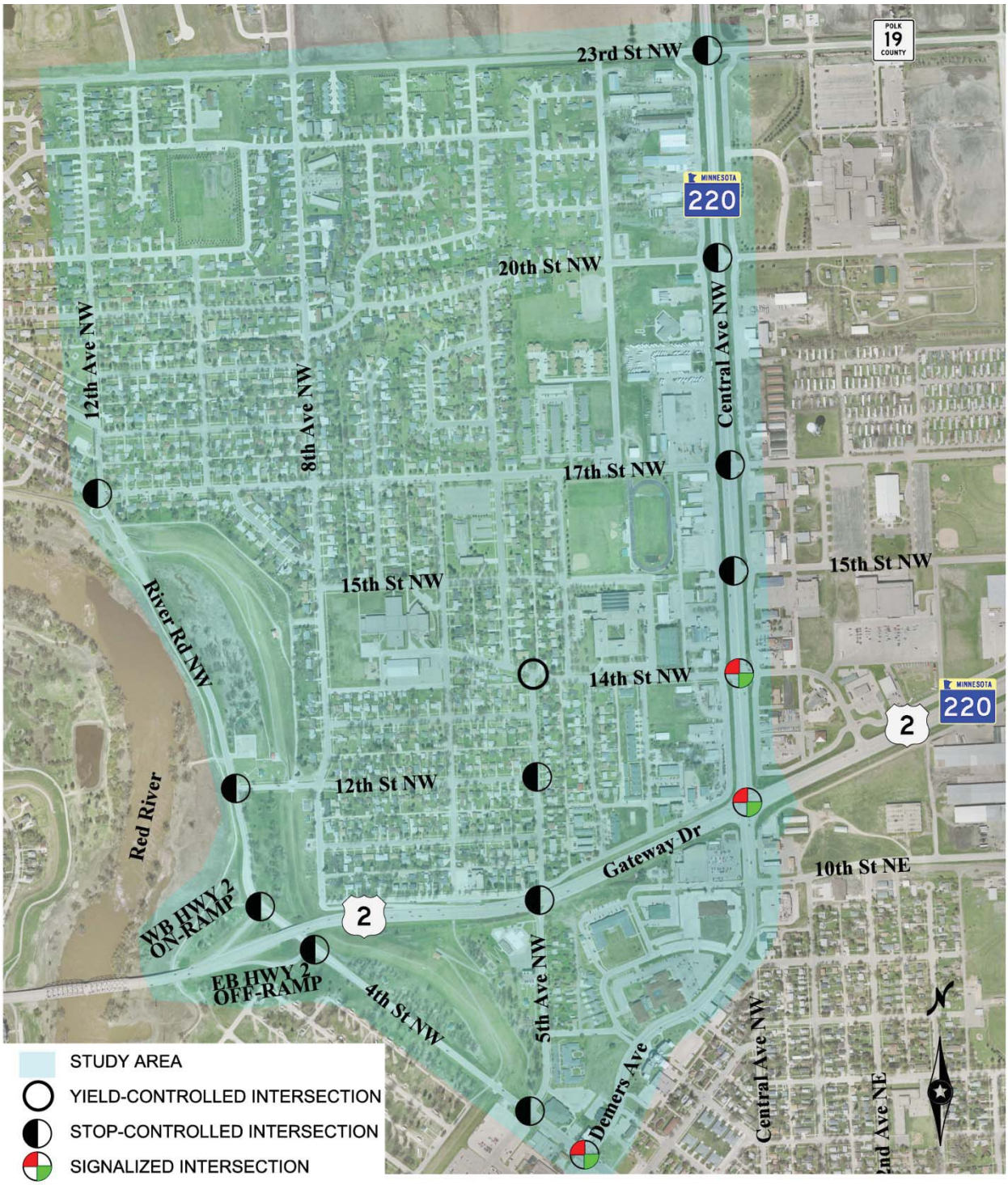


Figure 1.1. Project Location and Study Area

2.0 Existing Conditions

Key components of the existing conditions for the East Grand Forks Northwest Street Network Study include land use, corridor characteristics, mobility (traffic operations) and roadway safety. Existing land use and transportation network conditions are defined in the following sections

2.1 Land Use

The study area is fully developed with the mix of residential, commercial, institutional and park space. Commercial land uses are mainly centralized along Central Avenue and in the downtown area. Residential land uses are mainly located north of US Highway 2 between the Red River and Central Avenue. Figure 2.1 shows the existing land use inventory from 2010 as detailed in the City of East Grand Forks 2040 Land Use Plan[7].

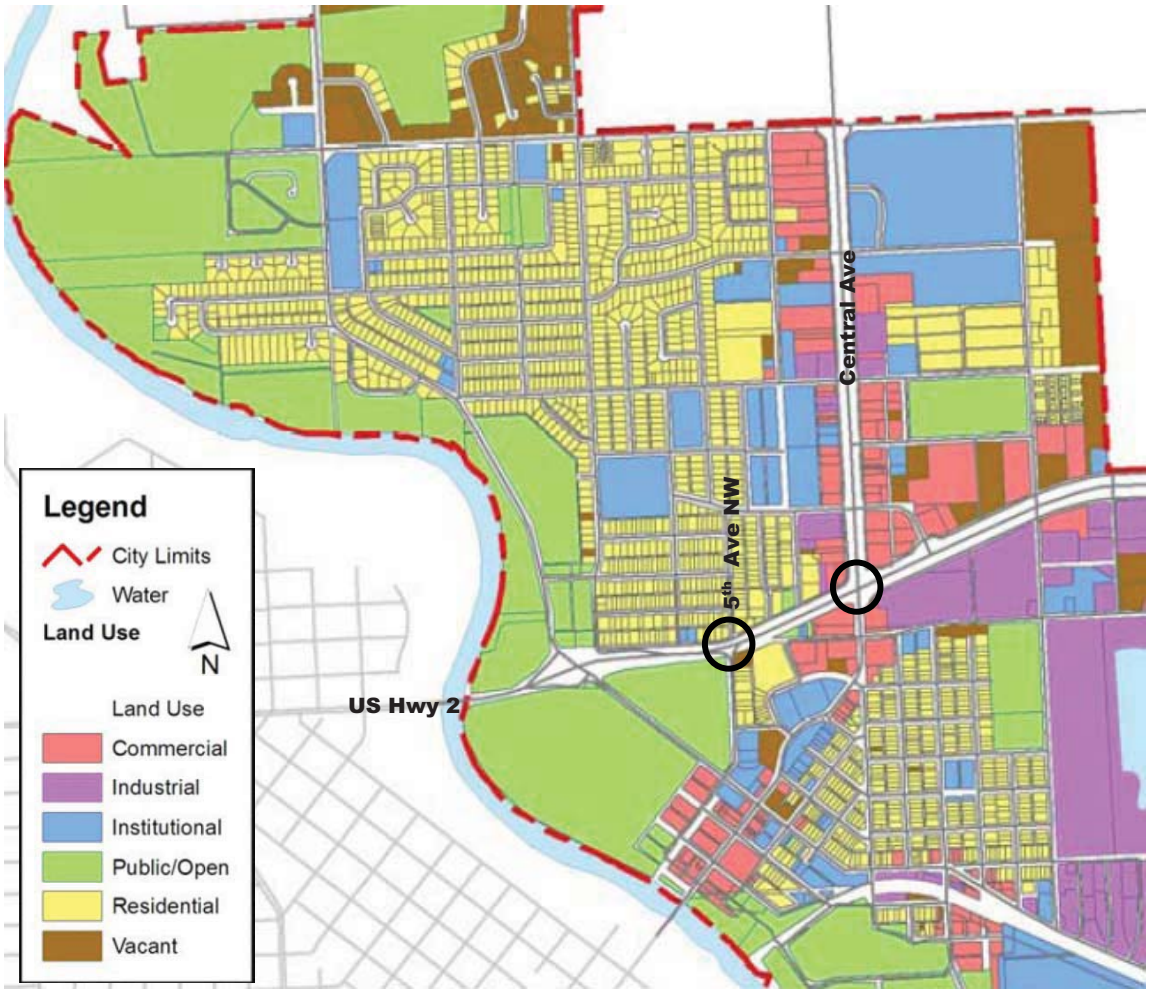


Figure 2.1. Existing Land Use Map

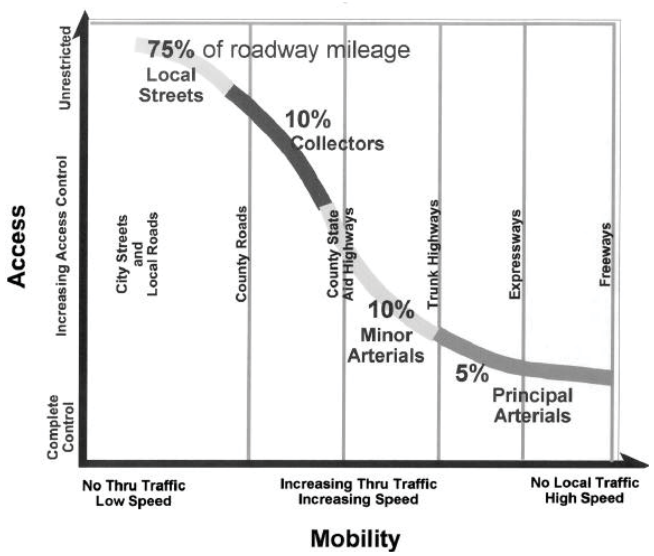
[7] City of East Grand Forks 2040 Land Use Plan, http://www.egf.mn/DocumentView.aspx?DID=799

2.2 Corridor Characteristics

The following sections define the key roadway characteristics including functional classification, roadway geometrics and traffic control devices.

2.2.1 Functional Class

Roadways serve two major functions, access and mobility. The function of a roadway is dependent on its classification. Interstates and principal arterials provide the highest degree of mobility but are limited in providing land access. Local streets provide a high degree of land access with less mobility. Figure 2.2 shows a comparison of the different functional classifications relating access to mobility.



Source: FHWA Publications No. FHWA-RD-91-044 (Nov 1992)

Figure 2.2 Access/Mobility Relationship to Functional Classification

The US Highway 2 corridor and the Central Avenue corridor are defined as Principal Arterials where mobility is emphasized and access is limited. It is noted that US Highway 2 is the only east-west principal arterial in the City of East Grand Forks. The GF-EGF LRTP states that principal arterials carry some of the highest traffic loads and is the backbone of the transportation system.

Figure 2.3 shows the transportation system functional classification of the surrounding roadway network as defined in the GF-EGF LRTP. River Road is defined as a Minor Arterial and is important for both access and mobility. 5th Ave NW and 14th St NW are defined as Collectors with limited mobility and high access. The US Highway 2 Corridor has been further investigated as access and full intersection spacing conditions at 5th Ave NW may change with the recommended intersection alternatives. MnDOT has classified US Highway 2 as "Category 2B", a Medium Priority Interregional Corridor. This is due to its economic importance as a link between regional centers of trade.

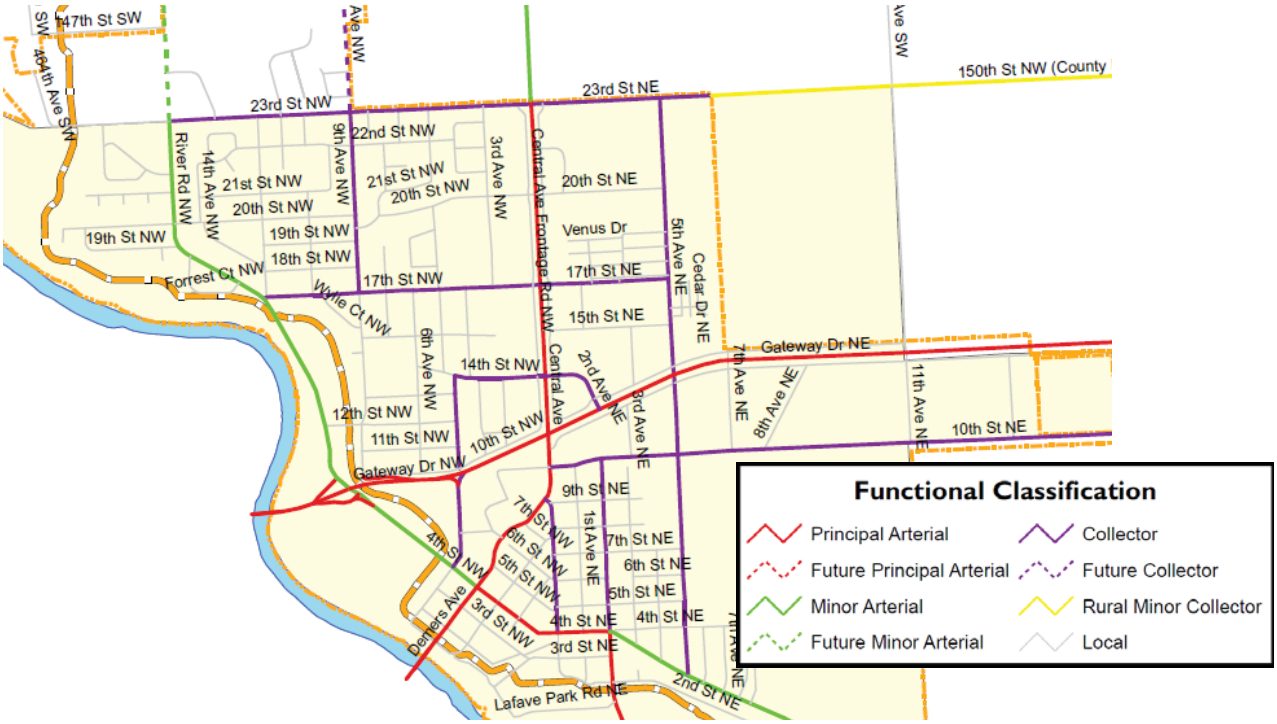


Figure 2.3 Transportation System Functional Classification

2.2.2 Access Spacing

One of the key factors affecting the quality of mobility (traffic operations) and the safety characteristics is roadway access. There is a balance between creating safe and efficient roadway with limited access points versus creating roadways that provide access points to neighborhood and local businesses. MnDOT has developed Access Management Guidelines for each level of roadway to help guide development and prioritize roadway improvements. As a result of the *US Highway 2 Access Management Study*, MnDOT agreed to a full access at the 5th Ave NW intersection.

2.2.3 Geometrics and Traffic Control

To determine the existing quality of traffic capacity and resulting operations, the roadway and intersection geometries and traffic control were documented. Figure 2.4 illustrates the existing geometrics and traffic control of the study area intersections.

2.2.4 Multimodal Facilities

Multimodal facilities provide for safe and convenient transportation by walking, bicycling or transit service. Figure 2.5 depicts the existing multimodal characteristics of the study area.

Bicycle/Pedestrian

East Grand Forks and Grand Forks currently has 46 miles of paved bicycle/pedestrian trails that traverse the both Cities and Greenway areas. An additional 18 miles are currently planned. In the study area, a 10-foot paved bicycle/pedestrian trail exists on the west side of River Road in

the green space area along the river. The trailhead of the multi-use trail is located on 12th St NW. Also, there is an existing multi-use trail underpass on US Highway 2 just to the west of the 5th Avenue NW intersection. Construction of a 10-foot multi-use trail is planned in the near future to connect the existing trailhead on 12th St NW to the US Highway 2 multi-use trail underpass with existing TE grant funding. This connection will be illustrated later in this report in section 5.3, The Multi-Use Trail Connection.

Sidewalks

Five-foot concrete sidewalks exist on many of the local neighborhood streets near the site.

Transit

Cities Area Transit (CAT) is the public transportation system serving Grand Forks and East Grand Forks. Routes 10 and 11 of the Black transit line serve the study area. The routes cross the river to/from Grand Forks via the Sorlie Bridge and cross US Highway 2 on Central Avenue. Route 10 travels through the neighborhood and past the high school on the north side of US Highway 2. The future geometrics of the US Highway 2/5th Ave NW intersection could allow for Route 10 to travel across US Highway 2 via 5th Ave NW.

Neighborhood Access during Flood Conditions

During high flood levels typically the Sorlie Bridge, the Point Bridge and a section River Road closes. This limits access for both vehicles and emergency vehicles to and from the neighborhood on the north side. The main route in and out of the neighborhood is via Central Ave during peak flood times as River Road is closed.

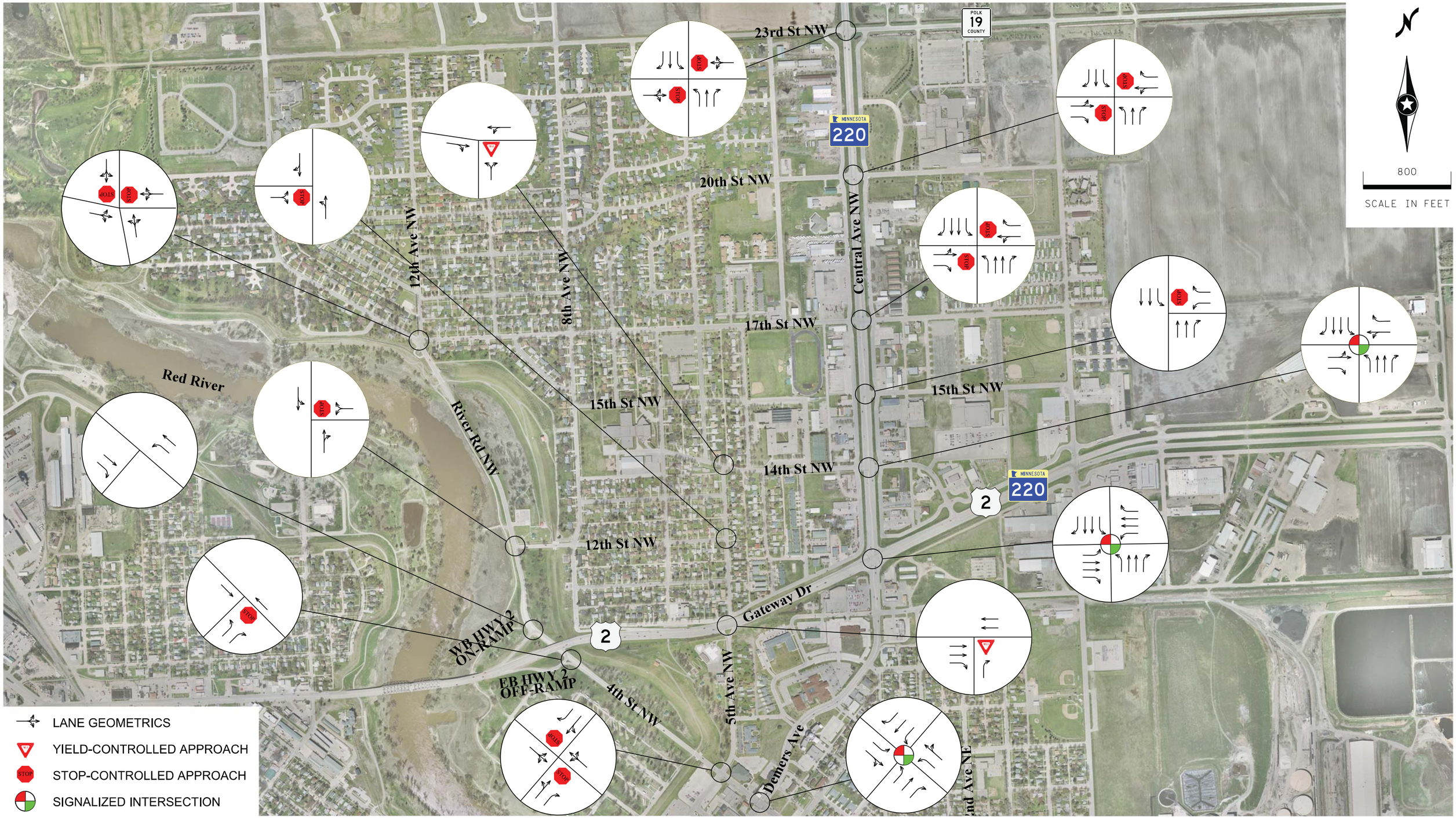


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FIGURE 2.4
EXISTING GEOMETRICS AND TRAFFIC CONTROL

EGF NORTHWEST STREET NETWORK STUDY

FIGURE 2.5
EXISTING MULTIMODAL FACILITIES

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2.3 Mobility

An assessment of the existing quality of mobility (traffic operations) for the existing intersections was completed. The assessment was completed for two conditions, non-flood and flood conditions. The non-flood conditions assume regular every day operations with no bridge, ramp or roadway closures. The flood conditions assume the closure of the Point Bridge, Sorlie Bridge, the US Highway 2 River Road Ramps and a section of River Road. Figure 2.6 depicts these bridges, ramp and roadway locations and the closure dates for the spring 2011 flood conditions. It is noted that the flood conditions model the worst case scenario; the closure of the two bridges, US Highway 2 River Road Ramps and a section of River Road. The following sections document the existing traffic operations characteristics.

2.3.1 Intersection Volumes and ADT – Non-Flood & Flood Conditions

To determine the existing quality of traffic operations in the study area during non-flood conditions and during flood conditions, a traffic operations analysis was conducted for the study area intersections. To complete the traffic analysis, existing vehicular traffic volumes were documented. The GF-EGF MPO provided year 2011 turning movement counts for a 12-hour period for the study area intersections during non-flood and flood conditions. From the 12-hour counts, AM and PM peak hour turning movements were calculated. The AM and PM peak hours were found to be 7:30 to 8:30 AM and 4:45 to 5:45 PM. Figure 2.7 shows the existing 2011 AM and PM peak hour turning movement counts and the estimated ADT for the non-flood conditions. Figure 2.8 show the existing 2011 AM and PM peak hour turning movement counts and the estimated ADT for the flood conditions.

2.3.2 Traffic Operations Analysis

The quality of traffic flow and mobility was measured using Level of Service (LOS) methodology. LOS calculations were performed for the study area intersections for both the non-flood and flood conditions. A discussion of the capacity including LOS is included in the following sections.

Definition of Level of Service

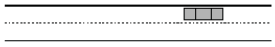
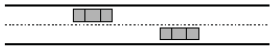
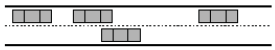
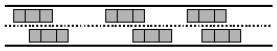
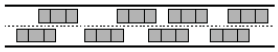
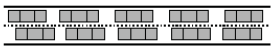
The concept of LOS is a method to estimate the quality of traffic flow through intersections. In general, the capacity of a street is a measure of its ability to accommodate a certain volume of moving vehicles. Typically, street capacity refers to the maximum number of vehicles that can be expected to be accommodated in a given time period under the prevailing roadway characteristics and conditions. The LOS methodology is standardized by the Transportation Research Board (TRB) and is applied uniformly regardless of jurisdictional boundaries. The method uses algorithms that are based on delay and drivers' expectations of acceptable delay to assign a LOS for particular conditions.

The study area intersections were analyzed to determine the operating LOS, a quantitative analysis that compares the vehicle flow of traffic on a roadway or through an intersection with the vehicle flow capacity of that particular roadway. The results are then categorized on an LOS A to LOS F scale. LOS A represents high quality traffic operations where motorists experience

little or no delay (i.e. free flow conditions). Conversely, LOS F corresponds to low quality operations with high delays and congestion. This study used the LOS C/D boundary, as directed by the GF-EGF MPO, as the lowest accepted level of service.

Although the measure of effectiveness used in determining LOS for each facility (i.e., arterial street vs. rural highway vs. signalized intersection) may differ, the concept of the LOS grade is the same. The general relationship between capacity and LOS are graphically displayed in Table 2.1.

Table 2.1 Level of Service Description

Level of Service		Description	Volume/Capacity Ratio
A		**Free Flow.** Low volumes and no delays.	**0.6**
B		**Stable Flow.** Speeds restricted by travel conditions, minor delays.	**0.7**
C		**Stable Flow.** Speeds and manueverability closely controlled due to higher volumes.	**0.8**
D		**Stable Flow.** Speeds considerably affected by change in operating conditions. High density traffic restricts manueverability, volume near capacity.	**0.9**
E		**Unstable Flow.** Low speeds, considerable delay, volume at or slightly over capacity.	**1.0**
F		**Forced Flow.** Very low speeds, volumes exceed capacity, long delays with stop and go traffic.	**> 1.0**

Intersection Level of Service

The LOS grade for an intersection as a whole is based on a weighted average delay of each movement. The delays can vary greatly based on traffic volume, lane geometry and intersection traffic control (traffic signal, through-stop and all-way-stop). Grades are different at unsignalized and signalized intersections; due to the fact the drivers anticipate longer delays at signalized intersections. Table 2.2 details the ranges for each letter grade for both types of intersection, in seconds of average delay per vehicle. This is based on the 2010 Highway Capacity Manual (HCM), published by the Transportation Research Board.

Table 2.2 Level of Service vs. Average Delay – Signalized and Unsignalized Intersections[8]

Unsignalized Intersections		Signalized Intersections	
Level of Service	**Average Delay per Vehicle** (Seconds)	**Level of Service**	**Average Delay per Vehicle** (Seconds)
A	0 – 10	A	0 – 10
B	10 – 15	B	10 – 20
C	15 – 25	C	20 – 35
D	25 – 35	D	35 – 55
E	35 – 50	E	55 – 80
F	50 – and up	F	80 – and up

[8] 2010 Highway Capacity Manual (HCM), Published by the Transportation Research Board.

The AM and PM peak hour LOS was calculated at each of the 15 key intersections identified previously for the non-flood everyday conditions. For the flood conditions, only the nine critical intersections on US Highway 2 and Central Ave were analyzed.

The intersection traffic operations analysis was completed for the existing conditions for both the AM and PM peak hours using the Synchro/SimTraffic7 software package. The software model was calibrated using the existing signal timing provided by the MnDOT. The LOS was calculated from the averaged delay per vehicle from five SimTraffic runs. Table 2.3 summarizes the existing overall intersection LOS for the study area intersections for both the non-flood and flood conditions.

Table 2.3 Existing 2011 Intersection LOS

Intersection	Traffic Control	Non-Flood Conditions LOS[1]	Flood Conditions LOS[1]
River Road & 12th Ave NW/17th St NW	Thru-Stop	A/**A**	--
River Road & 12th St NW	Thru-Stop	A/**A**	--
River Road & WB US Highway 2 On-Ramp	Thru-Stop	A/**A**	--
River Road & EB US Highway 2 Off-Ramp	Thru-Stop	A/**A**	--
4th St NW & 5th Ave NW	Thru-Stop	A/**A**	A/**A**
4th St NW & Demers Ave	Traffic Signal	B/**A**	A/**A**
5th Ave NW & 14th St NW	Thru-Stop	A/**A**	--
5th Ave NW & 12th St NW	Thru-Stop	A/**A**	--
US Highway 2 & 5th Ave NW	Thru-Stop	A/**A**	A/**F**
US Highway 2 & Central Ave	Traffic Signal	C/**D**	D/**F**
Central Ave & 14th St NW	Traffic Signal	B/**B**	B/**B**
Central Ave & 15th St NW	Thru-Stop	A/**A**	A/**B**
Central Ave & 17th St NW	Thru-Stop	A/**A**	A/**A**
Central Ave & 20th St NW	Thru-Stop	A/**A**	A/**A**
Central Ave & 23rd St NW	Thru-Stop	A/**A**	A/**A**

[1] LOS is shown "Existing AM/**Existing PM**", where the first rating is existing AM and the second rating in bold is existing PM.
Source: Alliant Engineering, Inc. using Synchro/SimTraffic 7.0 and 2011 traffic volume data.

As shown, nearly all intersections within the study area are currently operating at an acceptable LOS C or better during both the AM and PM peak periods for the non-flood and flood conditions. Only the US Highway 2/Central Ave intersection falls below this threshold.

For the non-flood conditions, the signalized US Highway 2/Central Ave signalized intersection operates at a LOS D during the PM peak hour. It is noted that the existing signal timings were used for the analysis. With updated optimized signal timings during the PM peak hour, operations of this intersection could improve to LOS C.

For the flood conditions, the signalized US Highway 2/Central Ave signalized intersection operates at LOS D for the AM peak hour and LOS F for the PM peak hour. Additionally,

eastbound queues from the signal extend to the west beyond the 5th Ave NW intersection resulting in a LOS D for the US Highway 2/5th Ave NW intersection during the PM peak hour. The existing signal timings were also used the flood analysis. Traffic operations on US Highway 2 could be greatly improved during flood conditions if the signals on the corridor (extending to the west across the Gateway Bridge into Grand Forks and extended to the signals to the east) were to be interconnected and coordinated. Unique time of day flood signal timing plans would have to be developed and implemented. Preliminary macroscopic analysis shows that the US Highway 2/Central Ave intersection could improve to a LOS C for both the AM and PM peak hours and that the resulting queues would be significantly shorter and not impact operations at the US Highway 2/5th Ave NW intersection. Developing flood conditions timing plans is out of the scope for this project. The Advanced Traffic Analysis Center (ATAC) at North Dakota State University has completed at Bridge Closure Study. This study analyzed the effects of bridge closures during flood conditions and developed specific signal timing plans. It is recommended that the EGF-GF MPO review the flood conditions signal timing plans presented in this study to determine if further analysis is needed. Interconnecting and creating optimized signal timing plans for the study area signals is identified as a feasible alternative to improve traffic flow in the study area. This alternative is further detailed in section 5.0.

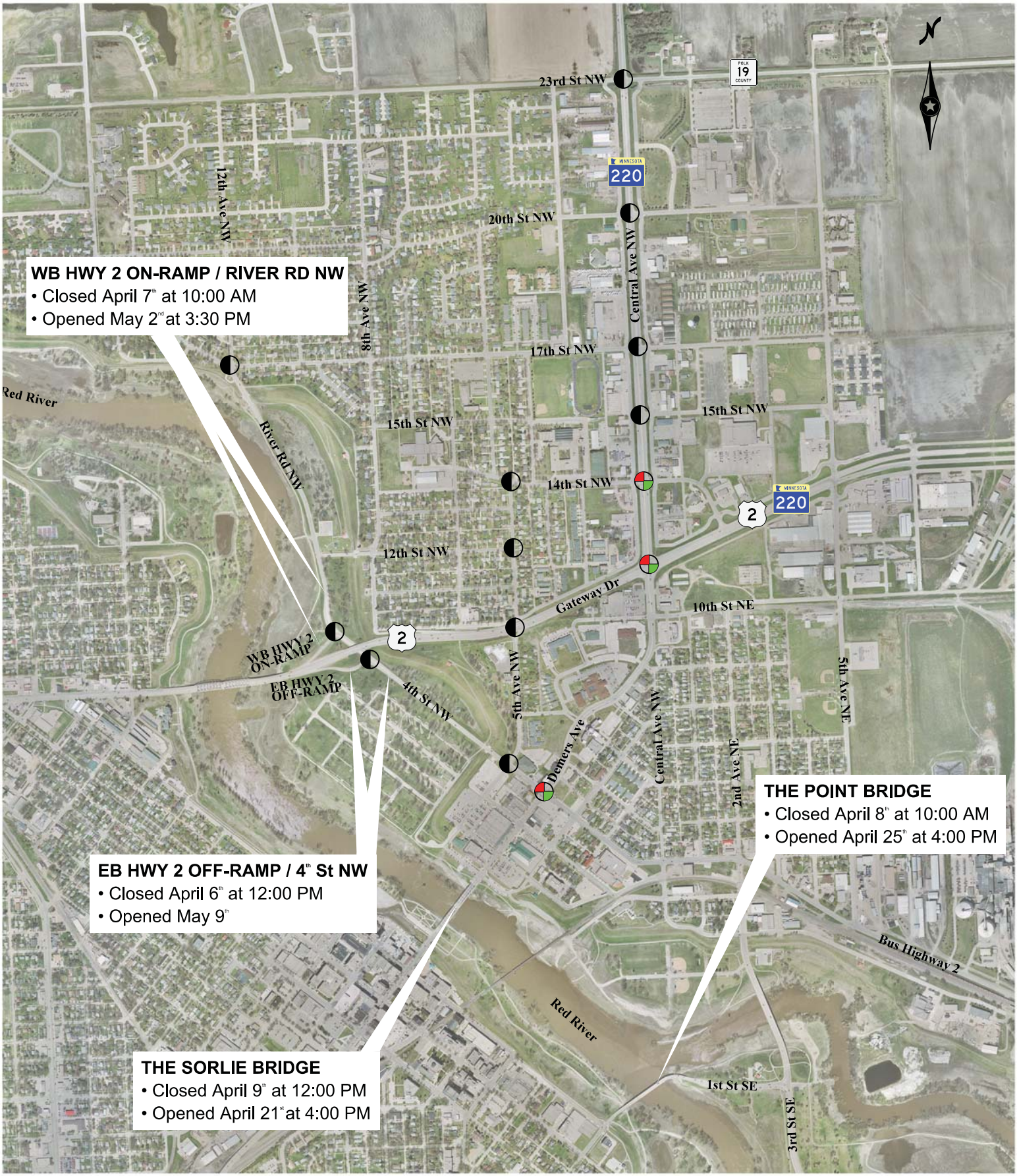


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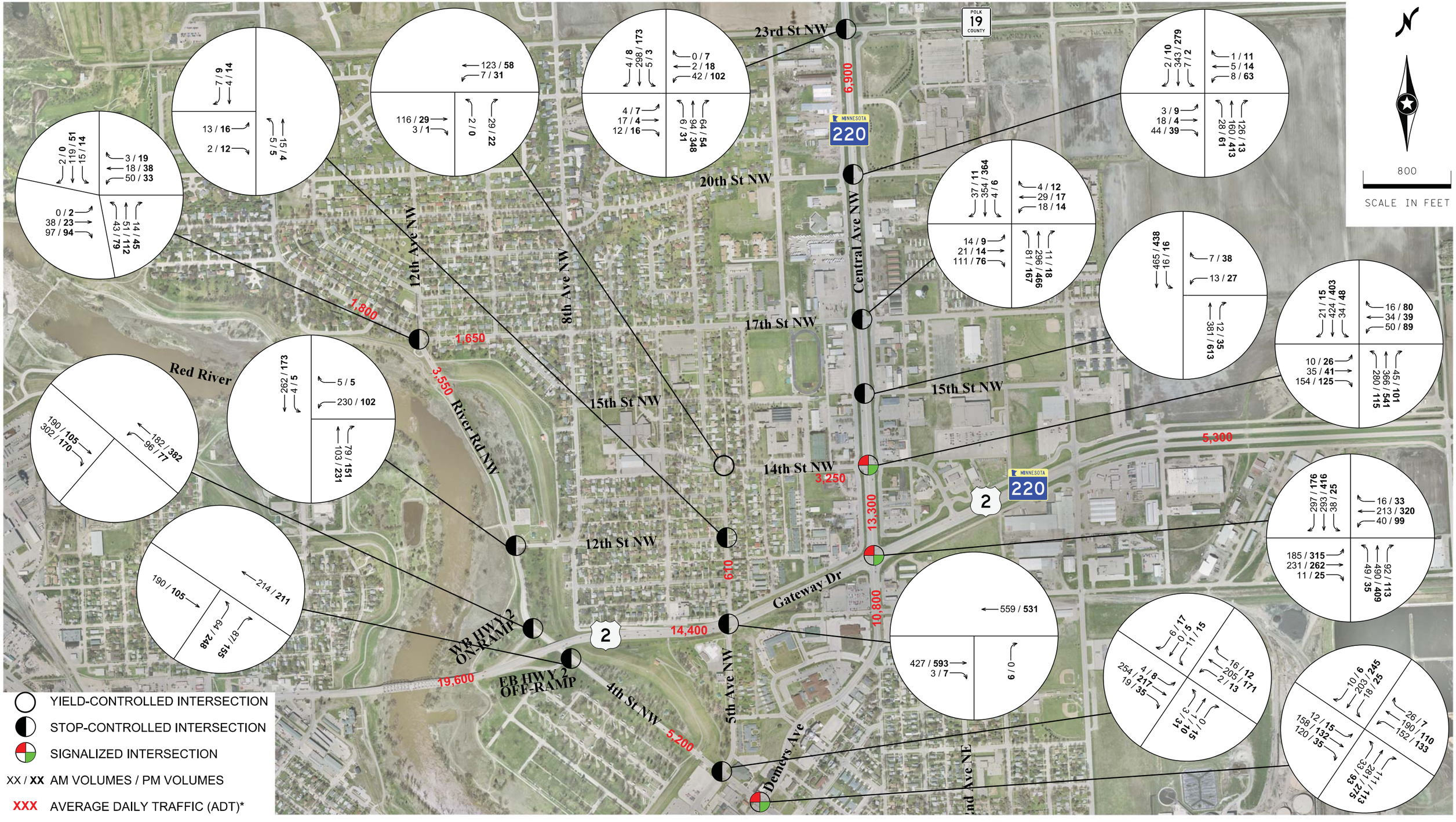
FIGURE 2.6
SPRING 2011 BRIDGE , RAMP AND ROAD CLOSURES



* ADT IS 2009 ADT FROM MNDOT TRAFFIC FLOW MAPS

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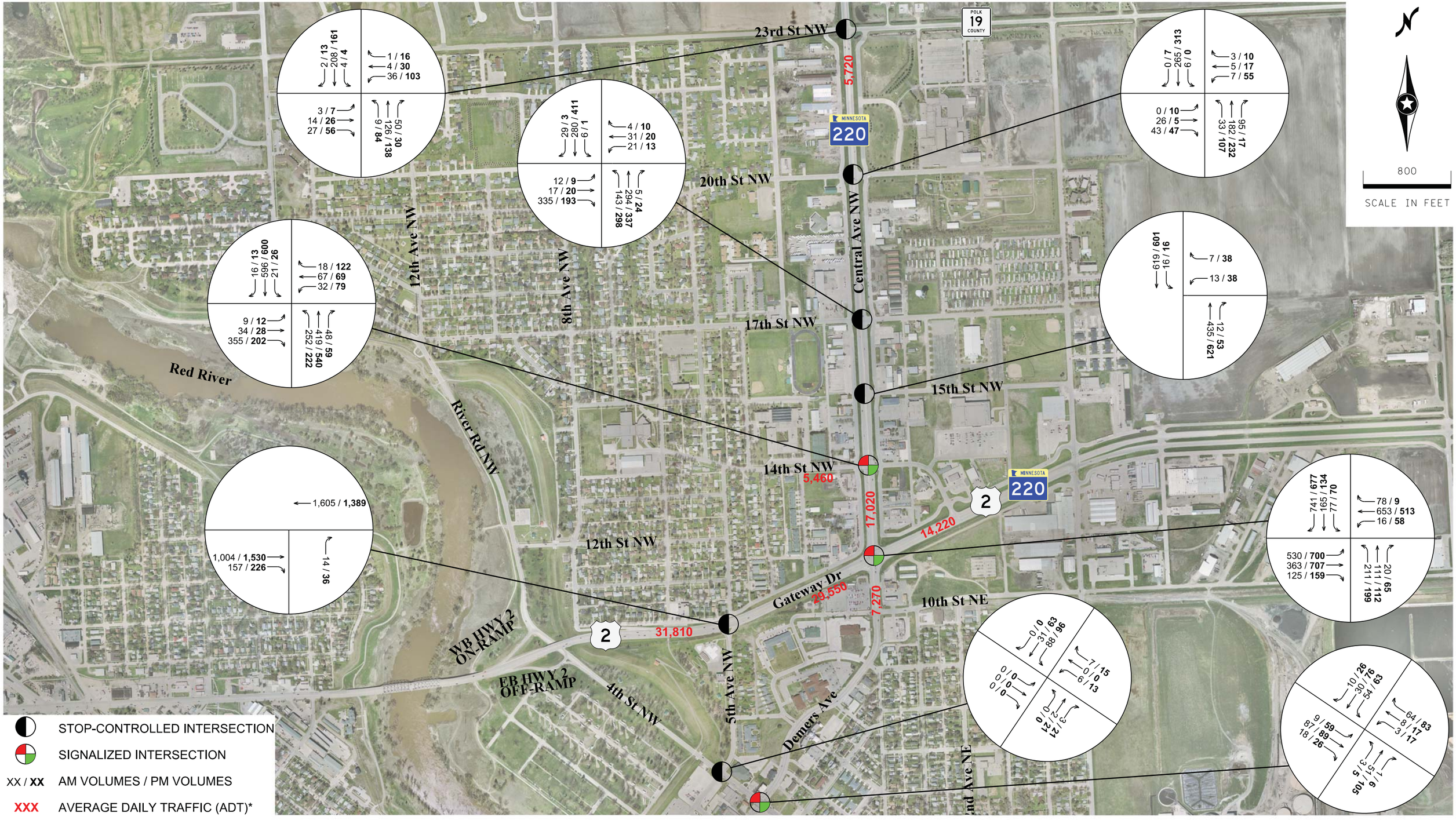
FIGURE 2.7
EXISTING 2011 PEAK HOUR TRAFFIC VOLUMES
NORMAL (NON-FLOOD) CONDITIONS



STOP-CONTROLLED INTERSECTION

SIGNALIZED INTERSECTION

XX / **XX** AM VOLUMES / PM VOLUMES

XXX AVERAGE DAILY TRAFFIC (ADT)*

* ADT IS ESTIMATED FROM THE PM PEAK HOUR VOLUMES ON THE ROADWAY. IT IS ASSUMED THE THE PM PEAK VOLUMES ARE APPROXIMATELY 10% OF THE ADT.

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FIGURE 2.8
EXISTING 2011 PEAK HOUR TRAFFIC VOLUMES
FLOOD CONDITIONS

2.4 Roadway Safety

A review of the corridor crash records was conducted to evaluate the safety characteristics of the roadway. Historical crash data from the most recent 5 years, 2006 to 2010, was obtained from MnDOT's Crash Mapping Analysis Tool (MnCMAT).

2.4.1 Key Factors in Safety Analysis

In examining these crashes, four key factors were considered: (1) crash rates, (2) critical crash rates, (3) crash severity, and (4) distribution of crashes.

Crash Rate

History has proven that crashes are a function of exposure. Roadways with higher traffic volumes experience more crashes than similar roadways with lower volumes. Rather than documenting the number of crashes that occur in a particular segment or at a particular intersection, the crash rate must be considered. Crash rates normalize different locations with varying traffic volumes, providing a useful tool in comparing the locations with respect to safety.

The first key factor in safety analysis is the crash rate. Intersection crash rates are defined by the number of crashes occurring per million entering vehicles (MEV). Intersections with high volumes can be compared to intersections with low volumes using the intersection crash rate. Actual crash rates at specific locations can be compared to average or typical values for a roadway of the same type.

Critical Crash Rate

Crash occurrence is somewhat random by nature. Identifying every intersection with a crash rate above the average value in an analysis would produce a large amount of data that may not be statistically relevant with respect to safety deficiencies. The critical crash rate, the second key factor in safety analysis, identifies those locations that have a crash rate higher than similar facilities by a statistically significant amount. The critical crash rate is calculated by adjusting the system wide average based on the amount of exposure and a statistical constant indicating level of confidence. Although varying confidence levels are typically utilized, the 99.5 percentile confidence interval was selected for all safety calculations for this study. At locations where the actual crash rate exceeds the critical crash rate, it is 99.5 percent certain that the crashes are a result of deficiencies in the segment or intersection design.

Crash Severity

The third key factor in establishing safety deficiencies is crash severity. Crash severity quantifies how severe the crashes are at a particular location. In the crash information obtained from MnCMAT, crashes are categorized into five major categories of severity:

- Property Damage – no injuries occurred
- Possible Injury - an injury might have occurred
- Non-Incapacitating Injury – a minor injury occurred
- Incapacitation Injury – a injury occurred that cause impairment
- Fatal– a fatality occurred in the crash

The purpose for analyzing this statistic is to identify locations that experience a low crash rate but have a high percentage of injury or fatal crashes. Conversely, locations which have high crash rates with a large proportion of property damage crashes may not warrant as much priority when deficiencies are being addressed.

Distribution of Crash Type

The fourth key factor in safety analysis is the distribution of crash type. Each crash is classified with a crash type. Crashes are classified into one of the following types:

- Rear End
- Sideswipe (Passing)
- Right Angle
- Head On
- Sideswipe (Opposite Direction)
- Other

The crash type distribution for the critical intersections was investigated to determine if there are any underlying factors that could be creating the unsafe conditions.

2.4.2 Crash Summary

The total number of crashes at the study area intersections, document by severity, is illustrated in table 2.4.

Table 2.4 Summary of Total Crashes by Severity

	Fatal	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	Property Damage	Total
Study Area Intersections	0	2	8	29	81	120

Table 2.5 summarizes the crash rate and critical crash rate for each of the study area intersections.

Table 2.5 Summary of Crash Rate and Critical Crash Rate

Intersection	Traffic Control	Total Crashes	Crash Rate	Critical Crash Rate[1,2]
River Rd NW @ 12th Ave NW/17th St NW	Thru-Stop	2	0.41	1.04
River Rd NW @ 12th St NE	Thru-Stop	1	0.17	0.97
Gateway Dr @ US Highway 2 On-Ramp	Thru-Stop	0	0.00	0.95
Gateway Dr @ US Highway 2 Off-Ramp	Thru-Stop	0	0.00	0.93
5th Ave NW @ 14th St NW	Thru-Stop	1	0.77	1.92
5th Ave NW @ 12th St NW	Thru-Stop	1	1.83	3.12
Gateway Dr @ 5th Ave NW	Thru-Stop	3	0.31	0.80
5th Ave NW @ 4th St NW	Thru-Stop	1	0.18	0.99
Demers Ave @ 4th St NW	Signal	15	1.38	1.55
Gateway Dr @ Central Ave	Signal	50	2.33	1.32
Central Ave @ 14th St NW	Signal	16	1.14	1.45
Central Ave @ 15th St NW	Thru-Stop	1	0.09	0.78
Central Ave @ 17th St NW	Thru-Stop	18	2.10	0.84
Central Ave @ 20th St NW	Thru-Stop	5	0.74	0.92
Central Ave @ 23rd St NW	Thru-Stop	6	1.15	1.01
Study Area Intersection Total		120		

[1] The critical crash rate is a statistically adjusted crash rate to account for random nature of crashes.

[2] A 99.5% confidence level was assumed. An average crash rate of 0.8 was assumed for signal control and 0.3 for thru-stop control.

Source: MnDOT Crash Mapping Tool (MnCMAT) for years 2006 to 2010.

The intersections of US Highway 2 (Gateway Dr)/Central Ave, Central Ave/17th St NW and Central Ave/23rd St NW have crash rates that exceed the critical crash rate and have been identified as Hot Spot locations for crashes.

The intersection of US Highway 2/Central Ave has been designated by MnDOT as one of the most dangerous in northwest Minnesota based on frequency of crashes. Investigation of the crash type distribution showed a high number of rear-ends and right angle crashes at this intersection. In many cases, increased read-end crashes are attributable to congested traffic signals that have deficient timing and coordination plans with adjacent signals. As part of the traffic operations analysis, updated timing and coordination with adjacent traffic signals is recommended and could possible reduce crashes. Additionally, the rear-end type crashes can be related to the channelized (pork-chop island) right turn lanes. Possible reasons for high right-angle crashes could be inadequate signal timing for the left turns and/or high speeds on US Highway 2. MnDOT will be monitoring this intersection and working with the City of East Grand Forks and the MPO to determine appropriate and feasible measures to improve safety at this intersection.

The intersections of Central Ave/17th St NW and Central Ave/23rd St NW are both currently side-street stop-controlled intersections. Most of the crashes that occurred at these intersections involved right-angle crashes for side-street traffic entering Central Ave. In the future, the geometrics and control of these intersections will change based on recommendations for the *Central Avenue Corridor Study*. The Central Ave/17th St NW intersection will be converted to a traffic signal or roundabout. The Central Ave/23rd St intersection will also be converted to traffic

signal or roundabout. The implementation of these future improvements could increase the safety of these two intersections.

2.5 Identification on Deficiencies

Through review of the existing conditions and comments from the SRC and public meetings, multimodal, roadway and safety deficiencies have been revealed in the existing roadway network. The following sections highlight the deficiencies.

2.5.1 Multimodal Deficiencies

- There is no 10-foot multi-use trail connection between the trailhead on 12th St NW and the US Highway 2 underpass.
- Illegal and unsafe at-grade pedestrian crossings of US Highway 2 occurring at or near 5th Ave NW have been observed.
- The Black transit line is currently at maximum travel time for the route and does not have any travel time to spare. A signalized full access intersection at US Highway 2/5th Ave NW would be beneficial for the route by creating another location to cross US Highway 2.

2.5.2 Mobility Deficiencies

- During non-flood everyday conditions, the signalized US Highway 2/Central Ave intersection operates at a poor level of service during the PM peak hour. With optimized signal timings, operations of this intersection could improve.
- During flood conditions, the signalized US Highway 2/Central Ave intersection operates at a poor level of service during the AM and PM peak hours. Additionally, eastbound queues from the signal extend to the west beyond the 5th Ave NW intersection resulting in poor operations for the US Highway 2/5th Ave NW intersection during the PM peak hour. To improve the existing flood operations, it is recommended that the EGF-GF MPO consider interconnecting the traffic signals on the US Highway 2 corridor and review and update, if needed, the flood timing plans in the ATAC Bridge Closure Study.

2.5.3 Safety Deficiencies

- The intersection of US Highway 2/Central Ave has been designated by MnDOT as one of the most dangerous in northwest Minnesota based frequency of crashes. Investigation of the crash type distribution showed a high number of rear-ends and right angle crashes at this intersection. MnDOT will be monitor this intersection and work with the City of East Grand Forks and the MPO to determine appropriate and feasible measures to improve safety at this intersection.
- The intersections of Central Ave/17th St NW and Central Ave/23rd St NW both have a higher than average crash rate. Most of the crashes involved right-angle crash types for

side-street traffic entering Central Ave. Future improvements along the Central Ave corridor, including the conversion of both there intersections to traffic signals or roundabout, will work to improve safety in the future.

- There is currently a perceived safety issue at the River Road NW and 12th Ave NW and 17th Street NW intersection due to vehicle right-of-way confusion. The crash rate analysis indicates that there have been two crashes at this intersection in the past 5 years and the crash rate is below the critical crash rate. This study will address alternatives to improve the right-of-way confusion and resulting perceived safety at this intersection.

3.0 Future Conditions

Chapter 3.0 documents the future land use and transportation network conditions. Key elements include study scenarios, land use, planned infrastructure, programmed improvements, planned developments, forecast traffic volumes and traffic operations analysis. Identification of deficiencies and future transportation needs as it relates to both motor vehicle traffic and multimodal facilities are documented in this chapter.

3.1 Study Scenarios

To remain consistent with currently planning strategies in the GF-EGF MPO Long Range Transportation Plan (LRTP), year 2035 was considered the design year.

3.2 Long Range Transportation Plan

The GF-EGF LRTP was used to estimate future traffic conditions in the study area. The Advanced Traffic Analysis Center (ATAC) at North Dakota State University maintains and updates the traffic model, which computes the 2035 traffic forecasts. The traffic model is based on Transportation Analysis Zones (TAZs) which incorporate employment, population and household data. Based on the year 2035 traffic forecasts produced by ATAC, needed infrastructure improvements are detailed in the LRTP.

3.2.1 Infrastructure Improvements

Infrastructure improvements were identified from two sources, the GF-EGF LRTP and the *Central Avenue Corridor Study*. Based on the GF-EGF LRTP and also the driving force of this study, the conversion of the US Highway 2/5th Ave NW intersection to a full access signalized intersection is assumed to be constructed. The GF-EGF LRTP identifies the widening of Central Ave from 17th St to 23rd St two a four lane roadway as a mid-term project (2013 to 2022 timeframe). Additionally, the signalization of the Central Ave/23rd St NW is recommended by 2035 (or when warranted). The *Central Avenue Corridor Study* identified intersection improvements that are needed on Central Ave. Traffic signals or roundabouts are recommended at the 17th St NW intersection and the 23rd St NW intersection. Right-in/right-out control or a roundabout is recommended at the 20th St NW intersection. Right-in/right-out control is recommended at the 15th St NW intersection. Additionally, it is assumed that interconnect will be installed between the study area signals (existing and future) and that optimized signal timing plans will be developed. The interconnect and optimization of the study area signals is discussed further in section 5.1.2.

All of these infrastructure improvements were assumed for the 2035 study network. Figure 3.1 graphically shows these improvements.

*It is noted that future traffic signals were assumed for the traffic operations analysis and are preferred by MnDOT and the City over roundabouts along the Central Ave corridor. For signal and roundabout consideration, further detailed analysis and ICE reports will be required by MnDOT.

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FIGURE 3.1
ASSUMPTIONS FOR 2035 CONDITIONS

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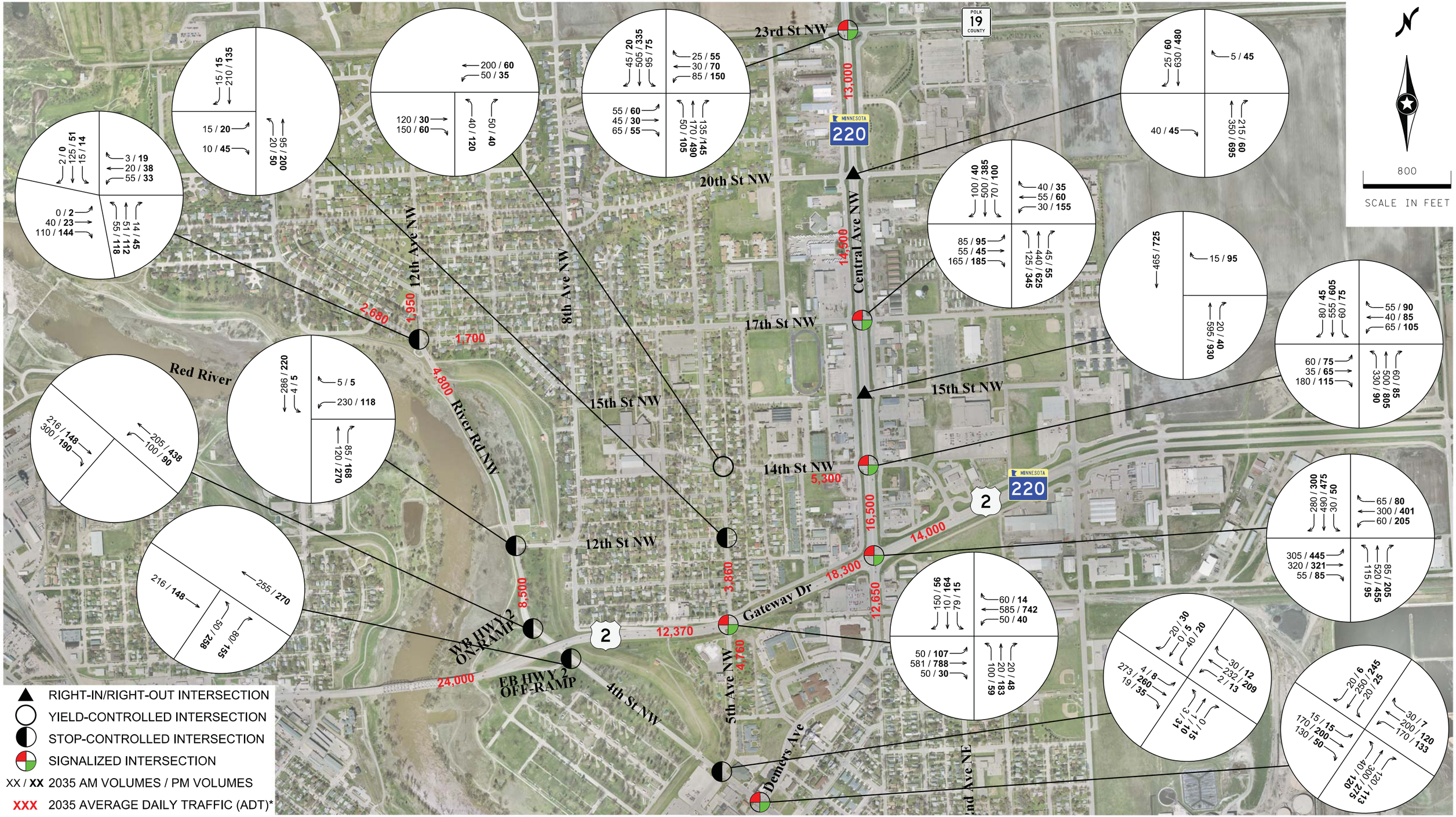
3.3 2035 Forecast Volumes

The estimation of the 2035 forecast traffic volumes for the study area intersections was based two sources; the 2035 forecast ADT provided by ATAC and 2035 peak hour volumes estimates from the *Central Ave Corridor Study*. The 2035 AM and PM peak hour volumes estimates from the *Central Ave Corridor Study* were used for the intersections on Central Ave. For the other study network intersections, the AM and PM peak hour volumes were estimated from the 2035 ADT. The AM peak hour volumes were assumed to be approximately 8 percent of the ADT for each intersection approach and the PM peak hour volumes were assumed to be approximately 10 percent of the ADT for each intersection approach. As noted previously the LRTP planned for a full access traffic signal at the US Highway 2/5th Ave NW intersection and the 2035 forecast traffic volumes provided by ATAC assume this configuration. The volumes from the *Central Avenue Corridor Study* also assume a traffic signal at the US Highway 2/5th Ave NW intersection. Therefore, the 2035 baseline conditions and reported traffic volumes include this geometry. Figure 3.2 illustrated the 2035 baseline AM and PM peak hour traffic volumes and ADT.



* ADT IS 2035 ADT PROVIDE BY ATAC.

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FIGURE 3.2
2035 ESTIMATED PEAK HOUR TRAFFIC VOLUMES
NORMAL (NON-FLOOD) CONDITIONS

3.4 Traffic Operations Analysis – Base Conditions

A traffic operation analysis was conducted for the year 2035 base conditions. The base conditions assume the infrastructure improvements detailed in section 3.2 (including signal interconnect and optimized timing plans) and the 2035 traffic volume estimates presented in section 3.3. Interconnect and coordination of all study area traffic signals is also assumed. The purpose of the analysis is to assist in identifying additional future transportation system needs.

3.4.1 2035 Intersection Analysis

An intersection traffic operations analysis was completed for the 2035 base conditions, which assumed implementation of the infrastructure improvements detailed in section 3.2, for both the AM and PM peak hours using the Synchro/SimTraffic7 software package. Table 3.1 summarizes the 2035 base conditions LOS for the study area intersections.

Table 3.1 2035 Base Conditions Intersection LOS

Intersection	Traffic Control	2035 Baseline LOS[1]
River Road & 12th Ave NW/17th St NW	Thru-Stop	A/**A**
River Road & 12th St NW	Thru-Stop	A/**A**
River Road & WB US Highway 2 On-Ramp	Thru-Stop	A/**A**
River Road & EB US Highway 2 Off-Ramp	Thru-Stop	A/**A**
4th St NW & 5th Ave NW	Thru-Stop	A/**A**
4th St NW & Demers Ave	Traffic Signal	B/**B**
5th Ave NW & 14th St NW	Thru-Stop	A/**A**
5th Ave NW & 12th St NW	Thru-Stop	A/**A**
US Highway 2 & 5th Ave NW	Traffic Signal	A/**C**
US Highway 2 & Central Ave	Traffic Signal	C/**C**
Central Ave & 14th St NW	Traffic Signal	B/**B**
Central Ave & 15th St NW	Right-In/Right-Out	A/**A**
Central Ave & 17th St NW	Traffic Signal	B/**B**
Central Ave & 20th St NW	Right-In/Right-Out	A/**A**
Central Ave & 23rd St NW	Traffic Signal	B/**B**

[1] LOS is shown "AM/**PM**", where the first rating is existing AM and the second rating in bold is existing PM.

Source: Alliant Engineering, Inc. using Synchro/SimTraffic 7.0 and 2035 baseline traffic volume data.

Results of the 2035 operational analysis show acceptable operations.

3.5 Identification of Deficiencies

Assuming the implementation of the planned infrastructure improvements and traffic signal interconnect and coordination, there are no predicted traffic operational deficiencies for the future roadway network.

4.0 Study Goals

The existing conditions and deficiencies of the study area were presented to the SRC and Public on Thursday, August 11th, 2011. The future conditions were presented on September Thursday, September 29th, 2011. Resulting from SRC and Public input, five main goals to evaluate the alternatives for the transportation components of the study were determined. The five goals are:

- **Traffic Operations –** The resulting traffic operations of each alternative need to acceptable. This is determined through an operational analysis. 2035 traffic volume estimates were used for the operational analysis. This provided conservative results.
- **Multi-Modal (Pedestrian, Bicycle and Transit) Operations –** Each alternative must consider multi-modal operations.
- **Safety –** Safety consideration of each alternative need to be detailed.
- **Access and Connectivity to the neighborhood and downtown –** Better connection and visibility to the Downtown area is desired for local businesses and improved access to the neighborhood is desired during flood conditions.
- **Cost –** The cost for each alternative needs to be considered as set funding amounts are available.

5.0 Evaluation of Feasible Alternatives

This study considered alternatives for four transportation elements in the northwest area of East Grand Forks that affect north-south traffic flow. Feasible improvement alternatives for these elements were identified to address the study goals and network deficiencies. The four transportation elements are:

1) **The Intersection of US Highway 2/5th Ave NW**
2) **The Intersection of River Road NW and 17th St NW/12th Ave NW**
3) **The Multi-Use Trail Connection -** From the existing trail head on 12th St NW to the existing US Highway 2 multi-use trail underpass.
4) **The Closure of the US Highway 2 Off-Ramp –** This element was considered as it related to the US Highway 8/5th Ave alternative and the multi-use trail alternatives.

The following sections discuss the feasible alternatives for each area as they relate to the study goals and improving network deficiencies.

5.1 US Highway 2/5th Avenue NW Intersection

The US highway 2/5th Ave NW intersection was studied to determine if the planned improvement of the reconstruction to a signalized full access intersection is the most appropriate alternative. Another geometric alternative may be more feasible. Four feasible alternatives were identified for this intersection; a Do Nothing Alternative, a US Highway 2 Westbound Left Only Alternative, a Three-Quarter Access Alternative and Signalized Full Access Alternative.

5.1.1 Do Nothing Alternative

This alternative assumes that the intersection would maintain its current geometry of a right-in/right-out only intersection for eastbound US Highway 2 traffic at 5th Ave NW. There is no access or connection the north for westbound US Highway 2 traffic. Figure 5.1 illustrates this alternative. The following describes how this alternative relates to each of the study area goals.

Traffic Operations

This alternative was analyzed for the 2035 network with existing signal timings. With the existing signal timings, the traffic operations at the US Highway 2/Central Ave intersection are unacceptable and fall below the LOS C/D boundary for the US Highway 2/Central Avenue signalized intersection and the Central Avenue/14th St NW signalized intersection. Signal timing improvements will need to be made in the future.

Multi-Modal Operations

With this alternative it is assumed that the US Highway 2 Westbound Off-Ramp onto 10th St NW will remain. Shared bicycle/vehicle lanes will be constructed on 10th ST NW and an off-street multi-use trail will be constructed west of 8th Ave NW. The shared lanes and multi-use trail will connect the existing underpass to the trail head at 12th Ave NW.

There is no designated at-grade crossing of US Highway 2 at 5th St NW. Pedestrian and bicycle crossing will be via the existing underpass.

This alternative provides no direct transit connection to the neighborhood across US Highway 2. Transit would have to use Central Ave to cross US Highway 2, similar to existing conditions.

Safety
The crash potential of this intersection alternative is low. There is minimal opportunity for vehicle conflict as there are only merge and diverge movements for eastbound US Highway 2 traffic.

Access & Connectivity to the Neighborhood & Downtown
This alternative maintains the current access conditions. No access is provided to the neighborhood to the north, the downtown area to the south or connectivity across US Highway 2. Additionally, the no route alternatives provided for congested flood conditions. Since no access to the neighborhood is provided, minimal impact (increased traffic volumes) to the neighborhood is expected.

Cost
There is no geometric reconstruction costs associated with this alternative.

5.1.2 Do Nothing Alternative with Updated Signal Timing

This alternative assumes that study area network traffic signals will be interconnected and that optimized signal timing plans will be developed and implemented for non-flood conditions and reviewed, possibly updated and implemented from ATAC's Bridge Closure Study for flood conditions. The traffic signals can be interconnected either by underground hardwire or wireless antennas. Figure 5.2 illustrates this alternative. The following describes how this alternative relates to each of the study area goals.

Traffic Operations
By interconnecting the study area traffic signals and implementing updated signal timings, acceptable traffic operations can be achieved for 2035 non-flood and flood conditions. It is noted that during flood conditions, no alternative routes for neighborhood or downtown traffic are provided.

The multi-modal operations, safety and access & connectivity are the same as the Do Nothing Alternative described above.

Cost
There is no geometric reconstruction costs associated with this alternative. The cost for interconnecting the study area traffic signals and developing optimized signal timing plans would be approximately $100,000. A further detailed cost break down is located in Appendix C.

5.1.3 US Highway 2 Westbound Left Only Alternative

This alternative includes the construction of the westbound left turn lane for US Highway 2 traffic. Figure 5.3 shows this alternative. The following describes how this alternative relates to each of the study area goals.

Traffic Operations
2035 peak hour traffic operations for this alternative are acceptable assuming study area traffic signal interconnect and coordination. During flood conditions downtown access is improved. Westbound US Highway 2 traffic will have an additional left turn option at this intersection.

Multi-Modal Operations
With this alternative it is assumed that the US Highway 2 Westbound Off-Ramp onto 10th St NW will remain. Shared bicycle/vehicle lanes will be constructed on 10th ST NW and an off-street multi-use trail will be constructed west of 8th Ave NW. The shared lanes and multi-use trail will connect the existing underpass to the trail head at 12th Ave NW.

There is no designated at-grade crossing of US Highway 2 at 5th St NW. Pedestrian and bicycle crossing will be via the existing underpass.

This alternative provides no direct transit connection to the neighborhood across US Highway 2. Transit would have to use Central Ave to cross US Highway 2, similar to existing conditions.

Safety
The crash potential for this alternative is slightly higher than the "Do Nothing" alternative as an additional traffic movement (westbound left turn) and additional conflict potential is being introduced to the intersection.

Access & Connectivity to the Neighborhood & Downtown
This alternative maintains the existing access and connectivity for the neighborhood on the north side of US Highway 2. Access to downtown is enhanced by providing a westbound left turn.

Cost
For this alternative the existing east leg median and south leg pork chop will have to be reconstructed to provide the westbound US Highway 2 left turn lane. There is currently a large grade difference between the eastbound and westbound travel directions on US Highway 2. To have a smooth elevation transition on the westbound left turn lane, the eastbound direction on US Highway 2 will have to be regarded in the area of the intersection. The cost for this alternative also includes the interconnect and optimization of the study area signals. The cost for this alternative is approximately $729,000. A further detailed cost break down is located in Appendix C

5.1.4 Three-Quarter Access Alternative

This alternative consists of a three-quarter access where all movements (left turns, through, and right turns) are allowed off of US Highway 2 and northbound and southbound right turn movements are allowed from 5th Ave NW. Northbound and southbound through and left turn

movements from 5th Ave NW are prohibited. This alternative is depicted on Figure 5.4. The following describes how this alternative relates to each of the study area goals.

Traffic Operations
2035 peak hour traffic operations for this alternative are acceptable assuming study area traffic signal interconnect and coordination. During flood conditions downtown and neighborhood access is improved. Existing on-street parking on both north and south sides of 5th Ave NW will need to be removed to accommodate the right turn lane geometry.

Multi-Modal Operations
Shared bicycle/vehicle lanes will be constructed on 10th ST NW and an off-street multi-use trail will be constructed west of 8th Ave NW. The shared lanes and multi-use trail will connect the existing underpass to the trail head at 12th Ave NW.

There is no designated at-grade crossing of US Highway 2 at 5th St NW. Pedestrian and bicycle crossing will be via the existing underpass.

This alternative provides no direct transit connection to the neighborhood across US Highway 2. Transit would have to use Central Ave to cross US Highway 2, similar to existing conditions.

Safety
The crash potential for this alternative is higher than the Do Nothing Alternative and the Westbound Left Alternative as additional traffic movements and additional conflict potential is being introduced to the intersection. Conversely, by allowing more movements at this intersection the traffic volumes will decrease at the US Highway 2/Central Ave intersection. This decreased volume at the US Highway 2/Central Ave intersection could improve safety.

Access & Connectivity to the Neighborhood & Downtown
This alternative enhances access to the neighborhood by providing a north leg and eastbound left turn lane from US Highway 2. Downtown access is also enhanced by providing a westbound left turn lane on US Highway 2. It is noted that northbound and southbound through and left turn movements are prohibited from 5th Ave NW. This alternative will slightly impact the neighborhood to the north as traffic volumes are anticipated to increase on 5th Ave NW and 14th St NW. However, traffic volumes on other neighborhood roads may decrease as travel patterns could shift.

Cost
For this alternative the north leg of the intersection will need to be constructed as well as cul-de-sacs on both sides of 10th St NW. (Final design of the cul-de-sacs can be determined with final engineering plans and is not part of this study.) US Highway 2 will need to be widened to provide turn lanes. A pork chop on the north leg will need to be constructed and the existing pork chop on the south leg will need to be reconstructed. Additionally, the grade issues through-out the intersection will have to be corrected. The cost for this alternative also includes the interconnect and optimization of the study area signals. The cost for this alternative is approximately $1.5 million. A further detailed cost break down is located in Appendix C. It is noted that this alternative could be part of a phased approach from the Westbound Left

Alternative to the Signalized Full Access Alternative, but the reported cost estimate does not consider a phased approach.

5.1.5 Signalized Full Access Alternative

This alternative is a signalized full access where all movements are allowed. Figure 5.5 shows this alternative. The following describes how this alternative relates to each of the study area goals.

Traffic Operations
2035 peak hour traffic operations for this alternative are acceptable assuming traffic signal interconnect and coordination with this intersection and study area intersections. During flood conditions downtown and neighborhood access is improved. Existing on-street parking on both north and south sides of 5th Ave NW will need to be removed to accommodate the right turn lane geometry. Approximately 250 feet of on-street parking will be removed on the north side and approximately 200 feet of on-street parking will be removed on the south side.

Multi-Modal Operations
The US Highway 2 Westbound Off-Ramp is assumed to be closed and removed for this alternative. A 10-foot off-street multi-use trail will be constructed from the trailhead to the existing underpass. A portion of the trail will be constructed in the area of the removed ramp.

At-grade crosswalks will be provided with the installation of a traffic signal at this intersection. The intersection pavement will have marked crosswalks and the traffic signal will have pedestrian crossing push-buttons and crossing countdown timers.

This alternative provides a benefit to transit operations. The transit route would be able to cross US Highway 2 at this location to access the neighborhood instead of using Central Ave.

Safety
This alternative has a higher crash potential than the other alternatives. The crash potential at traffic signals is higher than stop-controlled intersections, but the severity of the crashes is lower. The addition of a traffic signal will result in more crashes than the other alternatives, particularly rear-end crashes. Optimal signal timing could reduce the potential of rear-end crashes.

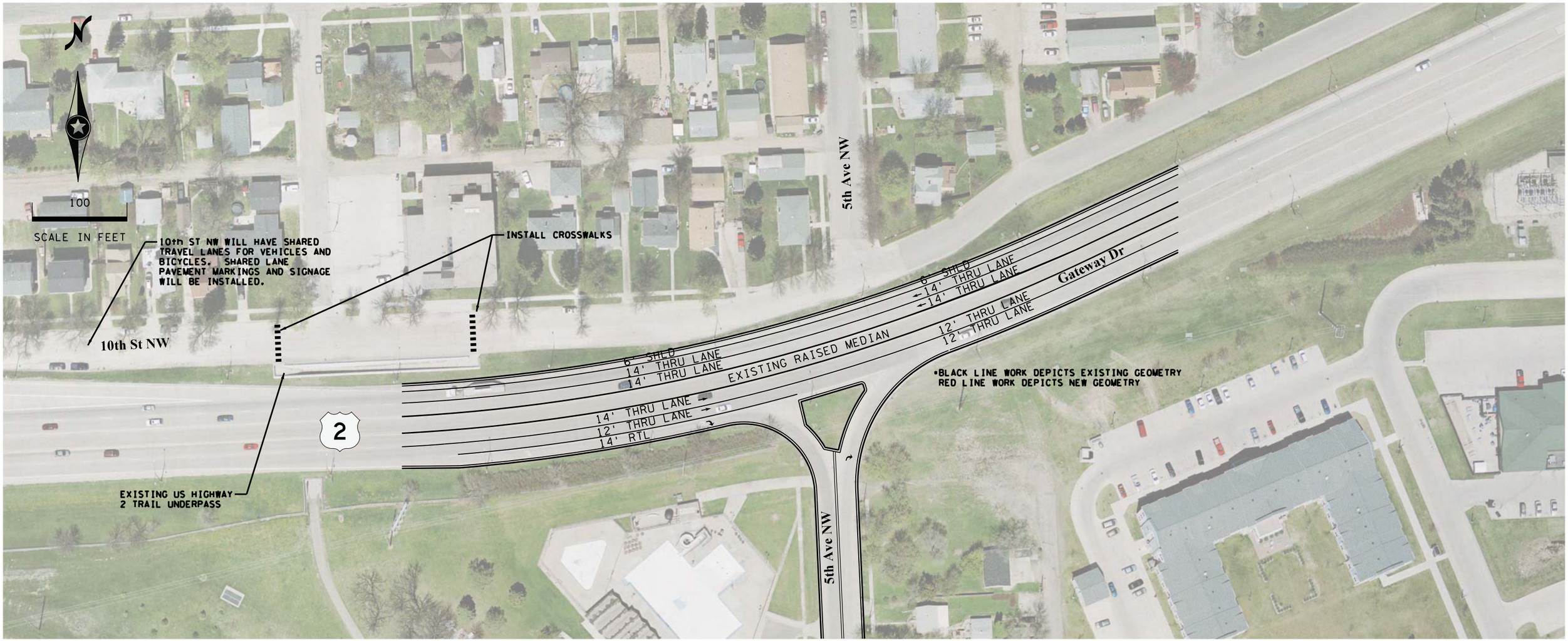
Access & Connectivity to the Neighborhood & Downtown
Access to the neighborhood and downtown will be improved as all movements will be allowed with this alternative. There are greater impacts to the immediate neighborhood as traffic volumes may increase on 5th Avenue NW and 14th St NW. However, traffic volumes on other neighborhood roads may decrease as travel patterns could shift.

Cost
For this alternative the north leg of the intersection will need to be constructed as well as cul-de-sacs on both sides of 10th St NW. US Highway 2 will need to be widened to provide turn lanes. The pork chop on south leg will need to be reconstructed. Signal hardware and interconnect will need to be provided. Additionally, grade issues through the intersection will need to be

corrected. This alternative could be part of a phased approach from the Three-Quarter Access Alternative. The estimated cost for this alternative is ~$1.8 million and does not include a phased approach. A further detailed cost break down is located in Appendix C.

5.1.6 Recommended Alternative

Based on SRC and public feedback, the Do Nothing Alternative with updated signal timing is recommended for short-term conditions (0 to 5 years). This should be accompanied by installation of advanced directional signage for the campground/recreational area and the EGF business district. For long-term conditions (15 to 25 years), a full access signalized intersection is recommended. A signal warrant analysis estimates that a traffic signal will be warrant in year 2018 based on projected traffic volumes. A traffic signal should be installed if and when it is warranted based on congestion levels. This intersection should be monitored in the future to determine if a signal is needed in year 2018 or at some point after. It is noted that a MnDOT Intersection Control Evaluation (ICE) report will be needed to show that a signal is warranted at this location before this recommendation can be implemented. Accordingly, this recommendation of a full signalized intersection for the long-term time frame should be preserved in the LRTP.



DO NOTHING (EXISTING GEOMETRICS) - EVALUATION CRITERIA

① TRAFFIC OPERATIONS:

- Acceptable 2035 AM & PM peak hour operations for the study area network. This assumes interconnect and coordination of study area traffic signals.
- Provides no alternative routes during flood conditions.

② MULTIMODAL (PED, BIKE & TRANSIT):

- Shared bike/vehicle lanes will be installed on 10th St NW via pavement markings and signage. A multi-use trail will be constructed to the west of 8th Ave NW. The shared lanes and multi-use trail will connect the existing underpass to the trail head at 12th St NW.
- Ped/Bike crossing of US 2 would be via the existing underpass. There would be no at-grade crossing of US 2 at 5th Ave NW.
- There would be no direct transit route to the neighborhood on 5th Ave NW. Transit would have to use Central Ave similar to existing conditions.

③ SAFETY:

- The crash potential of the intersection is low as there are minimal conflicting movements (only merge/diverge movements for the right turns).

④ ACCESS / CONNECTIVITY (DOWNTOWN & NEIGHBORHOOD):

- This alternative maintains the existing access and connectivity conditions. There is no access improvement to Downtown or the Neighborhood.

⑤ COST:

- No geometric costs or construction issues.
- The cost to interconnect and coordinate the study area traffic signals is ~$100,000.

FIGURE 5.1
DO NOTHING ALTERNATIVE (EXISTING CONDITIONS)
US HIGHWAY 2 & 5th AVE NW

EXISTING TRAFFIC SIGNAL

INTERCONNECT

SIGNAL TIMING PLANS WILL NEED TO BE DEVELOPED & IMPLEMENTED FOR:
- NORMAL CONDITIONS
- FLOOD CONDITIONS (ALREADY DEVELOPED IN ATAC BRIDGE CLOSURE STUDY. NEED TO BE REVIEWED & UPDATED, IF NEEDED.)

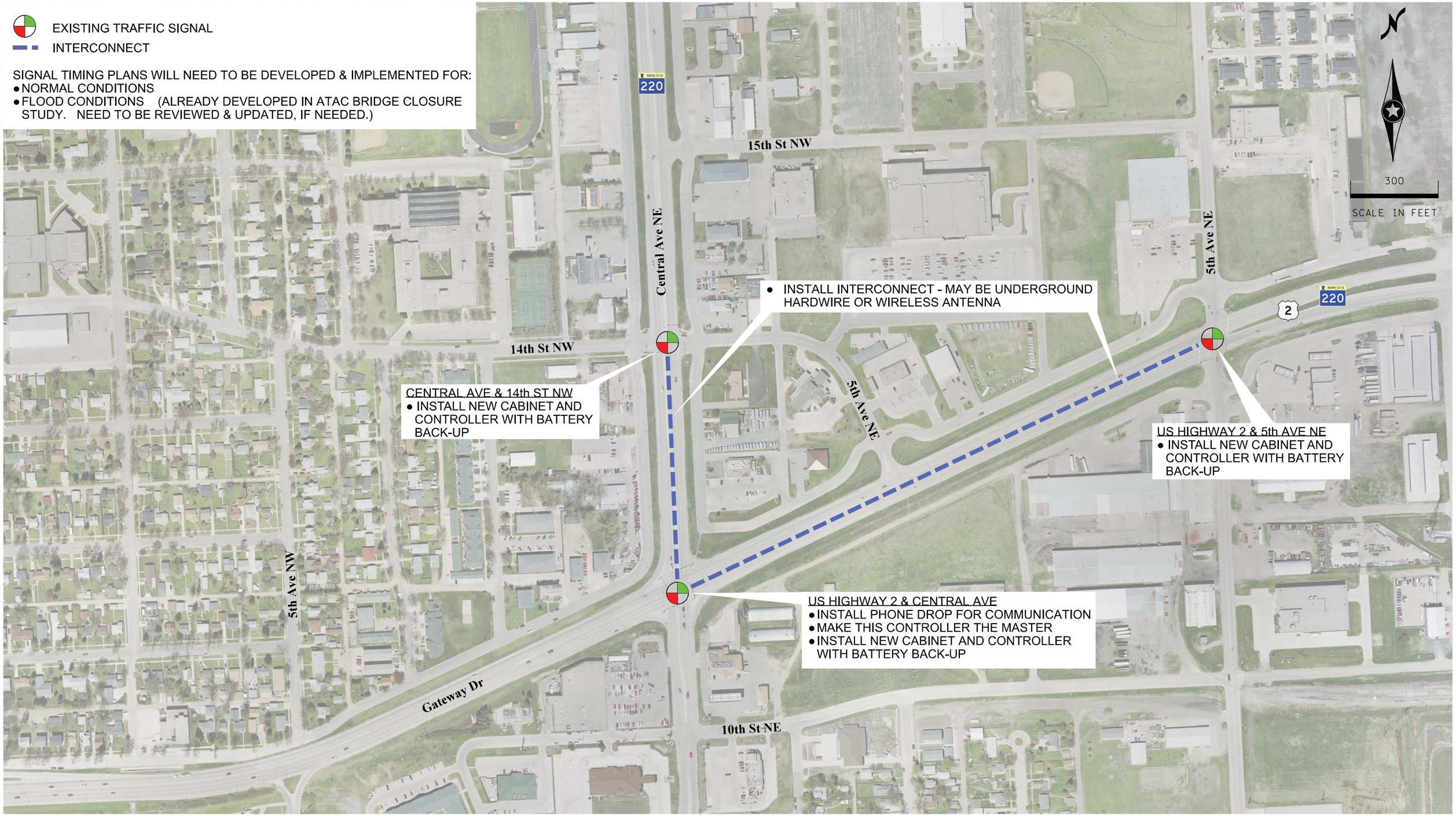
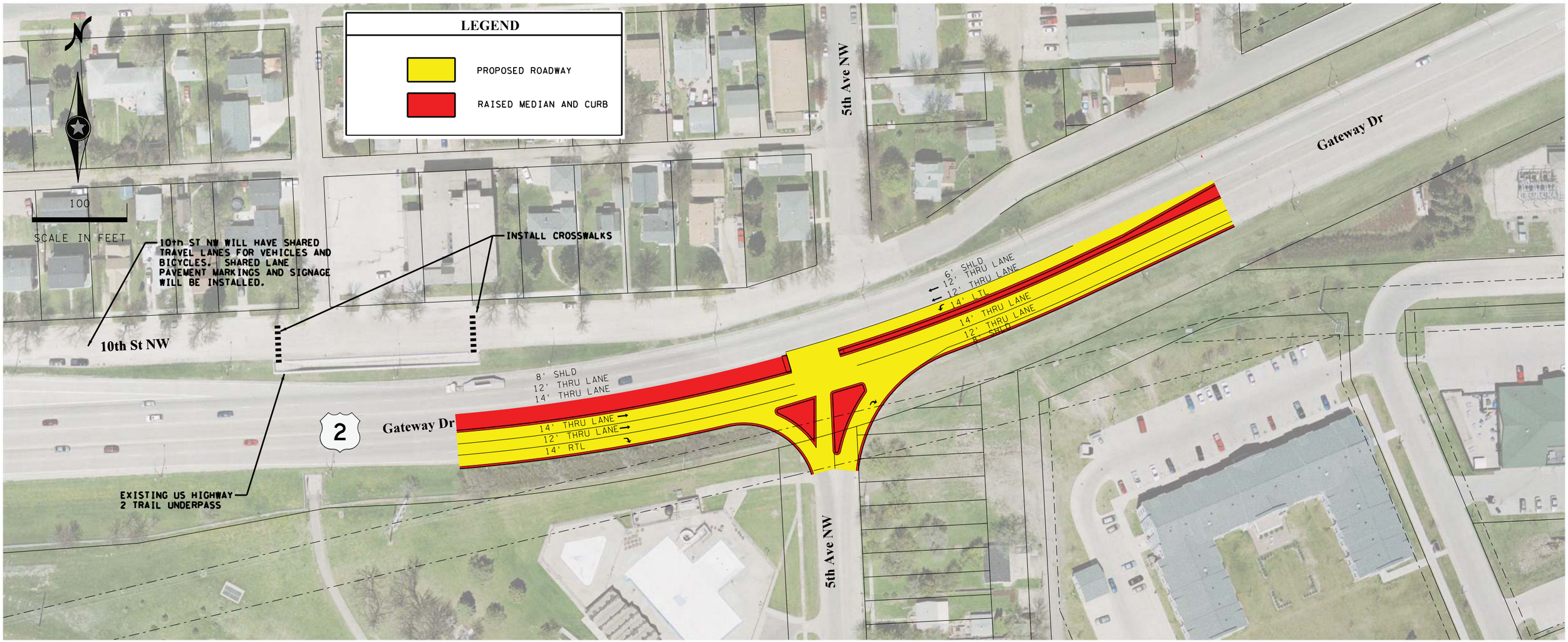


FIGURE 5.2
DO NOTHING WITH SIGNAL IMPROVEMENTS ALTERNATIVE



WB LEFT ONLY ACCESS INTERSECTION

① TRAFFIC OPERATIONS:

- Acceptable 2035 AM & PM peak hour operations for the study area network. This assumes interconnect and coordination of study area traffic signal.
- During flood conditions Westbound US 2 downtown traffic will have an alternative left turn option.

② MULTIMODAL (PED, BIKE & TRANSIT):

- Shared bike/vehicle lanes will be installed on 10th St NW via pavement markings and signage. A multi-use trail will be constructed to the west of 8th Ave NW. The shared lanes and multi-use trail will connect the existing underpass to the trail head at 12th St NW.
- Ped/Bike crossing of US 2 would be via the existing underpass. There would be no at-grade crossing of US 2 at 5th Ave NW.
- There would be no direct transit route to the neighborhood on 5th Ave NW. Transit would have to use Central Ave similar to existing conditions.

③ SAFETY:

- The crash potential for this alternative is slightly higher than the "Do Nothing"alternative. An additional traffic movement (WB left), along with additional conflict potential, is being introduced to the intersection.

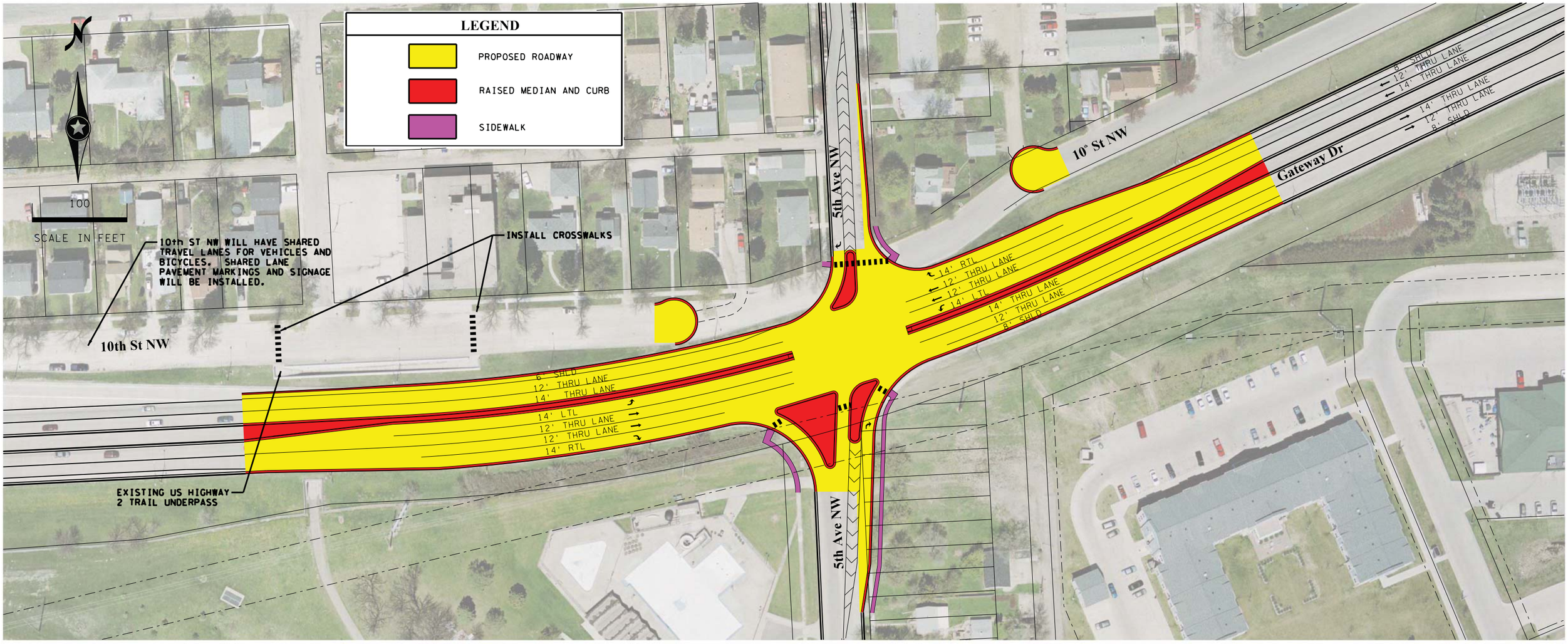
④ ACCESS / CONNECTIVITY (DOWNTOWN & NEIGHBORHOOD):

- This alternative maintains the existing access and connectivity for the neighborhood on the north side of US 2. Access to downtown is enhanced by providing a westbound left turn.

⑤ COST:

- Cost is ~$729,000.
- The existing median (east leg) and pork chop (south leg) will have to be reconstructed to provide the WB left turn lane. The US 2 eastbound travel way will have to be regraded.
- This alternative can be part of a phased approach to construct a future 3/4 - access intersection and ultimately a full access signalized intersection (if needed).

FIGURE 5.3
WESTBOUND LEFT ONLY ACCESS ALTERNATIVE
US HIGHWAY 2 & 5th AVE NW



THREE-QUARTER ACCESS INTERSECTION

(1) TRAFFIC OPERATIONS:

- All intersection movements are allowed off of US 2. From 5th Ave NW northbound and southbound right turn movements are allowed, while through and left turn movements are prohibited.
- Acceptable 2035 AM & PM peak hour operations for the study area network. This assumes interconnect and coordination of study area traffic signals.
- During flood conditions downtown and neighborhood access will be available off of US 2.
- On-street parking on the north and south legs of 5th Ave NW near the intersection will be prohibited.

(2) MULTIMODAL (PED, BIKE & TRANSIT):

- Shared bike/vehicle lanes will be installed on 10th St NW via pavement markings and signage. A multi-use trail will be constructed to the west of 8th Ave NW. The shared lanes and multi-use trail will connect the existing underpass to the trail head at 12th St NW.
- Ped/Bike crossing of US 2 would be via the existing underpass. There would be no at-grade crossing of US 2 at 5th Ave NW.
- There would be no direct transit route to the neighborhood on 5th Ave NW. Transit would have to use Central Ave similar to existing conditions.

(3) SAFETY:

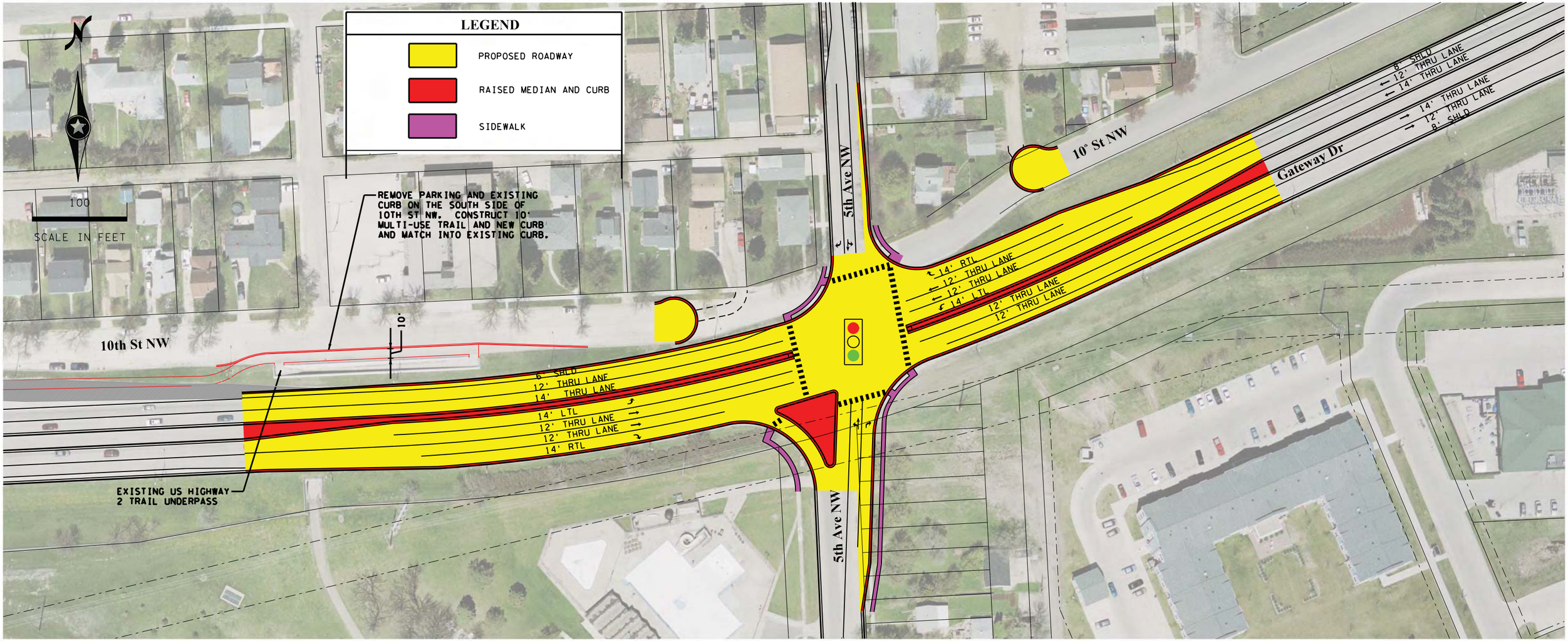
- The crash potential for this alternative is higher than the “Do Nothing” and "WBL" alternatives. Additional traffic movements, along with additional conflict potential, is being introduced to the intersection.

(4) ACCESS / CONNECTIVITY (DOWNTOWN & NEIGHBORHOOD):

- Access to the neighborhood and downtown is enhanced by providing a north leg and left turn lanes on US 2. Northbound and southbound left turn and through movements are still prohibited.

(5) COST:

- Cost is ~$1.5 million.
- The north leg of the intersection will need to be constructed as well as cul-de-sacs on 10th St NW. US 2 will need to be widened to provide turn lanes. The pork chop on south leg will need to be reconstructed and new pork chop on the north leg will need to be constructed. Additionally, grade issues through the intersection will need to be corrected.
- This alternative can be part of a phased approach from the "WB Left Only" alternative and to a full access signalized intersection (if needed).



SIGNALIZED FULL ACCESS INTERSECTION

1 TRAFFIC OPERATIONS:

- Acceptable 2035 AM & PM peak hour operations for the study area network. This assumes interconnect and coordination of study area traffic signals.
- During flood conditions downtown and neighborhood full access will be available.
- On-street parking on the north and south legs of 5th Ave NW near the intersection will be prohibited.

2 MULTIMODAL (PED, BIKE & TRANSIT):

- The removal of the WB US 2 Off-Ramp is assumed with this option. A future 10' multi-use trail can be constructed in the area of the removed WB US 2 Off-Ramp. The multi-use trail would connect the existing underpass to the trail head at 12th St NW.
- Ped/Bike crossing of US 2 would be via at-grade crosswalks at the signal. The signal will have marked crosswalks, pedestrian crossing push-buttons and crossing countdown timers.
- This alternative would be beneficial to transit operations. The black line could cross US 2 at 5th Ave NW instead of Central Ave.

3 SAFETY:

- The crash potential at traffic signals is higher than stop-controlled intersections, but the severity of the crashes is lower. The addition of a traffic signal will result in more crashes than the other alternatives, particularly rear-end crashes. Optimal signal timing could reduce the potential of rear-end crashes.

4 ACCESS / CONNECTIVITY (DOWNTOWN & NEIGHBORHOOD):

- All intersection movements are allowed with a traffic signal. Neighborhood and downtown access will be improved. Traffic will increase on neighborhood roads (5th Avenue NW and 14th St NW).

5 COST:

- Cost is ~$1.8 million.
- The north leg of the intersection will need to be constructed as well as cul-de-sacs on 10th St NW. US 2 will need to be widened to provide turn lanes. The pork chop on south leg will need to be reconstructed. Signal hardware and interconnect will need to be provided. Additionally, grade issues through the intersection will need to be corrected.

5.2 River Road NW and 17th St NW/12th Ave NW Intersection

The River Road NW and 17th St NW/12th Ave NW intersection was studied due to safety and right-of-way confusion. The City has received many resident complaints regarding this intersection. It is noted the only two property damage crashes have occurred at this intersection over the past 5 years. Three feasible alternatives were identified for this intersection; a Do Nothing Alternative, a Roundabout Alternative and a River Road Realignment Alternative.

5.2.1 Do Nothing Alternative

This alternative assumes that the intersection would maintain its current geometry where the southbound 12th Ave NW approach and the westbound 17th St NW approach are stop-controlled and River Road traffic is free-flowing. The traffic operations for this existing configuration are LOS C or better. Safety and geometric confusion would not be improved from existing conditions for this alternative. On the other hand, there would be no costs involved with this alternative.

5.2.2 Roundabout Alternative

This alternative assumes the construction of a single lane roundabout intersection. Figure 5.6 shows this alternative. The following describes how this alternative relates to the applicable study area goals.

Traffic Operations

The traffic operations of the single lane roundabout are acceptable for the 2035 conditions.

Safety

With this alternative the intersection right-of-way confusion will be corrected as each approach has to yield to only one movement, counterclockwise circulation traffic. The crash potential for a single-lane roundabout is relatively low when compared to a traffic signal or an all-way stop-controlled intersection. Additionally, speeds are low through a roundabout resulting in less severe crashes. The roundabout could also act as a traffic calming measure to help reduce speeds on River Road.

Cost

The estimated cost for this alternative is approximately $430,000 to $500,000. This involves the roundabout center island, truck apron, splitter island, median and curb construction. For snow removal purposes the center island will be constructed with a larger diameter with mountable curb and gutter. This will make it easier for snow removal. The initial cost of a roundabout may be high, but this type of control requires minimum maintenance and has very low long-term costs. A further detailed cost break down is located in Appendix C.

5.2.3 River Road Realignment Alternative

This alternative involves the realignment of River Road NW to form a typical right-angle two-way stop-controlled intersection where traffic from the northwest leg of River Road and the east leg of 17th St NW will be stop-controlled and the other two approaches will be free-flowing. The

existing turn movement count volumes facilitate this stop-control configuration. Figure 5.7 illustrates this alternative. The following describes how this alternative relates the applicable study area goals.

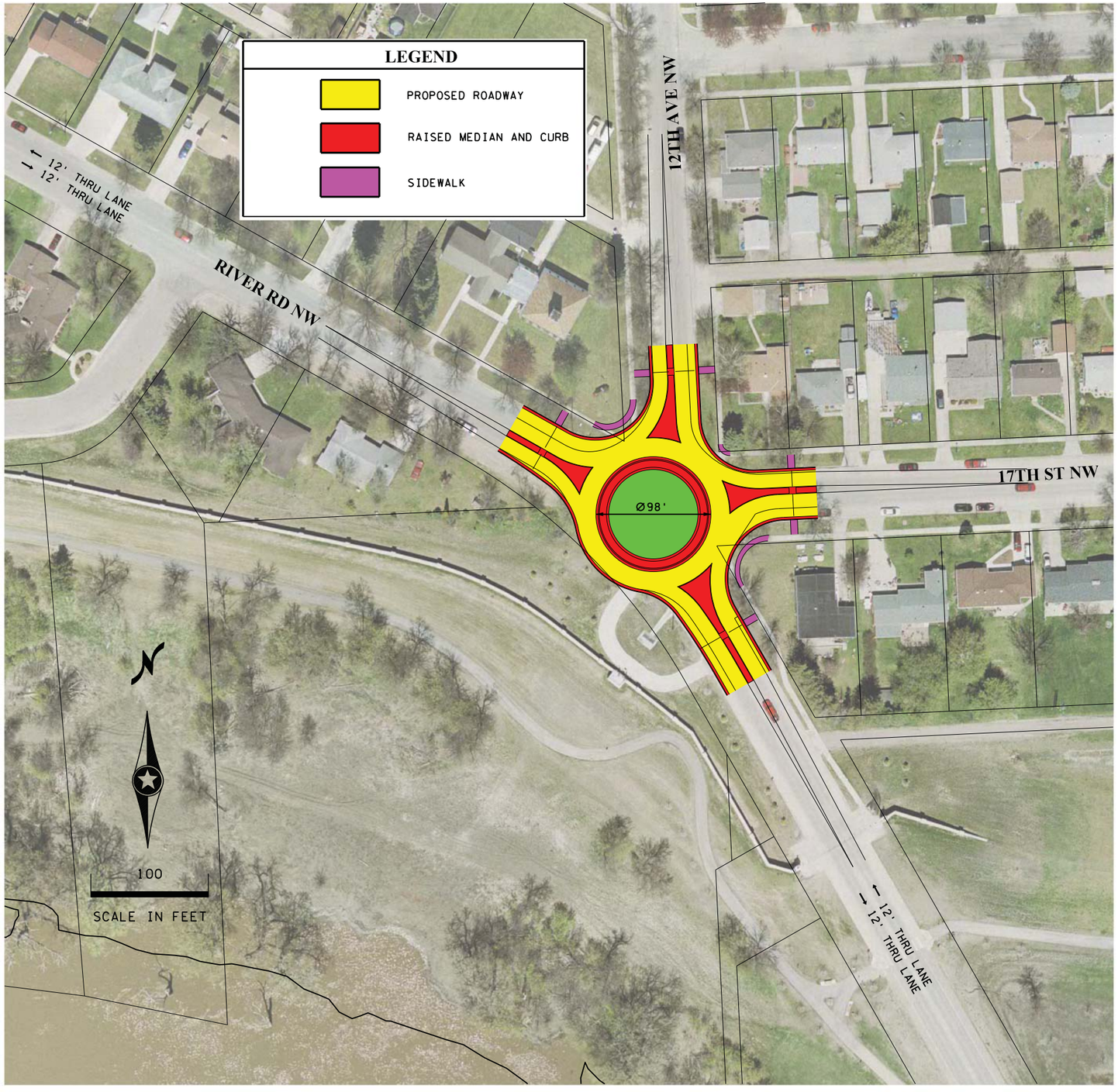
Traffic Operations
The traffic operations of the realigned intersection are acceptable for the 2035 conditions. Stopping the southeast bound River Road approach and letting the 12th Ave NW approach be free-flowing does not adversely affect the traffic operations.

Safety
The existing right-of-way confusion will be eliminated with the new right-angle geometry and typical side-street stop-control geometrics. In general, side-street stop-controlled intersections have low accident rates. The proposed stop condition for the northwest leg could act as a traffic calming measure and help reduce speeds on River Road. Additionally, this alternative could be tested in the field by using temporary striping and barrier/barrels to modify the southwest curb.

Cost
The cost of this alternative is approximately $105,000 and involves a small portion of new pavement, curb reconstruction, striping and signing. A further detailed cost break down is located in Appendix C.

5.2.4 Recommended Alternative

Based on SRC and public feedback, the River Road Realignment Alternative is recommended. It is noted that this alternative could be tested in the field by using temporary striping and barrier/barrels to modify the southwest curb.



ROUNDABOUT INTERSECTION

1 SAFETY:

- Intersection right-of-way confusion will be corrected as each approach has to yield to circulating roundabout traffic**.**
- The crash potential for a single-lane roundabout is low. Approach movements have to yield to circulating roundabout traffic. Additionally, speeds are low through roundabout resulting in less severe crashes.
- The roundabout could act as a traffic calming measure and help reduce speeds on River Rd NW.
- There might be a learning curve as residents become used to driving through a roundabout.

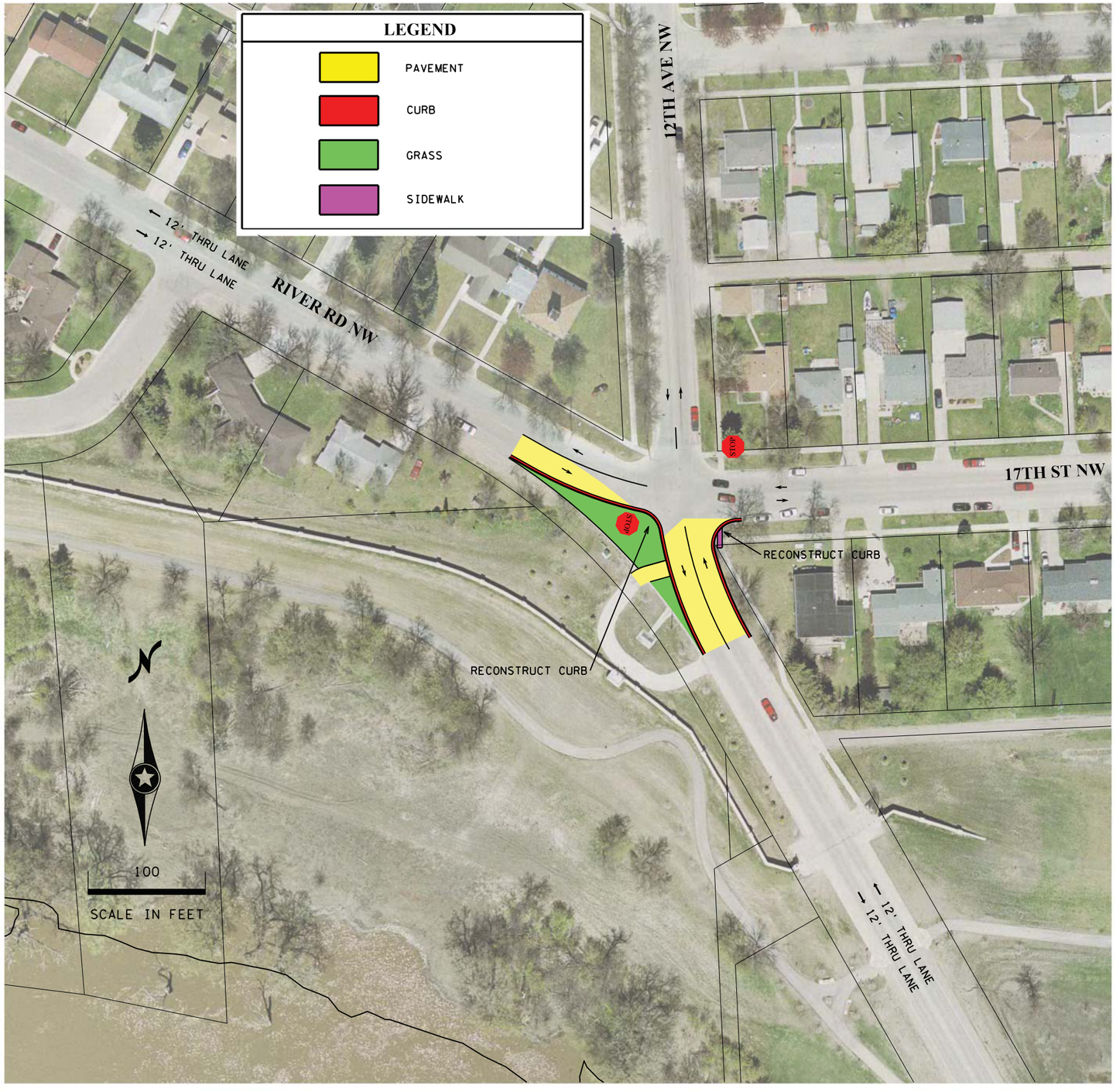
2 COST:

- Cost is ~$430,000 to $500,00.
- Roundabout, median and curb construction. The initial cost may be high, but roundabouts require minimum long-term costs when complared to traffic signals.

Notes:

- The center island of the roundabout should be designed large enough to accommodate for efficient snow removal as snow would need to be temporarily stored on the center island. The appropriate diameter shall be determined in final engineering design.

FIGURE 5.6
ROUNDABOUT ALTERNATIVE
RIVER RD NW& 17th ST NW / 12th AVE NW



REALIGNED INTERSECTION

1 SAFETY:

- Traffic from 12th Ave NW and the south leg of River Rd will be free-flowing as these approach have higher traffic volumes.
- Right-of-way confusion will be eliminated with the new right-angle geometry and standard side-street stop control.
- This alternative could be tested and be temporarily constructed with temporary striping and use of some type of barrier or barrels for the southwest curb.

2 COST:

- Cost is ~$105,000.
- Curb reconstruction, striping and signing will be rquired.

FIGURE 5.7
RIVER RD REALIGNMENT ALTERNATIVE
RIVER RD NW& 17th ST NW / 12th AVE NW

5.3 Multi-Use Trail Connection & US Hwy 2 Westbound Off-Ramp

A Transportation Enhancement (TE) Grant will provide funding to construct a multi-use trail connection from the existing trailhead on 12th St NW to the existing US Highway 2 underpass on 10th St NW. The funding amount is $145,000 (which includes $90,000 of federal funding). Possible layouts for this trail were considered and presented to the MPO and SRC. Based on the levee location and loading design in the green area and ADA grade design standards, it was determined that the most feasible and economic layout for the multi-use trail connection would be on the west side of 8th Ave NW. The existing parking and the existing curb would need to be removed. A 10-foot multi-use trail would be constructed. This would leave a roadway width of 32-feet for 8th Ave NE. A roadway width of 32-feet could accommodate two 12-foot travel lanes and 8-feet of parking on the east side.

Three alternatives for the multi-trail connection on 10th St NW were considered based on the future function of the US Highway 2 Westbound Off-Ramp. These alternatives are described below.

5.3.1 Multi-Use Trail Alternative 1

The Multi-Use Trail Alternative 1 connection assumes that the US Highway 2 Westbound Off-Ramp will remain in place. Figure 5.8 details this alternative.

The multi-use trail will be constructed on the west side of 8th Ave NW and the south side of 10th St NW. On 10th St NW parking and the existing curb will be removed on the south side. A 10-foot multi-use trail and new curb will be constructed. This will result in a roadway width of 28-feet for 10th St NW. A roadway width of 28-feet could accommodate a 10.5-foot westbound travel lane (the one foot curb lip could be used to create 11.5-feet of travel width), an 11.5 eastbound travel lane and 6-feet of parking on the north side. Minor reconstruction of the US Highway 2 Westbound Off-Ramp curb might be required, which would be determined in the final engineering plans.

5.3.2 Multi-Use Trail Alternative 2

The Multi-Use Trail Alternative 2 connection assumes that the US Highway 2 Westbound Off-Ramp will be removed. Figure 5.9 shows this alternative.

The construction of the multi-use trail on the west side of 8th Ave NW will be that same as Alternative 1. A 10-foot multi-use trail will be constructed in the area of the previous US Highway 2 Off-Ramp. To connect to the existing underpass the trail will have to match into 10th St NW. A portion of the existing curb and parking will have to be removed and a 10-foot trail and new curb will be constructed. This option provides a sense of increased safety for the trail along 10th St NW as there will be a buffer area between vehicle traffic on the road and pedestrian/bicycle traffic on the trail.

5.3.3 Multi-Use Trail Alternative 3

The Multi-Use Trail Alternative 3 connection assumes that the US Highway 2 Westbound Off-Ramp will remain in place. Figure 5.10 details this alternative.

The construction of the multi-use trail on the west side of 8th Ave NW will be that same as Alternative 1. Along 10th St NW shared bike and vehicle lanes will be installed via pavement marking and signage. The shared lanes and multi-use trail will connect the existing underpass to the trail head at 12th St NW. Approximately 300 feet of on-street parking (both sides) would need to be removed from 8th Ave NW to the east.

5.3.4 Recommended Alternative

Based on SRC and public feedback, the Multi-Use Trail Alternative 3 with shared lanes is recommended. If a full access traffic signal is installed at the US Highway 2/5th Avenue NW intersection at some point in the future it is recommended that the US Highway 2 Westbound Off-Ramp be removed and a 10' multi-use off-street trail be constructed.

EAST GRAND FORKS NORTHWEST STREET NETWORK STUDY

Alliant Engineering

EXHIBIT 5.8
MULTI-USE TRAIL CONNECTION-ALTERNATIVE 1
WITH US 2 WESTBOUND OFF-RAMP
(TRANSPORTATION ENHANCEMENT PROJECT)

EAST GRAND FORKS NORTHWEST STREET NETWORK STUDY

Alliant Engineering

FIGURE 5.9
MULTI-USE TRAIL CONNECTION-ALTERNATIVE 2
WITHOUT US 2 WESTBOUND OFF-RAMP
(TRANSPORTATION ENHANCEMENT PROJECT)

CONSTRUCT 10' MULTI-USE TRAIL TO CONNECT TO EXISTING TRAIL

INSTALL CROSSWALK

MATCH TO EXISTING CONCRETE PAD

CONSTRUCT 10' MULTI-USE TRAIL (EXACT LAYOUT TBD WITH FINAL ENGINEERING DESIGN)

12th St NW

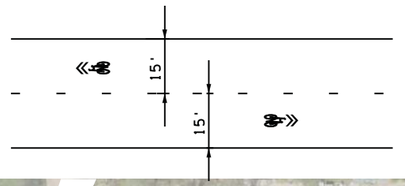
8th Ave NW

100

SCALE IN FEET

SHARROW (SHARED LANE) MARKINGS

- PLACED IN THE CENTER OF THE TRAVEL LANE SO THERE WILL NOT BE CONFLICTS WITH PARKED VEHICLES
- ASSISTS MOTORIST & BICYCLES TO SHARE THE ENTIRE LANE
- SPACE SHARROW ~200' IN EACH TRAVEL DIRECTION



PLACE ADVANCED WARNING SIGNAGE FOR TRAIL CROSSING

AHEAD
TRAIL XING

PLACE SIGNAGE DIRECTING PEDS TO USE 10TH ST NW TO ACCESS THE UNDERPASS

PARKING WILL BE REMOVED ON BOTH THE NORTH AND SOUTH SIDES OF 10TH ST NW FOR APPROXIMATELY 300' FROM 8TH AVE NW TO THE EAST

10th St NW

46'

PLACE SIGNAGE DIRECTING PEDS TO USE 10TH ST NW TO ACCESS THE TRAIL

EXISTING UNDERPASS STAIRS & RAMP

INSTALL CROSSWALK AND CURB CUT

30'

US 2 Off-Ramp

INSTALL CURB CUT

River Rd NW

TRAIL XING
AHEAD

PLACE ADVANCED WARNING SIGNAGE FOR TRAIL CROSSING

2

Gateway Dr

EAST GRAND FORKS NORTHWEST STREET NETWORK STUDY

Alliant Engineering

EXHIBIT 5.10
MULTI-USE TRAIL CONNECTION-ALTERNATIVE 3
WITH PAVEMENT MARKINGS ON 10th ST
(TRANSPORTATION ENHANCEMENT PROJECT)

6.0 Alternative Comparison

Feasible alternatives were developed based on the input from the SRC, public open houses and the results of the technical analysis completed herein. The following section provides a broad-spectrum summary of the feasible alternatives for each intersection alternative and trail connection alternative and serves as a planning tool to assist in determining the most appropriate alternative.

6.1 US Highway 2/5th Avenue NW Intersection

Table 6.1 provides a summary of the feasible alternative for the US Highway 2/5th Ave intersection. The Do Nothing alternative was assumed to be the baseline. The other alternatives were compared to the baseline.

Table 6.1 US Highway 2/5th Ave NW Intersection Alternative Comparison

US Highway 2 & 5th Ave NW Intersection Alternatives						
Evaluation Criteria		**Do Nothing (Figure 5.1)**	**Do Nothing w/Updated Signal Timing & Coordination (Figure 5.2)**	**US 2 Westbound Left Only* (Figure 5.3)**	**Three-Quarter Access* (Figure 5.4)**	**Full Access Signal* (Figure 5.5)**
Traffic Operations	US Hwy 2 Corridor	No affect	✓ Improved Traffic Flow on the corridor.	✓ Improved Traffic Flow on the corridor.	✓ Improved Traffic Flow on the corridor.	✘ Mainline traffic will have to stop at a signal and traffic flow will be interrupted.
	US Hwy 2/Central Ave Intersection	Poor operations	✓ Traffic operations improve to acceptable conditions.	✓ Traffic operations improve to acceptable conditions.	✓ Traffic operations improve to acceptable conditions.	✓ Traffic operations improve to acceptable conditions.
	Flood Conditions	Poor flood operations	✓ Traffic operations improve & queues are reduced.	✓ Traffic operations improve & queues are reduced.	✓ Traffic operations improve & queues are reduced.	✓ Traffic operations improve & queues are reduced.
Safety	US Hwy 2/Central Ave Intersection	Existing safety issues	● Updated timing & coordination could reduce rear-end type crashes, but there could be other geometric causes.	● Updated timing & coordination could reduce rear-end type crashes, but there could be other geometric causes.	● Updated timing & coordination could reduce rear-end type crashes, but there could be other geometric causes.	✓ Less volumes and crash potential through the intersection because of the signal at 5th Ave NW.
	US Hwy 2/5th Ave NW Intersection	Low crash frequency	✓ Updated timing at US 2/Central could reduces queues and conflicts through this intersection.	✘ The addition of a WBL turn lane adds more conflict potential.	✘ The addition of more turning movements add more conflict potential.	✘ Signalized intersections have a high crash frequency, but typically less severe rear-end crashes.
		Low crash severity	✓ Updated timing at US 2/Central could reduces queues and conflicts through this intersection.	✘ Right-Angle crashes could increase.	✘ Right-Angle crashes could increase.	✘ Signalized intersections typically have a low crash severity rate.
Multimodal	Transit Operations	No transit crossing of US Hwy 2.	● No transit crossing of US Hwy 2.	● No transit crossing of US Hwy 2.	● No transit crossing of US Hwy 2.	✓ Transit crossing of US Hwy 2.
	Pedestrian/Bicycle	No at-grade crossing of US Hwy 2.	● No at-grade crossing of US Hwy 2.	● No at-grade crossing of US Hwy 2.	● No at-grade crossing of US Hwy 2.	✓ At-grade crossing of US Hwy 2.
	Multi-Use Trail	Future connection via 10th St NW	● Future connection via 10th St NW.	✓ Future connection in area of removed US Hwy 2 Off-Ramp.	✓ Future connection in area of removed US Hwy 2 Off-Ramp.	✓ Future connection in area of removed US Hwy 2 Off-Ramp.
Access/ Connectivity	Neighborhood Flood Access	Access to/from neighborhood via Central Ave only.	● Access to/from neighborhood via Central Ave only.	● Access to/from neighborhood via Central Ave only.	✓ Access to/from neighborhood via Central Ave and US Highway 2 at 5th Ave NW.	✓ Full Access to/from neighborhood at 5th Ave NW.
	Visible Access to Downtown	Eastbound Right-In/Right-Out Only Access.	● Eastbound Right-In/Right-Out Only Access.	✓ Eastbound Right-In/Right-Out and Westbound Left Turn Access.	✓ Eastbound Right-In/Right-Out and Westbound Left Turn Access.	✓ Full Access at 5th Ave NW.
	Minimize Impact to residents on 5th Ave NW	No increase or change in routes in neighborhood traffic volumes.	● No increase or change in routes in neighborhood traffic volumes.	● No increase or change in routes in neighborhood traffic volumes.	● Traffic volumes would slightly increase on 5th Ave and 14th St. Volumes may decrease on other neighborhood roadways.	● Traffic volumes would increase on 5th Ave and 14th St. Volumes may decrease on other neighborhood roadways.
	Connectivity Across US Hwy 2	No current connectivity across US Hwy 2.	● No current connectivity across US Hwy 2.	● No current connectivity across US Hwy 2.	● No current connectivity across US Hwy 2.	✓ Connectivity via 5th Ave NW.
Cost		**$0**	**$100,000**	**$729,000**	**$1.5 Million**	**$ 1.8 Million**

* Study area traffic signal interconnect and updated timings were assumed.

Changes in operations using the Do Nothing Alternative as a baseline:

✓ improvement

● same

✘ decline

6.2 River Road & 17th St NW/12th Ave NW Intersection

Table 6.2 provides a summary of the feasible alternative for the River Rd and 17th St NW 12th Ave NW intersection. The Do Nothing alternative was assumed to be the baseline. The other alternatives were compared to the baseline.

Table 6.2 River Road & 17th St NW/12th Ave NW Intersection Alternative Comparison

River Road & 17th St NW/12th Ave Intersection Alternatives			
Evaluation Criteria	**Do Nothing**	**Roundabout (Figure 5.6)**	**River Rd Realignment (Figure 5.7)**
Safety	Right-of Way Confusion	✓	✓
	High Speed on River Rd	✓✓	✓
Cost	$0	$430,000	$105,000

✓✓ much improved

✓ slight improvement

6.3 Multi-Use Trail Options

Table 6.3 provides a summary of the multi-use trail alternatives for the trail connection from the existing trailhead on 12th St NW to the existing underpass on 10th St NW.

Table 6.3 Multi-Use Trail Alternative Comparison

Multi-Use Trail Alternatives				
Evaluation Criteria	**Do Nothing**	**Alternative 1 (Figure 5.8)**	**Alternative 2 (Figure 5.9)**	**Alternative 3 (Figure 5.10)**
Safety	No Pedestrian Facilities	✓✓	✓✓	✓✓
	Conflicts with vehicular traffic	✓✓	✓✓	✓
Cost		Mid	High	Low

✓✓ much improved

✓ improved

7.0 Recommended Transportation Plan

Recommendations were developed based on input from the SRC, public open houses and the results of the technical analysis completed herein. The following sections provide the GF-EGF MPO the necessary guidance and serve as a planning tool to develop a prioritization for future roadway and multimodal transportation improvements.

7.1 Implementation Plan

Chapter 5 details the feasible alternatives and recommendations for the investigated transportation improvement alternatives. An implementation plan has been developed to provide a schedule of priority to the recommendations and to denote the anticipated timeline and associated "triggers" of when the improvement might be necessary. Table 7.1 presents the recommended implementation plan. It is noted, the implementation plan could be subject change based on unforeseen traffic changes that may occur in the future.

7.2 Traffic Signal Warrant Analysis

For the full access signalized US Highway 2/5th Avenue NW recommendation (long-term conditions), it is important that a traffic signal be warranted per MnDOT's criteria. MnDOT requires a warrant analysis for any intersection control changes on a MnDOT road beyond a stop-through control. For traffic signal installation, there are special volume criteria that have to be satisfied. In particular, there are three detailed volume warrants; Warrant 1-Eight-Hour Vehicular Volume, Warrant 2 – Four-Hour Vehicular Volume and Warrant 3-Peak Hour Volumes. These traffic volume warrants compare mainline traffic volumes (major approach) with the side-street traffic volumes (minor approach). For each of the warrants there are unique threshold conditions.

The traffic signal volume warrant thresholds were analyzed for the 2035 conditions, the 2014 conditions (year of implementation), 2018-2019 conditions and existing flood conditions assuming a full access at 5th Ave NW. The following summarizes the volume warrants:

- **2035 Conditions:** Peak hour, 4-hour volume and 8-hour volume warrants are satisfied.
- **2014 Conditions:** Peak hour, 4-hour and 8-hour volume warrants are not satisfied. The forecasted 2014 traffic volumes fall just below the 4-hour warrant threshold. It is anticipated that the four hour volume warrants will be satisfied in the year 2018.
- **2018 - 2019 Conditions:** Between year 2018 and 2019 volumes estimates, the 4-hour volume warrant and the 8-hour volumes become satisfied.
- **2009 Flood Conditions with Full Access at 5th Ave:** Peak hour and 4-hour volume warrants are satisfied.

The pedestrian crossing count was also investigated at the US Highway 2/5th Ave NW intersection to determine if the Pedestrian Warrant would be satisfied. The 2011 existing number of pedestrian crossing is 4 pedestrians between 6 AM to 6 PM. The Pedestrian Warrant requires at least 100 pedestrians crossing during a four hour period or 190 pedestrians during an hour. The Pedestrian Warrant will not be satisfied at this location.

It is recommended that the US Highway 2/5th Avenue NW intersection be monitored in the future to determine if and when a signal would be warranted. For existing conditions, signal interconnect and implementation of optimized timing plans is recommended. This improvement is assumed to be inplace for future operations. It is important to keep in mind that an Intersection Control Evaluation (ICE) report may be required by MnDOT to make control changes to this intersection. A full summary of the warrant analyses with graphical representations are located in Appendix D.

7.3 Funding

To support the implementation of the recommended alternatives, the GF-EGF MPO may seek support from available funding sources. Key funding sources include:

- Mn/DOT District 2 Area-wide Transportation Partnership (ATP) City Sub-Target funds and East Grand Forks funds for the US Highway 2/5th Ave NW intersection.
- The Mn/DOT ATP Sub-Target funds or State funds for the US Highway 2 Corridor and Central Avenue Corridor signal interconnect and coordination plans.
- ATP City Sub-Target funds, East Grand Forks funds and State Aid funds for the River Road &17th Ave NW/17th St NW intersection.
- Transportation Enhancement (TE) funds for the Multi-Use Trail Connection.
- Highway Safety Improvement Program (HSIP) funding may be available for the recommended alternatives.
- Federal Aid opportunities may be available.

Table 7.1 Recommended Implementation Plan

Study Components	Improvement Measure Description	Improvement Figure	Priority	Implementation Trigger	Responsible Agency	Preliminary Cost Estimate	Notes
US Highway 2 Corridor	1. Improve existing traffic signal operations by interconnecting existing traffic signals in the study area and implementing new timing plans for existing and flood conditions. This will improve traffic flow along the corridor for both existing and flood conditions.	5.2	Short-Term	Currently warranted.	Mn/DOT	$100,000	Each existing signal cabinet will need to be replaced and have batter back-up. A master controller with a phone drop will need to be assigned.
	2. Interconnect and implement timing plans for the signals along US Highway 2. For flood conditions the timing plans in the ATAC Bridge Closure Study should be reviewed, updated (if needed) and implemented. For non-flood conditions timing plans should be developed and implemented.	NA	Long-Term	Warranted when congestion increases and traffic operations deteriorate below acceptable thresholds on the US Highway 2 Corridor between GF and EGF.	Mn/DOT	TBD	The MPO should consider completing a study to analyze the possibility of coordinating all the signals on US Highway 2 (in both GF and EGF). The study should also consider the possibility of one lead agency to control the US Highway 2 signals.
	3. Install advanced directional signage on westbound US Highway 2 directing travelers to the EGF Downtown Business District and the Campground/Recreational Area. The signage will need to be installed before Central Avenue as this is where access will occur. This improvement is currently underway or occurring in the near future per the City's Trail Blazing Study.	NA	Short-Term	Currently warranted.	City of EGF	$2,000	There is currently a Trail Blazing Study for the City. This plan should be investigated and amended to include this additional signage if needed.
US Highway 2 & 5th Avenue NW Intersection	1. Construction the full access signalized intersection alternative with pedestrian crossings. As a result of providing access to the north, the US Highway 2 westbound off-ramp will be removed if and when a traffic signal is installed.	5.5	Long-Term	A signal warrant analysis estimates that a traffic signal will be warrant in year 2018 based on projected traffic volumes. A traffic signal should be installed if and when warranted based on congestion levels. This intersection should be monitored in the future to determine if a signal is needed in year 2018 or at some point after.	Mn/DOT & City of EGF	$1.8 Million	This signal will be interconnected to the traffic signal system and will be included in optimized timing plans.
River Rd & 17th ST NW/12th Avenue NW Intersection	1. Construct the river road realignment alternative. This alternative could be temporarily constructed with temporary striping and use of some type of barrier or barrels for the southwest curb.	5.7	Short-Term	Currently warranted based on safety and driver right-of-way confusion.	City of EGF	$105,000	Stopping SB River Rd could act traffic calming measuring for River Rd.
Multi-Use Trail Connection	1. Construct a multi-use trail from the existing trailhead on 12th Street NW to the existing US Highway 2 underpass. An off-street 10' multi-use trail will be constructed near the toe of the floodwall between 12th Street NW to 10th Street NW. On 10th Street NW on-street sharrows or shared lane pavement markings will be installed from 8th Avenue NW to the underpass. Appropriate signage will also be installed.	5.10	Short-Term	Currently warranted. Transportation Enhancement Funds are dedicated and currently available for this connection. Final engineering plans will be completed in winter 2012.	City of EGF	$145,000	If a full access signal at US Highway 2/5th Avenue NW is installed in the future, it is recommended that the US Highway 2 WB Off-Ramp be removed and a 10' off-street multi-use trail be constructed (This is not included in the cost estimate).

Short-Term = Expected necessary within 0-5 years
Mid-Term = Expected necessary within 5-15 years
Long-Term = Expected necessary within 15-25 years
Note: Cost estimates are design and construction costs and include preliminary and final engineering design service fees and contingencies. Detailed cost estimates are located in Appendix C.

Appendix A:

Study Review Committee (SRC) Meeting Minutes

ALLIANT PROJ. NO. 111-0054

MEETING MINUTES

MEETING DATE: Thursday, June 9th, 2011; 1:30 - 2:30

PURPOSE: Northwest Street Network Study
Kick-Off Meeting with Steering Committee

ATTENDEES: See Sign-in Sheet (attached)

CC: File

MINUTES BY: Katie Bruwelheide, Alliant
June 15, 2011

The focus of the kick-off meeting on Thursday, June 9th was to provide a background of the project, review the scope of work, discuss the role of the Steering Committee, highlight the key issues and project goals and objectives. In general, the meeting followed the outline presented in the agenda. These meeting minutes will follow the agenda outline.

1) **Introductions** – Attendees are listed on sign-in sheet.

2) **Project Background –** Nancy Ellis provided a brief background of the project. In summary, the intersection of 5th Avenue NW/US Highway 2 has been planned as a future full access intersection in the LRTP. It currently operates as a right-in/right-out intersection for on the eastbound direction with no access to 5th Avenue in the westbound direction. Future traffic forecasts and planned infrastructure improvements are based on this assumption of a full access intersection. The propose of this study is to re-examine what type of control and access need there is for this intersection and how traffic patterns will be affected. Seasonal flooding of River Road and resulting traffic pattern impacts will also be considered for this intersection.

3) **Review of Work Scope** – Bob Green provided a review of the work scope and technical analysis (attached).

4) **Role of the Steering Committee** – Bob Green detailed the role of the Steering Committee. In general, the Steering Committee will provide the following:
   - Local knowledge and experience; diverse input based on area of expertise or interest
   - Provide input at key points in project (Four meetings)
     - Meeting #1 – Identify potential issues and project goals
     - Meeting #2 – Review technical issues from existing and "no-build" analysis
     - Meeting #3 – Review potential concepts and analysis of "build" options
     - Meeting #4 – Review final concepts and potential recommendations
   - Review materials to be presented at the Public Open Houses

The Steering Committee consists of the following members:

- Business Owner rep – Craig Buckalew, cbuckalew@eastgrandforks.net
- Business Owner rep – Steve Gander, ganders@infionline.net
- City Council rep - Mike Pokrzywinski, mpokrzywinski@eastgrandforks.net
- EGF Planning Commission rep – Niel McWalter, niel.mcwalter@usbank.com
- School District rep – Brian Loer, Senior High Principal, bloer@egf.k12.mn.us
- MNDOT rep – Joe McKinnon, District 2 Planner, joseph.mckinnon@state.mn.us
- EGF Engineering rep - Brad Bail, bbail@fs-mn.com
- EGF Public Works rep – John Wachter, jwachter@ci.east-grand-forks.mn.us
- Fire/Emergency Response Dept rep – Randy Gust, rgust@ci.east-grand-forks.mn.us
- EGF Police rep – Mike Hedlund, mhedlund@egf.mn
- MPO rep - Nancy Ellis, nancy.ellis@theforksmpo.org
- Transit rep – Teri Kouba, teri.kouba@theforksmpo.org

There will be a neighborhood representative on the Steering Committee, but the member has yet to be determined. Possible members will be asked at the first public meeting.

5) **Key Issues/Goal and Objectives –** Bob Green distributed a handout listing the goal and objectives of the project. The following issues will be reviewed as part of the study:

- Does the north-south traffic flow in the northwestern area of East Grand Forks need improving?
- How can connectivity and mobility to and from northwestern East Grand Forks be enhanced? Does it need to be?
- Should the US 2 / 5th Ave NW intersection remain a right-in/right-out, or be constructed as a full access intersection as described in the Long Range Transportation Plan?
- Is there another intersection configuration that would be more appropriate for 5th Avenue / US 2?
- What benefits and impacts does each alternative for 5th Ave NW have on:
  - Regional mobility?
  - Emergency access?
  - The residential neighborhood?
  - The elementary and high schools?
  - Traffic management during flooding?
- If the full access at 5th Ave NW is not constructed, Is the US 2 WB off-ramp to 10th St still needed?
- How can congestion during flooding be relieved? Does it need to be?
- What is the impact on the Central Ave Corridor Study and the US 2 Access Management Plan?
- What should the layout for the multi-purpose trail running along 10th St and 8th Ave NW look like for the recommended alternative?

  -This trail had TE Funding, but is not currently designed. It will be designed after this project is determined.
- What improvements can be made at the River Road/12th Ave NW / 17th St NW intersection to improve safety and operations?

-Alliant will develop alternatives, including a Roundabout, and re-aligning 17th St to become a "T" intersection with 12th Ave.

6) Other Discussions- The following details other discussions regarding the project:

- There is a campground in the vicinity of the project next to the river on the south side of Highway. Campers often miss the exit and have to travel across Gateway Bridge and turn around. The campground signing is not very prominent and more may be needed.

- Black Transit Route 10 and 11 serves this area. Transit is not on Highway 2, but on 220 (Central). The transit route accesses the neighborhood to the north via 220 and 14th Street by the library. A full access at Highway 2/5th Avenue would be beneficial to transit operations as time would be saved.

- Better access to downtown is needed for the westbound direction on Highway 2. Maybe 5th Avenue should be opened up for the westbound to south bound direction.

- There is a guide signing study going on to improve signing to downtown area.

- There was a lot of discussion about the signal timing in East Grand Forks. The signals are not connected and can't communicate with each other, so there is no coordination. In the future the signals could be interconnect and timing plans could be developed for both normal conditions and for flood events. This could provide a significant improvement in traffic operations. Alliant will obtain the existing signal timing and coordination information from Mn/DOT.

- For the school, safe multi-modal travel is the biggest concern. Left turn stacking on Central (220)/14th Avenue is a concern in the AM hours due to Grand Forks Senior High.

- A full access was once considered at Highway 2/2nd Avenue (east side of 220), but was eliminated as part of the Highway 2 Access Study. That alternative will not be considered as part of this project.

- The intersection of Demers Avenue/4th St is to be included in the study.

7) Schedule and Next Meetings

- Schedule Handout – The project schedule was presented (attached)
- Future Steering Committee Meeting Dates – Please mark your calendars:
  - #2 – Thursday, 7/28/11
  - #3 – Thursday, 9/15/11
  - #4 – Thursday, 10/20/11

ALLIANT PROJ. NO. 111-0054

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3) **Review of Work Scope** – Bob Green provided a review of the work scope and technical analysis (attached).

4) **Role of the Steering Committee** – Bob Green detailed the role of the Steering Committee. In general, the Steering Committee will provide the following:
   - Local knowledge and experience; diverse input based on area of expertise or interest
   - Provide input at key points in project (Four meetings)
     - Meeting #1 – Identify potential issues and project goals
     - Meeting #2 – Review technical issues from existing and "no-build" analysis
     - Meeting #3 – Review potential concepts and analysis of "build" options
     - Meeting #4 – Review final concepts and potential recommendations
   - Review materials to be presented at the Public Open Houses

EGF Northwest Street Network Study

Summary of Technical Analysis

Steering Review Committee (SRC) Meeting #1- Identify Issues, Goals, and Objectives

Task 3 - Existing Conditions Analysis

1. Obtain existing information from City (volumes, crash records, etc.)
2. Conduct a traffic operations analysis for AM and PM peak
3. Conduct a traffic operations analysis for flood event (various bridge closures)
4. Conduct a safety analysis
5. Conduct an access inventory
6. Identify existing operational and safety deficiencies from technical analysis

Task 4 – Future Conditions "No-Build" Analysis

1. Obtain forecasts from MPO assuming 5th Avenue stays as is (right-in/right-out)
2. Conduct a traffic operations analysis for AM and PM peak
3. Identify anticipated future deficiencies from technical analysis
4. Document future land use and planned multi-modal features (walking, biking, and transit).
5. Identify potential deficiencies in multi-modal system.

SRC Meeting #2 -Finalize issues and deficiencies

Task 5.2 – Roadway Improvement Concepts

1. Develop high level concept sketches for full access intersection at 5th Avenue
2. Develop other high level concept sketches that address the deficiencies identified in Tasks 3 and 4
3. Modify forecasts as necessary for changes in access
4. Conduct a traffic operations analysis for concepts
5. Evaluate concepts based on operations, safety, access, and mobility
6. Evaluate impact of concepts on previous studies and plans (LRTP, US 2 Access Study, Central Avenue Study)

SRC Meeting #3 - Review alternatives and select preferred

Task 5.3 – Recommendations and Costs

1. Preferred alternatives to be selected at SRC #3.
2. Develop final concepts based on input from SRC.
3. Develop associated costs.

Task 7.1 Draft Report

1. Prepare draft report

SRC Meeting #4 - Review draft report, preferred alternatives, and costs

Task 7.2 Prepare Final Report

Other Tasks

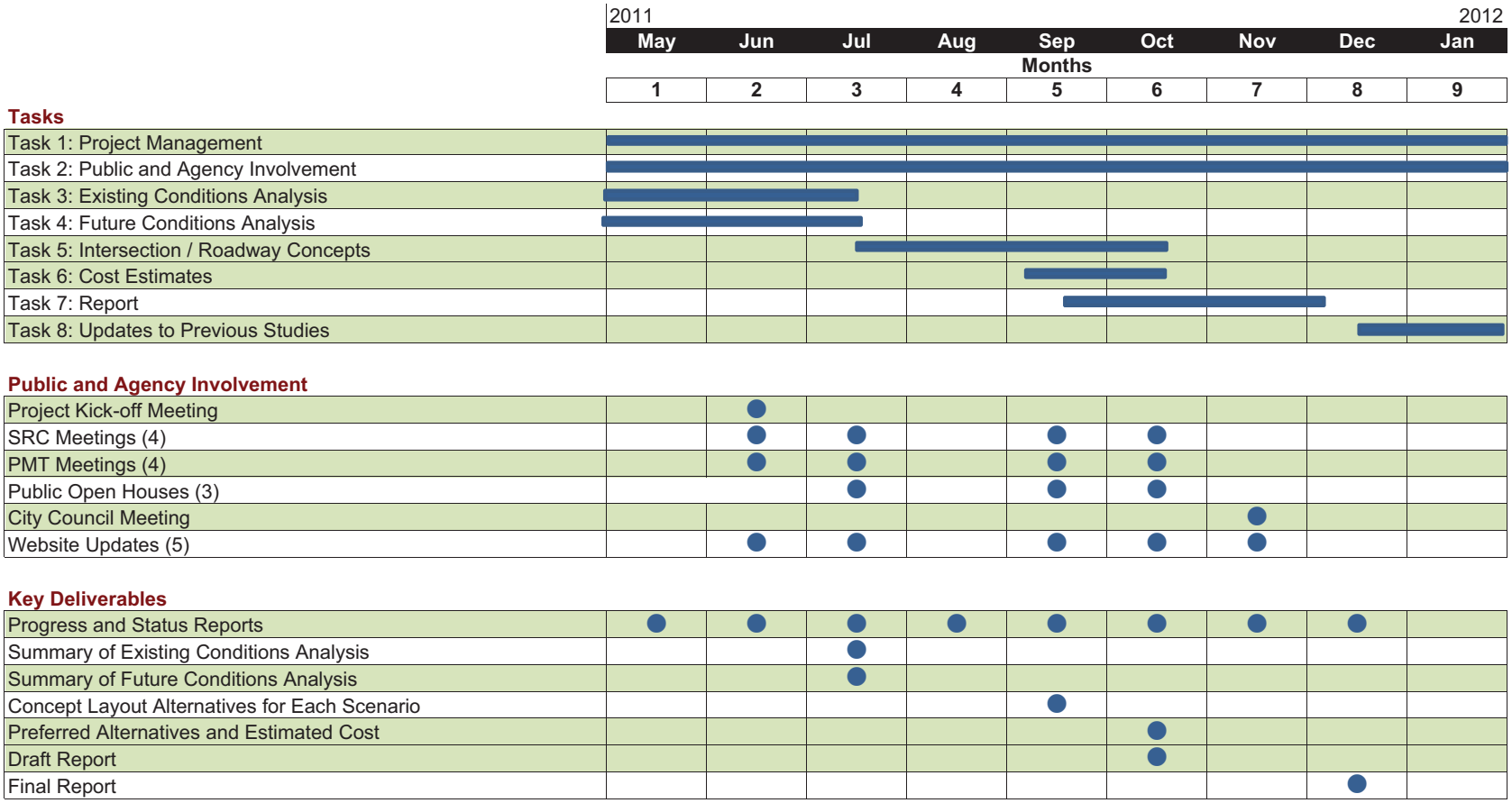
Task 1 – Project Management

Task 2 – Public and Agency Involvement

1. Four Steering Review Committee meetings
2. Three public open houses
3. One city council meeting
4. Maintain project website

Task 8 – Update Previous Studies (if necessary)

Northwest EGF Street Network Study
Project Schedule
June 9, 2011



ALLIANT PROJ. NO. 111-0054

SRC MEETING MINUTES

MEETING DATE: Thursday, August 11th, 2011; 2:00 – 3:00

PURPOSE: Northwest Street Network Study
Review of Existing Analysis and Background Conditions for Future Analysis

ATTENDEES: See Sign-in Sheet (attached)

CC: File

MINUTES BY: Katie Bruwelheide, Alliant
August 12th, 2011

The focus of Study Review Committee meeting on Thursday, August 11th was to provide a review of the existing analysis and background conditions for future analysis. In general, the meeting followed the outline presented in the agenda. These meeting minutes will follow the agenda outline.

1) **Introductions** – Attendees are listed on sign-in sheet (attached).

2) **Project Overview –** Bob Green gave a brief overview of the project and the work completed to this point. So far, the existing analysis has been completed and background conditions for the future analysis have been determined.

3) **Existing Conditions Analysis –** Katie Bruwelheide gave an overview of the existing conditions analysis and went over the following figures (attached to the agenda).
   - Study Area – Handout
   - Existing Issues Map – Handout
     - Police Department stated that there is a speeding problem on US Hwy 2 and on Central north of US Hwy 2.
     - SRC members stated that existing signal timing and coordination on US Hwy 2 and Central is not optimal.
     - There are higher traffic volumes on Central at 14th, 17th and 20th in the morning hours from the high school and tech students.
   - Multimodal Network – Handout
     - The future 10' multi-use trail on the north side of US Hwy 2 conflicts with the westbound US Hwy 2 off-ramp.
     - MnDOT will be making the traffic signal at US Hwy 2/Central Avenue ADA compliant. This means new curb ramps, pedestrian push-buttons and new indications for crossing.
   - Safety Analysis – Handout
     - 3 intersections have a higher than average crash rate. These are Central Avenue/23rd Street, Central Avenue/17th Street and Central Avenue/US Hwy 2.

  - The 23rd and 17th Street intersections are side-street stop control and have a high incidence right angle crashes that could be attributable to vehicles turning into the flow of traffic on Central Avenue.
  - Central Avenue/US Hwy 2 is a traffic signal and has a high incidence of rear end crashes that could be a result of un-optimized signal timing.
  - There is a visibility/merge issue on westbound US Hwy 2 where the on-ramp from River Road merges. There have been a lot of rear end crashes as vehicles tend to stay in the right lane and not move over for entering vehicles.
- Bridge/Ramps/Roadway Flood Closure Map - Handout
- Existing LOS Analysis – Handout
  - Traffic operations for existing conditions (all bridges and ramps open) are acceptable with some minor signal timing updates at US Hwy 2/Central Avenue.
  - Traffic operations for flood conditions (ramps and bridges closed) show major congestion along US Hwy 2 and at the US Hwy 2/Central Avenue traffic signal.
- Traffic Flow Map – Handout
  - The changes in traffic flows are shown for each ramp/bridge closure scenario.

4) Future Conditions – Handout

The future improvements and recommendations for the roadway network are illustrated in this figure. Two additional improvements will be added to this figure; the removal of the US Hwy 2 westbound off-ramp and the construction of a ¾ access and southern leg at US Hwy 2/2nd Avenue NE. These conditions will be used in the future 2035 analyses.

There might be plans for the rehabilitation of the Kennedy Bridge. This could affect the River Rd ramps. Alliant will confirm the plans with (MnDOT – Joe McKinnon).

5) Future Conditions Analysis Scenarios

The following states the main goals of the project determined by SRC members at this meeting:

- Maintain acceptable traffic operations
- Direct and visible Downtown EGF and Business access
- Optimal Transit Operations
- Enhanced Safety
- Multimodal Considerations
- Minimize the impact to the neighborhood to the north

The following are alternatives for future analysis that were discussed for the US Hwy 2/5th Avenue NW intersection:

- Do nothing – keep in the existing eastbound right-in/right-out configuration
- Full intersection with traffic signal - planned in the LRTP
- ¾ -Access – Allowing left turns and right turns off of US Hwy 2 and right turns off of 5th Avenue NE while prohibiting left turns off of 5th Avenue NE.
- Sequential alternative – ¾ access for interim (short term improvement) and full signalized intersection for long term improvement
- Temporary barriers to be moved during flooding conditions

6) Other Discussions

- There is currently a signing project underway for the campground. Five new signs will be installed by the end of the year.

- Nancy stated that there should be more multimodal considerations with the project.
- Bridge discussion should take place with MnDOT to determine the future of the Sorlie and Kennedy bridges.
- It was noted that US Hwy 2 travels through many towns in Minnesota and full crossing intersections are allowed at most of the cross-street locations.

7) Next SRC Meeting - Set-up for 2:00 PM Thursday, September 29th, to discuss Future Conditions Analysis and Roadway Recommendations and Intersection Concepts. This has been moved back two weeks from previous stated date (9/15/11).

ALLIANT PROJ. NO. 111-0054

SRC MEETING MINUTES

MEETING DATE: Thursday, September 29th, 2011; 2:00 PM – 3:45 PM

PURPOSE: Northwest Street Network Study
Review of Intersection Alternatives

ATTENDEES: See Sign-in Sheet (attached)

CC: File

MINUTES BY: Katie Bruwelheide, Alliant
September 30th, 2011

The focus of Study Review Committee (SRC) meeting on Thursday, September 29th was to provide a review of potential intersection alternatives for the US Highway 2 & 5th Ave NW intersection and the River Rd & 17th St NW/12th Ave NW intersection. In general, the meeting followed the outline presented in the agenda. These meeting minutes will follow the agenda outline.

1) **Introductions** – Attendees are listed on sign-in sheet (attached).

2) **Project Overview –** Bob Green gave a brief overview of the project and the work completed to this point. So far, the existing and future analysis has been completed and conceptual layouts of the intersection alternatives have been prepared. In general, the main reason driving the study is operations and safety of the roadway network during flood conditions. This main goal/reason was discussed at many points throughout the meeting.

3) **Alternatives for the US Highway 2 & 5th Ave NW Intersection (Exhibits 1 through 4)**
   - Katie Bruwelheide gave an overview of the four (4) intersection alternatives (listed below) for the intersection.
     a) Do Nothing
     b) Westbound US Highway 2 Left Only
     c) Three-Quarter Access
     d) Full Signalized Access

   - There was group discussion about a phased approach for the Three-Quarter Alternative to the Full Signalized Alternative to save money. The footprint of the Full Signalized Alternative could be constructed for the Three-Quarter Alternative and then there would be minor pork-chop, signing and pavement marking construction and signal installation to convert the intersection to a Full Signalized Access. The Three-Quarter intersection could easily be constructed into a Full Signalized intersection if and when needed.

   - The Three-Quarter Access Alternative could be designed to allow emergency vehicles to travel straight through (north /south) the intersection.

- SRC members asked Alliant to give a rough cost estimate of each alternative. The Westbound US Highway 2 Left Only Alternative is ~$200,000. The Three-Quarter Access Alternative is ~$800,000 and the Full Signalized Access Alternative is ~$1.2 million. It is noted that the Three-Quarter Access estimate assumes the Full Signal Alternative footprint.

- It was mentioned in a newspaper article that the reconstruction of this intersection would reroute the south leg directly through the East Grand Forks swimming pool. This is not true. The swimming pool property will remain untouched with all proposed intersection alternatives.

- There was concern about the cul-de-sac design on 10th St NW for the Three-Quarter Access and Full Signalized Access alternatives. The exhibits are only conceptual and the cul-de-sac design will be refined in final engineering design. The exact location, size and connection to driveways/alleys will be determined in the future and will take into account City standards, property/driveway access and emergency vehicle travel.

- Based on MnDOT standards for signal installation, traffic volumes warrants must be satisfied before a signal can be installed. Alliant will investigate the projected volumes for a signal at the US Highway 2/5th Ave NW intersection and determine if and when a traffic signal would be warranted. To determine these volumes, an additional volume request from ATAC for existing conditions with a traffic signal will be needed. Alliant will follow-up with the MPO to request this data.

4) Alternatives for the River Rd & 17th St NW/12th Ave NW Intersection (Exhibits 5 through 7)

- Katie Bruwelheide gave an overview of the four (4) intersection alternatives (listed below) for the intersection.
  - **a)** Do Nothing
  - **b)** Roundabout
  - **c)** Curb Construction
  - **d)** River Rd Realignment

- This intersection has a perceived safety problem as the geometry and stop sign location is confusing. In reality, there have only been two minor crashes at this intersection in the past 5 years.

- Roundabout discussion included maintenance difficulties associated to snow plowing. It will be difficult to plow and store the snow. It was noted that Fargo has 12 roundabouts that are maintained through the winter months.

- In general, the Curb Construction Alternative (Exhibit 6) was not favored as it provided no solution the confusion issues. This alternative will be removed in future analysis and presentation of alternatives.

- The SRC favored the River Rd Realignment Alternative (Exhibit 7). This option eliminated confusion and could help slow down speeding traffic on River Rd. This alternative can be evaluated cost effectively on a temporary basis by striping modification and construction of a barrel barrier.

5) Frontage Road Exhibit (Exhibit 8)

- In previous studies for the area (1994 and before) a frontage road on the south side of US Highway 2, extending 10th St NE to connect 5th Ave NW to Central Avenue, was considered. Although there are currently no plans for this road, Alliant was asked to show how a potential frontage would work with the US Highway 2/5th Ave NW intersection alternatives.

- There was discussion among the SRC as to why this Frontage Road would be needed. Comments ranged from not need at all to needed to help downtown circulation and optimize real-estate.

- The alignment on Alternate 1 will not be feasible if a signal is installed at the US Highway 2/5th Ave NW intersection. The access on 5th Ave NW would be too close to US Highway 2 and create operation issues.

6) Multi-Use Trail Connection (Exhibit 9 and 10)

- There is currently Transportation Enhancement (TE) funds available to construct a 10' multi-use trail from the existing trailhead on 12th St NW to the existing trail underpass of US Highway 2. The location of the trail will depend on removal of the US Highway 2 Off-Ramp.

- If the Off-Ramp remains, the trail will be constructed on the south side of 10th St NW. This would require removal of parking on the south side of 10th St NW and reconstruction of the curb. If the Off-Ramp is removed, the trail will be constructed in the area of the Off-Ramp.

- There was general discussion pertaining to the need of the Off-Ramp. Currently there are ~100 vehicles a day using the ramp. This volume is very low and removal of the ramp will not cause operational issues at other intersections.

- Construction of the trail in the area of the flood wall will be difficult due to grade changes and reinforcement of the wall. An alternate layout with trail construction on the west side of 8th Ave NW was favored by the SRC. Alliant will show the trail alignment on the west side of 8th Ave NW in future figures.

7) US Highway 2 & Central Ave Safety Discussion

- Bill Pirkl, a MnDOT Traffic Engineer, was asked to attend the SRC meeting to discuss safety at the US Highway 2/Central Ave intersection. This intersection is one of the most dangerous signalized intersections in northwest Minnesota based on crash frequency. A newspaper article was recently published in the Grand Forks Herald highlighting the crash problem at this intersection.

- Alliant gave an overview of the documented crashes at this intersection in the past 5 year (50 crashes). The intersection has a higher right angle crash percentage than average signalized intersections.

- MnDOT and EGF Police estimate that ~60% of the crashes are rear-ends or right angles related to the free right turn movements.

- The high crash rate could be due to a combination of factors such as high speeds, improper signal timing and lack of coordination, intersection geometrics and vehicle driver sight lines.

- MnDOT has a rough hand drawn crash diagram that they will share with Alliant.

- Further discussions will take place between EGF, Alliant and MnDOT to determine possible mitigation measures to improve safety at this intersection.

8) Other Discussions

- Exhibit 12 illustrates the 2035 ADT for the different intersection alternatives for the US Highway 2/5th Ave NW intersection. The general concern is that traffic estimates on 5th Avenue NW are a lot higher with the signal installation (4 times higher than existing volumes). Even though the ADT is increasing, the volumes are still relatively low and will be similar to existing traffic volumes on 17th Ave NW.

9) Next SRC Meeting - Set-up for 2:00 PM Thursday, November 10th, to discuss the preferred alternatives and the draft report.

10) Tasks

- MnDOT will share their crash diagram with Alliant. Further discussion about possible measures to reduce crashes will take place.

- Alliant will investigate the traffic volumes warrants for signal installation at the US Highway 2/5th Ave NW intersection. Additional traffic forecasts from ATAC will be requested.

ALLIANT PROJ. NO. 111-0054

SRC MEETING MINUTES

MEETING DATE: Thursday, November 10th, 2011; 2:00 PM – 3:15 PM

PURPOSE: Northwest Street Network Study
Review of Refined Intersection Alternatives and Cost Estimates

ATTENDEES: See Sign-in Sheet (attached)

CC: File

MINUTES BY: Katie Bruwelheide, Alliant
November 14th, 2011

The focus of Study Review Committee (SRC) meeting on Thursday, November 10th was to provide a review of the refined intersection alternatives for the US Highway 2 & 5th Ave NW intersection and the River Rd & 17th St NW/12th Ave NW intersection, as well as detailed cost estimates of each alternative. In general, the meeting followed the outline presented in the agenda. These meeting minutes will follow the agenda outline.

1) **Introductions** – Attendees are listed on sign-in sheet (attached).

2) **Project Overview –** Bob Green gave a brief overview of the project and the work completed to this point. So far, all the analysis and development of the intersection alternatives with cost estimates has been completed. The first draft of the Final Report is also complete and posted on the website. It is anticipated that there will be a couple versions of the draft report in the process of creating the final report.

3) **Alternatives for the US Highway 2 & 5th Ave NW Intersection (Exhibits 1 through 4)**
   - Bob Green gave an overview of the four (4) intersection alternatives (listed below) and cost estimates for the intersection.

     a) Do Nothing
     b) Westbound US Highway 2 Left Only
     c) Three-Quarter Access
     d) Full Signalized Access

   - There were general questions as to why the pavement cost for the WBL, Three-Quarter and Full Signal Alternatives was so high. The reasoning behind this is a 2-foot or more elevation difference between the eastbound and westbound directions on US Highway 2. To have new movements crossing the highway, the elevation would need to be smoothed out to an even elevation requiring a large area of pavement reconstruction. The new pavement estimates are conservative as worst case reconstruction is assumed.

- For the Three-Quarter Access Alternative, a possible outcome would be to have the Highway Patrol controlling this intersection and left turn movements off of the highway during flood conditions. The additional cost of a Highway Patrol time should be added to the cost estimate for this alternative.

- With the Three-Quarter Access and Signal Alternatives the property values of homes along 5th Avenue NW could decrease as traffic increases and on-street parking is eliminated or reduced. This should be considered in the cost estimates.

- The change in traffic volume anticipated on 5th Avenue NW with each alternative was discussed. With the traffic signal installation, the volumes will increase by approximately 300% by year 2014 (980 vehicles per day to 3000 vehicles per day). 3000 vehicles per day is similar to the existing traffic volumes on 17th Street NW. Traffic volumes estimates are higher (500%) for year 2035 projections.

- Traffic signal warrant analyses indicate that a traffic signal will be warranted in 2018/2019. This is six years from now. There were questions as to why is a traffic signal even an option if it is not warranted in 2014 (the construction year).

- The funding for the project was discussed. There will be $737,000 in City Sub-Target funds from MnDOT available in 2014. The City of EGF will have to provide the remaining cost for the project. The City Sub-Target funds must be used on federal aid streets. US Highway 2 and 5th Avenue NW are federal aid streets.

- Most SRC members agreed that signal interconnect and updated timing plans for normal and flood conditions for the existing signal systems are needed regardless of what intersection alternative is chosen. At a minimum this improvement should be done.

- In general, the Westbound Left Turn Only Alterative is not favorable.

- Most SRC members agreed that a traffic signal is not a desirable alternative at this time, but it might be needed in the future. A traffic signal should remain in the LRTP and be constructed if/when truly needed.

- Most SRC members agreed that the US Highway 2 Westbound Off-Ramp should be removed and the Multi-Use Trail shall be constructed in that area.

- This is currently a Way Finding sign study for EGF. Appropriate signage directing vehicles to Downtown EGF and the campground are being investigated.

- As part of the Final Report an Implementation Plan will be prepared. The Implementation Plan will recommend short-term (0 to 5 years), mid-term (5-10years) and long-term (10-20 years) improvements. Short term recommendations will include signal interconnect and timing plans, City way finding signs and the removal of the US Highway 2 Westbound Off-Ramp. Mid to Long-term recommendation will be to monitor operations on US Highway and 5th Avenue NW to determine if and when a traffic signal installation might be needed.

4) Alternatives for the River Rd & 17th St NW/12th Ave NW Intersection (Exhibits 5 & 6)

- Bob Green gave an overview of the four (3) intersection alternatives (listed below) for the intersection.

  a) Do Nothing
  b) Roundabout
  c) River Rd Realignment

- This intersection has a perceived safety problem as the geometry and stop sign location is confusing. In reality, there have only been two minor crashes at this intersection in the past 5 years.

- For the Roundabout Option, the inner circle could be designed larger to accommodate snow. Plows could move the snow inward and store it in this area until crews are able to move it. This is what Fargo does with this type of intersection.

- The Roundabout Alternative was not favored due to the high cost. The River Road Realignment Alternative was more favorable.

- Funding for improvement to this intersection could come from the City Sub-Target funds.

5) Other Discussions/Next Steps

- This was our last SRC meeting. Thank you for all of your time and input. Please review the draft report online and provide any additional input to Nancy Ellis.

ALLIANT PROJ. NO. 111-0054

CITY COUNCIL WORKSHOP PRESENTATION MEETING MINUTES

MEETING DATE: Tuesday, November 22nd, 2011

PURPOSE: Northwest Street Network Study
Project Summary and Draft Implementation Plan

CC: File

MINUTES BY: Bob Green, Alliant

The focus of the City Council workshop presentation was to provide a summary of the Northwest Street Network Study, including a review of the alternatives for the US Highway 2 & 5th Ave NW intersection, the River Rd & 17th St NW/12th Ave NW intersection, and the options for a multi-use trail alignment.

1) **Project Overview –** Nancy Ellis gave a brief overview of the project and the work completed to this point. So far, all the analysis and development of the intersection alternatives with cost estimates has been completed. The first draft of the Final Report is also complete and posted on the website. It is anticipated that there will be a couple versions of the draft report in the process of creating the final report.

2) **Alternatives for the US Highway 2 & 5th Ave NW Intersection (Exhibits 1 through 4)**
   - Bob Green gave an overview of the four (4) intersection alternatives (listed below) and cost estimates for the intersection.

     a) Do Nothing (includes traffic signal improvements only)
     b) Westbound US Highway 2 Left Only
     c) Three-Quarter Access
     d) Full Signalized Access

   - The group agreed that the traffic signal option should not be pursued at this time, but should remain in the LRTP and be constructed if/when truly needed.

   - The group agreed that the traffic signal improvements described in the "Do Nothing" alternative should be pursued as a short-term improvement.

   - As part of the Final Report an Implementation Plan will be prepared. The Implementation Plan will recommend short-term (0 to 5 years), mid-term (5-10years) and long-term (10-20 years) improvements. Short term recommendations will include signal interconnect and timing plans and City way finding signs and. The long-term recommendation will include monitoring operations on

US Highway and 5th Avenue NW to determine if and when a traffic signal installation might be needed.

3) Alternatives for the River Rd & 17th St NW/12th Ave NW Intersection (Exhibits 5 & 6)

- Bob Green gave an overview of the four (3) intersection alternatives (listed below) for the intersection.

  a) Do Nothing
  b) Roundabout
  c) River Rd Realignment

- This intersection has a perceived safety problem as the geometry and stop sign location is confusing. In reality, there have only been two minor crashes at this intersection in the past 5 years.

- The group agreed that although the number of crashes are low, the potential for crashes exists and that something should be done to improve safety at this location.

- The Roundabout Alternative was not favored due to the high cost. The River Road Realignment Alternative was more favorable.

- Funding for improvement to this intersection could come from the City Sub-Target funds. This option will be included in the short-term recommendations.

4) Multi-Use Trail

- There were two alternatives analyzed for the proposed multi-use trail alignment between the underpass and the trailhead at 12th Avenue.
  a) Close the US Highway 2 Westbound Off-Ramp and construct the Multi-Use Trail in that area.
  b) Leave the off-ramp open and construct the trail within the existing 10th Street roadway.

- The group discussed the options, and came up with a third alternative. This alternative would use striping to create bike lanes on 10th Street, and use the existing sidewalk for pedestrian access. This option was preferred by the group, and will be further developed by Engineering staff during design of the trial project.

Appendix B:

Public Open House, Public Comments and Publications

ALLIANT PROJ. NO. 111-0054

PUBLIC MEETING MINUTES

MEETING DATE: Thursday, September 29th, 2011, 5:30 PM to 7:00 PM – East Grand Forks High School Library

PURPOSE: Northwest Street Network Study
Public Open House – Review of Intersection Alternatives

CC: File

MINUTES BY: Katie Bruwelheide, Alliant
September 30th, 2011

The intent of the Public Open House on Thursday, September 29th was to review of potential intersection alternatives for the US Highway 2 & 5th Ave NW intersection and the River Rd & 17th St NW/12th Ave NW intersection. Fourteen people attended the meeting (see sign-in sheet). One of the attendees, Jeff Parent, agreed to be the neighborhood representative and will be at the next SRC and Public Meeting. The following bullet points document the public's concerns and questions voiced at the meeting:

US Highway 2 & 5th Ave NW

- There was general concern about 5th Avenue NW running through the pool. This is reaction due to an inaccurate newspaper article that was published. None of the intersection alternatives will affect the pool.

- There were operational and safety concerns with the Westbound Left Only and Three-Quarters Access Only Alternatives. The left turn movements might be difficult and unsafe due to mainline US 2 traffic. The public is concerned that this movement will be difficult to make and that a vehicles could easily get hit by mainline traffic.

- With the Full Access Signalized Alternative, loss of parking on 5th Ave NW near the signal was a concern as well as the potential increase of traffic and speeds.

- Residents on 5th Ave NW on the south side of US Highway 2 were in attendance. They were concerned with the interaction of the intersection alternatives with the new Sherlock Park. Currently, there are a lot of children in the area. High speeds and "showboating" occur on this section of 5th Ave NW. Conversion of the intersection to a full signalized access could increase these activities and decrease safety for the children.

- Parking on the 5th Ave NW on the south side of US Highway 2 was also a concern. The park and pool patrons often park on-street as there is not enough space in the lots.

- Additional discussion also took place regarding pedestrian crossing on US Highway 2. Residents stated that many people illegally cross the highway at 5th Ave NW. They stated that the existing

underpass seemed too far away and seemed unsafe since it is underground. The residents are in favor of having some type of designated crosswalk on US Highway 2 at 5th Ave NW.

- The public commented that traffic operations during the flooding this past spring have greatly improved. This could be attributable to updated signal timing and the fact that the public is getting used to the detours.

River Rd & 17th St NW/12th Ave NW

- The River Rd & 17th St NW/12th Ave NW intersection alternatives were presented. The public commented that the intersection confusion was more prevalent during the busier AM and PM peak hours.

- There were comments that the flood wall may block sight distance to see northbound River Rd traffic. This will be reviewed in the field.

- In general, the public liked the River Rd Realignment Alternative. The fact that this alternative could be temporarily constructed to see how it would operate interested them.

- The Roundabout Alternative created discussion that this treatment could create more confusion because no-one know how to drive through them.

Frontage Rd Alternatives

- The Frontage Road Alternatives were discussed. General public comments were that the road was not really needed. The access point on 5th Ave NW would create more opportunity for accidents and could make conditions unsafe for children/park patrons.

- The residents do not want the road in their backyard.

Multi-Use Trail Alternatives

- The public had no major comments about the multi-use trail alternatives. There was more concern about safely crossing US Highway 2 at 5th Ave NW.

The public had concerns regarding the potential funding for all of these alternatives. The MPO stated that there would be no special assessment for any improvements. There is already funding for improvements at the US Highway 2/5th Ave NW intersection. For the River Rd & 17th St NW/12th Ave NW intersection State Aid funds would be available for improvements. Additionally, there is Transportation Enhancement (TE) funds available for the multi-use trail connection.

Alliant Engineering, Inc.

ALLIANT PROJ. NO. 111-0054

PUBLIC MEETING MINUTES

MEETING DATE: Thursday, November 10th, 2011, 5:30 PM to 7:00 PM – East Grand Forks City Hall, Training Room

PURPOSE: Northwest Street Network Study
Public Open House – Review of Refined Intersection Alternatives & Cost Estimates

CC: File

MINUTES BY: Katie Bruwelheide, Alliant
November 14th, 2011

The intent of the Public Open House on Thursday, November 10th was to review the intersection alternatives for the US Highway 2 & 5th Ave NW intersection and the River Rd & 17th St NW/12th Ave NW intersection. 20 people attended the meeting. The following bullet points document the public's concerns and questions voiced at the meeting:

US Highway 2 & 5th Ave NW

- Regarding the Signal Alternative there was general a concern about sight distance on US Highway 2 for the eastbound direction and traffic back-ups if a sign is installed. Field review indicates acceptable sight distance and an operation analysis shows acceptable traffic operations.

- The public is concerned about increased traffic volumes on 5th Avenue NW in the neighborhood. There is a high school, elementary school. Church and a lot of neighborhood children. Increased traffic will create safety issues.

- The public is also concerned about an increase in traffic on 5th Avenue NW on the south side of the US Highway 2. There is the new park, swimming pool and senior housing. Additionally, there are many scooters in use in this area. More traffic and higher speeds from a signal could create safety issues.

- Some of the public did see the need for any changes to the intersection. Some questioned why 5th Avenue NW because it is not a straight thru road.

- In general, the public did not support the signal alternative at this time.

River Rd & 17th St NW/12th Ave NW

- There are currently high speeds on River Road. The realignment alternative or roundabout would help reduce speeds.

- Ambulances do not take this intersection due to confusing geometrics.

Multi-Use Trail Alternatives

- The public supported the removal of the US Highway 2 Westbound Off-Ramp and the construction of the multi-use trail in this location.

- No one at the public meeting uses the US Highway 2 Westbound Off-Ramp.

The public had concerns regarding the potential funding for all of these alternatives. The MPO stated that there would be no special assessment for any improvements. There is already funding for improvements at the US Highway 2/5th Ave NW intersection. For the River Rd & 17th St NW/12th Ave NW intersection State Aid funds would be available for improvements. Additionally, there is Transportation Enhancement (TE) funds available for the multi-use trail connection.

East Grand Forks' Community Newspaper

THE EXPONENT

Volume 33 • Number 14 Wednesday, October 26, 2011 $1.00

Deja vu for 5th Avenue NW and Highway 2 intersection

Karl Lindquist
Exponent Freelance Writer

When residents who live in the northwest part of the City (north of Highway 2) want to travel downtown or to Grand Forks, they have to either drive to the west and use River Road NW, or drive to the east and use Central Avenue.

Wouldn't it be great if those residents could use 5th Avenue NW to access Highway 2, or simply drive across the highway directly to downtown EGF?

Or would it?

A study of the pros and cons of constructing an intersection where Highway 2 cuts through 5th Avenue NW was commissioned by the GF/EGF Metropolitan Planning Organization (MPO) in 1994.

The study, prepared by Barton-Aschman Associates, Inc., recommended that an intersection be constructed that provided access between 5th Avenue NW and Highway 2 and stated the following:

"It has been determined that Fifth Avenue Northwest should be connected to US Highway 2 both north and south. This would provide much needed circulation to the area north of US Highway 2 and also provide access to potential economic areas to the south."

"This congestion and the resultant delays can severely impact emergency response."

– Findings of a 2006 study of Central Avenue and Highway 2 intersection

After the flood of 1997 created massive traffic jams and delays at the intersection of Central Avenue and Highway 2, the MPO commissioned another study of the desirability of constructing a 5th Avenue NW and Highway 2 intersection. This study, prepared by

Intersection
— Continued page three

Intersection – continued from front

HDR Engineering, Inc., and Floan Sanders Engineering, Inc., was released in 2006 and stated:

"The highway forms a logical barrier between the north and south sides of the City of East Grand Forks. The proposed north/south connection at 5th Avenue NW will provide an additional link between residential and commercial areas, promoting easier access between the two land uses."

The 2006 study also found that when River Road NW was closed as a result of flooding, vehicles that normally would have used River Road NW to access the northwest part of the City were forced to travel to the intersection of Central Avenue and Highway 2 and, according to the study:

"This added demand on the intersection (of Central Avenue and Highway 2) causes significant failure, particularly for the eastbound left turn movement during the PM peak hour when these commuters are returning home."

The authors of the 2006 study found that the "significant failure" of the Central Avenue and Highway 2 intersection during the times of flooding had dire consequences. According to the study, "This congestion (at Central Avenue and Highway 2) and the resultant delays can severely impact emergency response."

Recently the MPO created a Citizen Task Force and commissioned yet another engineering firm, Alliant Engineering, Inc. out of Minneapolis, to take another look at the proposed intersection. Alliant held its first public open house to discuss its findings on August 11, and a second open house on September 29.

During a meeting prior to the September 29 open house, the Citizen Task Force appeared to favor either a three-quarter access intersection, or a fully signalized intersection at 5th Avenue NW and Highway 2.

The three-quarter access intersection would allow vehicles traveling east on Highway 2 to exit the highway and go either north or south on 5th Avenue NW. Vehicles traveling west on Highway 2 would also be able to exit the highway and go either north or south on 5th Avenue NW.

Vehicles north of the highway that were traveling south on 5th Avenue NW would only be able to turn to the right (west) on the highway. Vehicles south of the highway that were traveling north on 5th Avenue NW would only be able to turn to the right (east) on the highway.

The three-quarter access intersection would not permit vehicles traveling north or south on 5th Avenue NW to cross the highway. The paths of such vehicles traveling north or south on 5th Avenue NW would still be blocked by the highway, and such vehicles could only make a right hand turn onto the highway and continue in either an easterly or westerly direction on the highway.

Alliant and the MPO estimate a three-quarter intersection will cost about $800,000, with 75 percent of the cost being paid with Federal funds and the remaining 25 percent being paid by the City.

A fully signalized intersection at 5th Avenue NW and Highway 2 would operate just like the intersection of Highway 2 and Central Avenue, and would cost approximately $1 million. As with the three-quarter intersection, 75 percent of the cost of the fully signalized intersection would be paid with Federal funds, with the balance being paid by the City.

So in a nutshell, it appears the justification for constructing an intersection at 5th Avenue NW and Highway 2 may be stated as convenience for drivers traveling to and from the northwest community; reduced traffic congestion at the intersection of Central Avenue and Highway 2, especially whenever River Road NW is closed or flooded; reduced emergency response time to the northwest community, again especially whenever River Road NW is closed or flooded; and economic growth for the downtown merchants.

Those are the benefits.

It has been argued that the detriments of a 5th Avenue NW intersection with Highway 2 are reduced traffic flow on Highway 2, increased traffic volume and noise for those residing on 5th Avenue NW, and increased traffic and therefore danger for the children attending New Heights Elementary School and using the swimming pool and the newly rebuilt Sherlock Forest Playground.

Do the benefits of constructing a 5th Avenue NW and Highway 2 intersection outweigh the detriments and the cost of construction? In the past, a majority of the City Council members answered that question in the negative, giving the intersection scant change of being constructed.

Next week's issue of *The Exponent* will examine the past and present positions and concerns of City Council members with respect to the proposed intersection at 5th Avenue NW and U.S. Highway 2.

In two weeks Alliant Engineering and the MPO will host the third and final open house to present and discuss alternative intersections at 5th Avenue NW and Highway 2, and that most confusing intersection of River Road NW, 12th Avenue NW, and 17th Street NW.

The open house will be held from 5:30 pm to 7:00 pm on Thursday, November 10, in the training room on the first floor of City Hall.

Intersection – **continued from front**

Recent telephone conversations with Buckalew, DeMers, and Leigh indicated their opposition to the intersection may have softened.

Buckalew's recent response could best be described as luke-warm when he said, "I can't support a fully signalized intersection, and I'm worried about the effects of a three-quarter intersection. If something should happen to a child near the playground because I supported the intersection, I would be devastated. But I'm still willing to talk about it."

During the recent telephone conversation DeMers said, "I don't think I'm as opposed to an intersection as I was back in 2009, but before I could support an intersection I would need some questions answered."

DeMers remarked that he would like to know more about the impact of the proposed intersection on 5th Avenue NW north of the highway.

"Fifth Avenue on the north side of the highway is truly a residential street," DeMers said. "What is the impact of allowing cars to enter 5th Avenue from the highway going to be on the street and the neighborhood? Are we going to have to make changes to the street and, if so, how is that going to affect the neighborhood?"

DeMers also wondered about the rebuilding of the Kennedy Bridge. "If the rebuilding of the Kennedy Bridge results in a loss of access to River Road, are we going to wish we had an intersection off the highway at 5th Avenue?"

DeMers said he also had questions about the safety of the intersection that would have to be answered before he could support the intersection. "Drivers on the Kennedy Bridge exceed the speed limit. That's just the nature of things.

"As you exit the bridge into East Grand Forks you don't have a direct line of sight to where the intersection would be built. Will that invite rear-end collisions? I need to know more about that before I can support the intersection."

During a recent telephone conversation Leigh said, "I've talked to some people in that neighborhood and I think I could now support a three-quarter intersection. Let's face it, the only people who will be using that intersection to enter the neighborhood will be residents of the neighborhood. But I am still against a fully signalized intersection."

Leigh continued, "I still go back to one of my original arguments. A three-quarter intersection is estimated to cost $800,000. Our share will be $200,000. Where is that money coming from?"

Contacted by telephone Tweten said he was still opposed to the intersection of 5th Avenue NW with Highway 2, again citing the increased danger created by sending more vehicles into the neighborhood. But Tweten also stated that, in his opinion, the increased traffic would reduce property values.

"The family home is probably the single largest investment a family will make," Tweten said, "and the increased traffic will depreciate those homes. I'm not going to bend in my opposition to the intersection."

When recently asked his opinion of an intersection at 5th Avenue NW and Highway 2, Alderman Wayne Gregoire said he was undecided. "What's going to happen to the swimming pool?" Gregoire asked. "I don't like the idea of sending more traffic past the pool.

"And I'm not particularly in favor of sending more traffic north on 5th Avenue NW because with the apartment buildings in that neighborhood the traffic and parking is already congested."

Alderman Ron Vonasek echoed Gregoire's concerns. "I haven't made up my mind," Vonasek recently said during an interview in City Hall. "I see a lot of problems and not much in the way of benefits.

"I don't like the idea of dumping more traffic into the 5th Avenue neighborhood north of the highway, nor do I like the idea of sending more traffic past the swimming pool and Sherlock Forest Playground. But I'm still willing to listen to those who support the intersection."

Of all the members of the current Council, Mike Pokrzywinski is probably the intersection's staunchest supporter. But during a recent telephone conversation Pokrzywinski said, "I may have moved a little more toward the middle. It may be premature to put a fully signalized intersection at that location, but I don't want to deprive future City Councils of that option."

Pokrzywinski said he was in favor of reconfiguring the proposed intersection so that vehicles traveling west on Highway 2 could make a left turn and proceed in a southerly direction on 5th Avenue NW.

"I've re-thought my position on exiting the highway by turning north on 5th Avenue," Pokrzywinski said. "I'm still in favor of the intersection, but we may want to wait ten or fifteen years before we complete the lanes so that vehicles can turn north on 5th Avenue NW off the highway."

Pokrzywinski would also like to see the off-ramp that exits the highway onto 8th Avenue NW removed. "That off-ramp is rarely used," Pokrzywinski said, "and building the bike path in such close proximity to the off-ramp creates a danger[ous] situation."

River Road NW, 17th Street NW, and 12th Avenue NW

Alliant Engineering a[nd] the MPO are also looking [at] the intersection of Riv[er] Road NW with 17th Str[eet] NW and 12th Avenue N[W]. One of the alternatives bei[ng] offered by Alliant to sol[ve] this most confusing intersec[tion] is to reconfigure the i[n]tersection so that River Ro[ad] NW and 12th Avenue N[W] become a north-south tho[r]oughfare.

Traffic entering the intersection traveling south on River Road NW, or west on 17th Street NW would be required to stop before proceeding through the intersection.

Alliant has offered three alternatives for the 5th Avenue NW with Highway 2 intersection, and three alternatives for the River Road NW, 17th Street NW, and 12th Avenue NW intersection, including a roundabout. All of the alternatives are interesting and thought provoking.

A third and final open house to present and discuss the alternatives at those two intersections is being held by Alliant Engineering and the MPO from 5:30 pm to 7:00 pm on Thursday, November 10, in the training room on the first floor of City Hall.

This is grass-roots democracy at its very best. You really should try to attend this last and final open house on this very important topic and let your voice be heard.

Anyone in favor of a 5th Avenue NW and Highway 2 intersection?

Karl Lindquist
Exponent Freelance Writer

An article in last week's *Exponent* examined the history of the proposed intersection of 5th Avenue NW with U.S. Highway 2. This article will examine the attitudes, past and present, of current City Council members toward the possible construction of the intersection.

In the May 6, 2009 issue of *The Exponent*, Alderman Craig Buckalew was quoted as saying, "I have concerns about the 5th Avenue NW project. That's a hard one for me to support, but I can go along with the group if a majority supports it."

In the same article Alderman Marc DeMers was quoted as agreeing with Buckalew and saying, "We need longer turning lanes, not another intersection. I have a real problem with dumping a United States highway into a residential neighborhood."

In 2009 Aldermen Greg Leigh and Henry Tweten were also against the construction of a 5th Avenue NW and Highway 2 intersection. Leigh said, "Adding a traffic signal on Highway 2 at 5th Avenue NW is just going to back traffic up across the Kennedy Bridge. I would rather spend the money to find a way to keep River Road from flooding."

In 2009 Tweten added, "We've got the swimming pool, Sherlock Forest Playground, and covered picnic tables all along that part of 5th Avenue NW. We are inviting people and their children to that area for recreation. I don't like sending a lot of traffic through that recreational area."

Intersection
— Continued page seven

East Grand Forks' Community Newspaper

THE EXPONENT

Volume 33 • Number 15 Wednesday, November 2, 2011 $1.00

Subject: FW: Todays Meeting

From: Katie Bruwelheide

To: nancy.ellis@theforksmpo.org;

Date: Friday, November 11, 2011 8:24 AM

Here is an email from [redacted] for your files. He replied yesterday while we were driving up. I will also put this in the appendix.

Enjoy your day off.

-Katie

From: [redacted]
Sent: Thursday, November 10, 2011 11:19 AM
To: Katie Bruwelheide
Subject: Todays Meeting

Katie,
I have been working out of town all week and hoped to be finished in time for today's meeting. But regrettably its not the case.

In chatting with some of my neighbors about the future plans for 5th ave NW The consensus is

1. We agree that emergency services needs access across Highway 2,
2. We do not want a signal light there.
3. Westbound access to 5th ave NW though we understand we would rather not have it.
   No west bound access from 5th ave NW
4. If there is increased traffic, on 5th ave NW, Something needs to be done to slow it down. Some day a child will be hurt running across that street
   It like a freeway there sometimes now with cars speeding past
5. No parking on the east side was **not** an option that anybody supported as some people do not have access from the alley for winter parking
6. With increased traffic on 5th ave NW, More parking is needed for the park,

This about covers it,

Thank you

Sincerely

Subject: US highway 2 & 5th ave intersection

From:

To: nancy.ellis@theforksmpo.org;

Date: Sunday, November 13, 2011 9:49 AM

Hi City council and MPO:

My name is (We live a(nd I have a few comments about the proposed US 2 & 5th Ave NW intersection.

Don't we as a city have more pressing things to spend our hard to get tax dollars on improving? I.E. the city sewer and more necessary items?

If you decide to put in a ¾ access. You will limit our access to my home. By way of the median, I cannot cross on north 5th. I in exiting my garage would be forced to go south to Hwy 2 turn west and cross the Kennedy Bridge so I could go East. I would also have to enter from the North because of the median.

Both the ¾ and the full intersections will take away all my parking in front of my property. North of me are apartments that use their parking on both sides of the street.

According to the note in the MPO bulletin the emergency personal are not effected by the flood. This is only suppose to help alleviate some congestion at flood time. I have never seen when adding another traffic light has done that.

For me the resale of my house is a negative. We would have extra traffic, no parking,& limited access.

Thank You

East Grand Forks Northwest Street Network Study
Public Meeting Comment Form

Please indicate any comments regarding the study and intersection alternatives for the four areas:

US Highway 2 & 5th Avenue NW Intersection: The Sunshine Terrace and Edgewood Vista Alzheimers don't have people in personal motorized scooters and people in wheel chairs that are using 5th ave NW to go to the library and downtown. People coming off the highway are not looking for these hazards. The Sherlock Park Playground and Swimming pool have customers who line both sides of 5th Ave NW with cars. Kids run out from between parked cars and are back and forth on the street. If we double the amount of traffic on 5th Ave NW in this area we are increasing the possibility of a deadly accident which we are already facing with current conditions.

River Road NW &17th Street NW/12th Avenue NW Intersection:

Multi-Use Trail Alternatives:

Other:

Subject: Re: EGF NW Street Network Study - Steering Review Committee Meeting

From:

To:

Date: Thursday, November 10, 2011 9:22 AM

Good morning,

I regret that I will be unable to attend today's meeting. I am usually scheduled out of the clinic on Thursday afternoons for administrative time so I did not specifically schedule myself out for this meeting. We have been unusually busy, so our staff scheduled patients for me through the entire day. I apologize.

I appreciate the opportunity to participate in this discussion. I have enjoyed considering the objectives we will accomplish as affordably as possible, with as little disruption to the neighborhood as possible. I have enjoyed hearing the differing viewpoints and I hope that I have been able to add to the conversation.

If I were there today, I would listen more than speak (not always easy for me). But somewhere along the way I would have hoped to make/repeat the following points:

1. Increased traffic past the pool and playground is a good thing. In areas with little traffic there will be increased graffiti and other vandalism and property destruction. Some amount of traffic through the area makes people less likely to feel comfortable defacing or destroying property. And if the recreation venue is laid out like this one, the traffic goes by the area without splitting it. The traffic does not cut off the pedestrian pattern between attractions (pool, playground, and campground).

2. I have read a quote to the effect that we shouldn't "dump traffic from a US highway into a residential neighborhood". That makes a great sound bite, but does not describe what is going on here. A 4-lane US highway through a city chops the city in two. We are attempting to allow the parts of the city to communicate with one another, and to allow the residents of our neighborhoods to access their homes as smoothly as possible. Once again I look to the two major cities nearest to us along US Highway 2: Grand Forks and Crookston. As US Highway 2 passes through those two cities, there are crossings every 1-2 blocks. Are we dumping traffic from a US highway into those neighborhoods? No. We are letting people move through their communities smoothly.

3. The loss of a full on/off ramp at River Road due to construction of the flood protection project increases the need for this connection.

4. It is important that we allow westbound traffic one more chance to get downtown before we make them try to do a u-turn in Grand Forks to come and enjoy what we have to offer.

5. The need for full access with signal may increase in the future, so any new infrastructure should lay out to accommodate that without having to be torn out and rebuilt.

I know that some of you share these viewpoints and some differ. Ain't that what makes America great?

Again, thanks for the opportunity to participate. Whatever the group recommends and whatever final decision the City Council/MPO makes, I will accept it and know that it will work out well.

----Original Message----
From: Katie Bruwelheide <kbruwelheide@alliant-inc.com>

Appendix C:

Detailed Cost Estimates

Full Signal Intersection

ITEM	Quantity	UNIT	MUTIPLIER	QUANTITY	COST	TOTAL
Remove Concrete Curb	4932	LF	110%	5425.2	$ 1.75	$ 9,494.10
Remove Concrete Sidewalk	60	SY	110%	66	$ 4.25	$ 280.50
Remove Concrete Median	1789	SY	110%	1967.9	$ 6.00	$ 11,807.40
Remove Concrete Pavement	10205	SY	110%	11225.5	$ 4.25	$ 47,708.38
Remove Bituminous Pavement	45	SY	110%	49.5	$ 2.25	$ 111.38
Relocate Hydrant and Valve	1	EACH	100%	1	$ 5,000.00	$ 5,000.00
Remove Lighting Unit	2	EACH	100%	2	$ 500.00	$ 1,000.00
Light Pole Relocation	10	EACH	100%	10	$ 2,000.00	$ 20,000.00
Grading and Fill	1	LS	100%	1	$ 30,000.00	$ 30,000.00
Concrete Pavement 8.0"	10971	SY	110%	12068.1	$ 60.00	$ 724,086.00
Colored Concrete Median	1490	SY	110%	1639	$ 40.00	$ 65,560.00
4" Concrete Walk	2200	SF	110%	2420	$ 4.00	$ 9,680.00
Concrete Curb & Gutter Design B624	4932	LF	110%	5425.2	$ 14.00	$ 75,952.80
Bituminous Pavement	23	TON	110%	25.3	$ 100.00	$ 2,530.00
Signing and Striping	1	LS	100%	1	$ 8,000.00	$ 8,000.00
Drainage Structures & Pipes	3	EACH	100%	3	$ 4,500.00	$ 13,500.00
Signal System	1	EACH	100%	1	$ 175,000.00	$ 175,000.00
Turf, Erosion Control	1	LS	100%	1	$ 20,000.00	$ 20,000.00
Adjust Stormsewer Manhole	2	EACH	100%	2	$ 600.00	$ 1,200.00
Traffic Control	1	LS	100%	1	$ 20,000.00	$ 20,000.00
					Estimated Total Construction Cost	**$ 1,241,000.00**
					Signal Interconnect & Optimized Timing Plans	$ 100,000.00
					Increase cost 4% per year (3) years	$ 154,960.00
					R/W Cost 5%	$ 62,050.00
					Engineering 10%	$ 124,100.00
					Contingency 10%	$ 124,100.00
					Total Cost	**$ 1,806,210.00**

3/4 Intersection

ITEM	Quantity	UNIT	MUTIPLIER	QUANTITY	COST	TOTAL
Remove Concrete Curb	4932	LF	110%	5425.2	$ 3.00	$ 16,275.60
Remove Concrete Sidewalk	60	SY	110%	66	$ 4.25	$ 280.50
Remove Concrete Median	1789	SY	110%	1967.9	$ 6.00	$ 11,807.40
Remove Concrete Pavement	10205	SY	110%	11225.5	$ 4.25	$ 47,708.38
Remove Bituminous Pavement	45	SY	110%	49.5	$ 2.25	$ 111.38
Remove Lighting Unit	2	EACH	100%	2	$ 500.00	$ 1,000.00
Relocate Hydrant and Valve	1	EACH	100%	1	$ 5,000.00	$ 5,000.00
Grading and Fill	1	LS	100%	1	$ 16,000.00	$ 16,000.00
Concrete Pavement 8.0"	10971	SY	110%	12068.1	$ 60.00	$ 724,086.00
Colored Concrete Median	1731	SY	110%	1904.1	$ 40.00	$ 76,164.00
4" Concrete Walk	2200	SF	110%	2420	$ 4.00	$ 9,680.00
Concrete Curb & Gutter Design B624	5252	LF	110%	5777.2	$ 14.00	$ 80,880.80
Bituminous Pavement	23	TON	110%	25.3	$ 100.00	$ 2,530.00
Signing and Striping	1	LS	100%	1	$ 5,000.00	$ 5,000.00
Drainage Structures & Pipes	3	EACH	100%	3	$ 4,500.00	$ 13,500.00
Light Pole Relocation	10	EACH	100%	10	$ 2,000.00	$ 20,000.00
Turf, Erosion Control	1	LS	100%	1	$ 15,000.00	$ 15,000.00
Traffic Control	1	LS	100%	1	$ 10,000.00	$ 10,000.00
					Estimated Total Construction Cost	**$ 1,055,100.00**
					Signal Interconnect & Optimized Timing Plans	$ 100,000.00
					Increase cost 4% per year (3) years	$ 131,750.00
					R/W Cost 5%	$ 52,755.00
					Engineering 10%	$ 105,510.00
					Contingency 10%	$ 105,510.00
					Total Cost	**$ 1,550,625.00**

WB Left only Access

ITEM	Quantity	UNIT	MUTIPLIER	QUANTITY	COST	TOTAL
Remove Concrete Curb	2130	LF	110%	2343	$ 3.00	$ 7,029.00
Remove Concrete Median	778	SY	110%	855.8	$ 6.00	$ 5,134.80
Remove Concrete Pavement	3772	SY	110%	4149.2	$ 4.25	$ 17,634.10
Remove Concrete Island	2980	SF	110%	3278	$ 1.75	$ 5,736.50
Remove Lighting Unit	1	EACH	100%	1	$ 500.00	$ 500.00
Grading and Fill	1	LS	100%	1	$ 16,000.00	$ 16,000.00
Concrete Pavement 8.0"	4212	SY	110%	4633.2	$ 60.00	$ 277,992.00
Colored Concrete Median	1457	SY	110%	1602.7	$ 40.00	$ 64,108.00
Concrete Curb & Gutter Design B624	2658	LF	110%	2923.8	$ 14.00	$ 40,933.20
Signing and Striping	1	LS	100%	1	$ 4,000.00	$ 4,000.00
Drainage Structures & Pipes	4	EACH	100%	4	$ 4,500.00	$ 18,000.00
Light Pole Relocation	3	EACH	100%	3	$ 2,000.00	$ 6,000.00
Turf, Erosion Control	1	LS	100%	1	$ 2,000.00	$ 2,000.00
Traffic Control	1	LS	100%	1	$ 10,000.00	$ 10,000.00
					Estimated Total Construction Cost	**$ 475,100.00**
					Signal Interconnect & Optimized Timing Plans	$ 100,000.00
					Increase cost 4% per year (3) years	$ 59,330.00
					Engineering 10%	$ 47,510.00
					Contingency 10%	$ 47,510.00
					Total Cost	**$ 729,450.00**

River Road Roundabout

ITEM	Quantity	UNIT	MUTIPLIER	QUANTITY	COST	TOTAL
Remove Concrete Curb	944	LF	110%	1038.4	$ 3.00	$ 3,115.20
Remove Concrete Sidewalk	109	SY	110%	119.9	$ 4.25	$ 509.58
Remove Concrete Pavement	2110	SY	110%	2321	$ 4.25	$ 9,864.25
Remove Bituminous Pavement	5027	SF	110%	5529.7	$ 1.25	$ 6,912.13
Relocate Hydrant and Valve	1	EACH	100%	1	$ 5,000.00	$ 5,000.00
Clear and Grub	1	LS	100%	1	$ 800.00	$ 800.00
Grading	1	LS	100%	1	$ 10,000.00	$ 10,000.00
Concrete Pavement 8.0"	2015	SY	110%	2216.5	$ 60.00	$ 132,990.00
Concrete Median	634	SY	110%	697.4	$ 30.00	$ 20,922.00
Adjust Manhole Structure	2	EACH	100%	2	$ 400.00	$ 800.00
Concrete Curb & Gutter Design B624	1716	LF	110%	1887.6	$ 14.00	$ 26,426.40
Concrete Curb & Gutter Design S	295	LF	110%	324.5	$ 14.00	$ 4,543.00
4" Concrete Walk	993	SF	110%	1092.3	$ 4.00	$ 4,369.20
Signing and Striping	1	LS	100%	1	$ 4,000.00	$ 4,000.00
Drainage Structures & Pipes	5	EACH	120%	6	$ 4,500.00	$ 27,000.00
Remove Lighting Unit	2	EACH	100%	2	$ 500.00	$ 1,000.00
Light Pole Relocation	5	EACH	100%	5	$ 2,000.00	$ 10,000.00
Turf, Erosion Control	1	LS	100%	1	$ 10,000.00	$ 10,000.00
Relocate Electrical Cabinets	1	LS	100%	1	$ 8,000.00	$ 8,000.00
Traffic Control	1	LS	100%	1	$ 5,000.00	$ 5,000.00
				Estimated Total Construction Cost		**$ 291,300.00**
				Increase cost 4% per year (3) years		$ 36,380.00
					R/W Cost 15%	$ 43,695.00
					Engineering 10%	$ 29,130.00
					Contingency 10%	$ 29,130.00
					Total Cost	**$ 429,635.00**

River Road Realignment

ITEM	Quantity	UNIT	MUTIPLIER	QUANTITY	COST	TOTAL
Remove Concrete Curb	370	LF	110%	407	$ 3.00	$ 1,221.00
Remove Concrete Sidewalk	9	SY	110%	9.9	$ 4.25	$ 42.08
Remove Concrete Pavement	1004	SY	110%	1104.4	$ 4.25	$ 4,693.70
Clear and Grub	1	LS	100%	1	$ 400.00	$ 400.00
Grading	1	LS	100%	1	$ 3,000.00	$ 3,000.00
Saw Cut Concrete full Depth	260	LF	110%	286	$ 4.00	$ 1,144.00
Concrete Pavement 8.0"	672	SY	110%	739.2	$ 60.00	$ 44,352.00
Concrete Pavement 5.0"	45	SY	110%	49.5	$ 15.00	$ 742.50
Concrete Curb & Gutter Design B624	380	LF	110%	418	$ 14.00	$ 5,852.00
4" Concrete Walk	60	SF	110%	66	$ 4.00	$ 264.00
Drainage Structures & Pipes	3	EACH	100%	3	$ 4,000.00	$ 12,000.00
Signing and Striping	1	LS	100%	1	$ 800.00	$ 800.00
Turf, Erosion Control	1	LS	100%	1	$ 2,000.00	$ 2,000.00
Traffic Control	1	LS	100%	1	$ 3,000.00	$ 3,000.00
				Estimated Total Construction Cost		**$ 79,600.00**
				Increase cost 4% per year (3) years		$ 9,940.00
					Engineering 10%	$ 7,960.00
					Contingency 10%	$ 7,960.00
					Total Cost	**$ 105,460.00**

Appendix D:

Traffic Signal Warrant Analysis

APPENDIX D
SIGNAL WARRANT ANALYSIS
WARRANT 1
LOCATION: **US Highway 2 @ 5th Ave NW**

Count Date: Estimated 2035 Volumes
Source:
Factor: 1.00
Population < 10,000? yes
Speed over 40 mph? NO

APPROACH	DESCRIPTION	NUMBER OF LANES	SPEED (MPH)
Major Approach 1	US Highway 2, East Approach, WB	2	35
Major Approach 3	US Highway 2, West Approach, EB	2	35
Minor Approach 2	5th Ave NW, South Approach, NB	1	25
Minor Approach 4	5th Ave NW, North Approach, SB	1	25

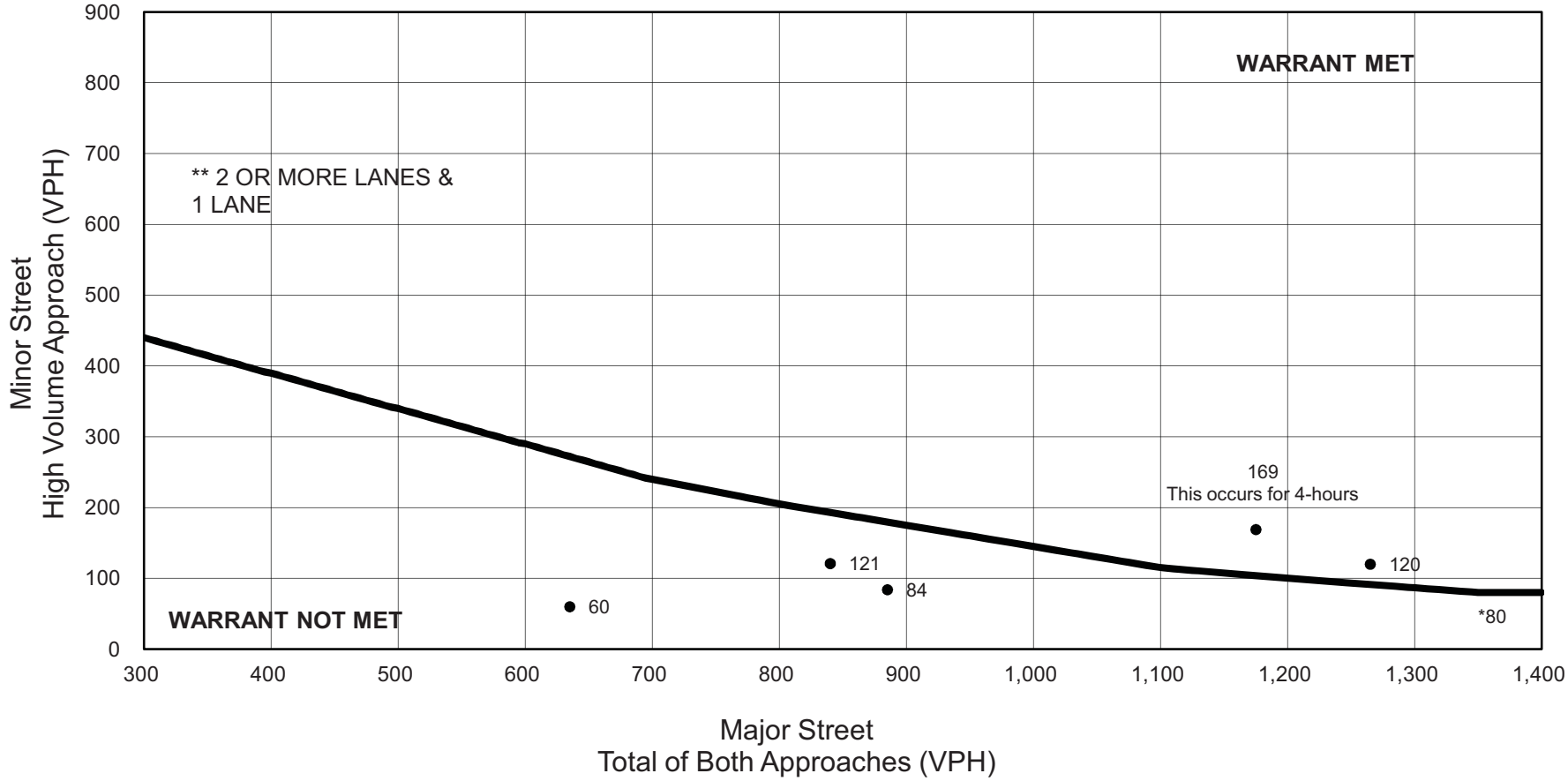
If population is less than 10,000; or the major street speed is over 40 mph, seventy percent factor can be applied. Apply seventy percent factor? No

	MAJOR STREET							MINOR STREET										WARRANT MET SAME HOURS ON MAJOR AND MINOR STREETS			
	APPROACH VOLUME			WARRANT MET *				APPROACH VOLUME		WARRANT MET APPROACH 2 *				WARRANT MET APPROACH 4 *							
				Cond. A	Cond. B	7 & (A&B) Comb.				Cond. A	Cond. B	7 & (A&B) Comb.		Cond. A	Cond. B	7 & (A&B) Comb.					
						80% of A	80% of B					80% of A	80% of B			80% of A	80% of B				
HOUR	1	3	TOTAL 1 + 3	600	900	480	720	2	4	150	75	120	60	150	75	120	60	Cond. A	Cond. B	7 & (A&B) Comb. 80% of A	7 & (A&B) Comb. 80% of B
12 - 1 AM			0																		
1 - 2 AM			0																		
2 - 3 AM			0																		
3 - 4 AM			0																		
4 - 5 AM			0																		
5 - 6 AM	318	316	633	X		X		60	45				X								
6 - 7 AM	445	442	886	X		X	X	84	62		X		X				X				X
7 - 8 AM	635	631	1,266	X	X	X	X	120	89		X	X	X		X		X		X	X	X
8 - 9 AM	445	442	886	X		X	X	84	62		X		X				X				X
9 - 10 AM	445	442	886	X		X	X	84	62		X		X				X				X
10 - 11 AM	318	316	633	X		X		60	45				X								
11 - Noon	354	382	736	X		X	X	91	67		X		X				X				X
12 - 1 PM	391	448	839	X		X	X	121	90		X	X	X		X		X			X	X
1 - 2 PM	391	448	839	X		X	X	121	90		X	X	X		X		X			X	X
2 - 3 PM	547	627	1,174	X	X	X	X	169	125	X	X	X	X		X	X	X	X	X	X	X
3 - 4 PM	547	627	1,174	X	X	X	X	169	125	X	X	X	X		X	X	X	X	X	X	X
4 - 5 PM	782	895	1,677	X	X	X	X	242	179	X	X	X	X	X	X	X	X	X	X	X	X
5 - 6 PM	547	627	1,174	X	X	X	X	169	125	X	X	X	X		X	X	X	X	X	X	X
6 - 7 PM	547	627	1,174	X	X	X	X	169	125	X	X	X	X		X	X	X	X	X	X	X
7 - 8 PM	391	448	839	X		X	X	121	90		X	X	X		X		X			X	X
8 - 9 PM	391	448	839	X		X	X	121	90		X	X	X		X		X			X	X
9 - 10 PM			0																		
10 - 11 PM			0																		
11 - Midnight			0																		

SUMMARY OF RESULTS:

Warrant 1 - Cond. A was	not met:	5	hours satisfied requirements
Warrant 1 - Cond. B was	not met:	6	hours satisfied requirements
Warrant 1 - Combine A & B was	met:	10	hours satisfied requirements

Note:
* Warrant volume requirements are from the 2005 Minnesota Manual on Uniform Traffic Control Devices.



Warrant Met for 5 Hours

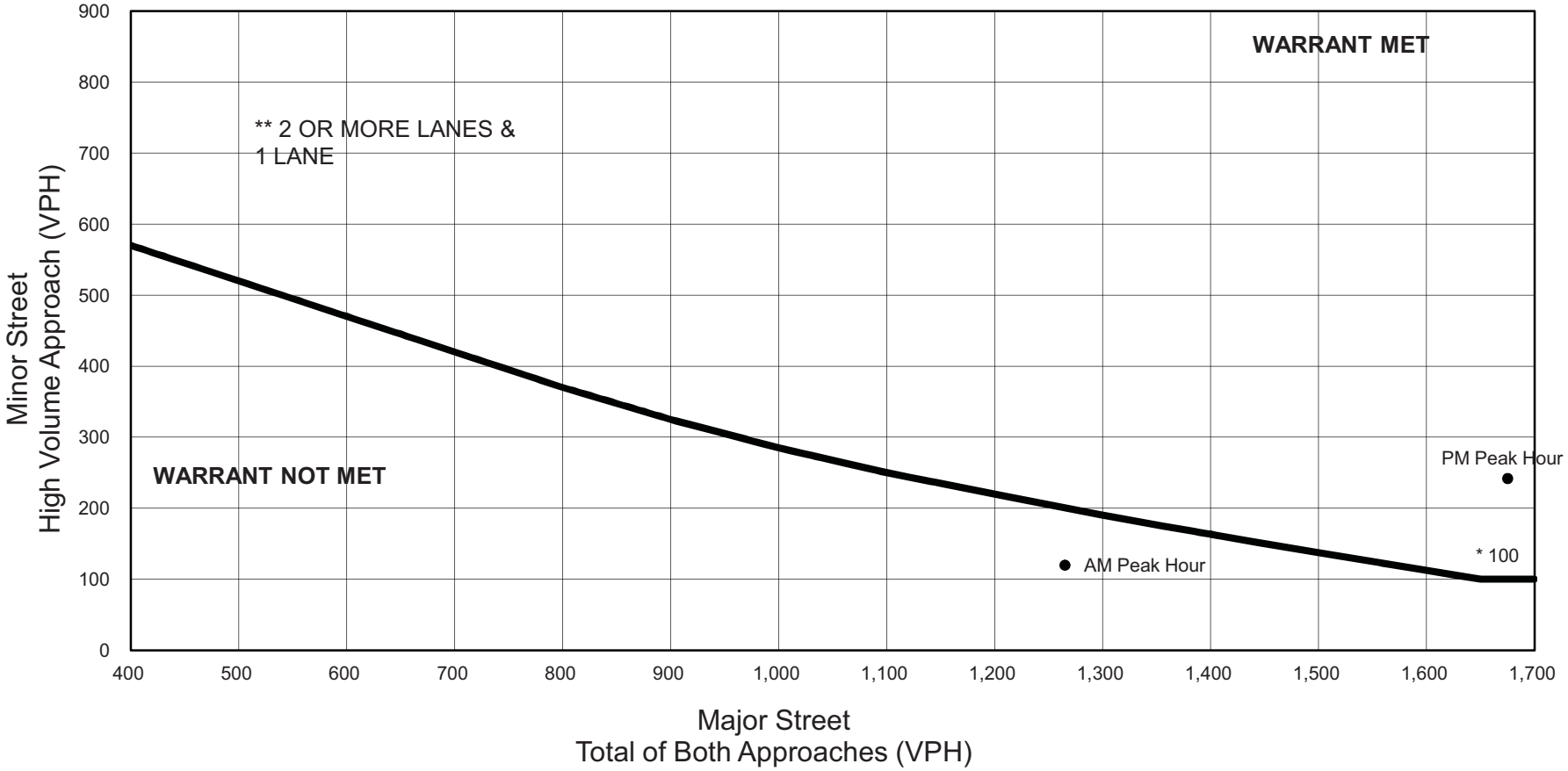
** NOTE: 80 vph applies as the lower threshold volume for a minor street approach with 1 lane (right turn lanes are not considered).

** The first number refers to the number of lanes of approach on the major street and the second number refers to the number of lanes of approach on the minor street.

Source: 2005 Minnesota Manual on Uniform Traffic Control Devices.

APPENDIX D
US Highway 2 & 5th Ave NW
SIGNAL WARRANT ANALYSIS
Estiamted 2035 Traffic Volumes

FOUR HOUR VOLUME WARRANT
WARRANT 2



Warrant Met (PM Peak Hour)

* NOTE: 150 vph applies as the lower threshold volume for a minor street approach with 1 lane .

** The first number refers to the number of lanes of approach on the major street and the second number refers to the number of lanes of approach on the minor street.

Source: 2005 Minnesota Manual on Uniform Traffic Control Devices.

APPENDIX D
US Highway 2 & 5th Ave NW
SIGNAL WARRANT ANALYSIS
Estiamted 2035 Traffic Volumes

PEAK HOUR VOLUME WARRANT
WARRANT 3

APPENDIX D
SIGNAL WARRANT ANALYSIS
WARRANT 1 - Eight-Hour Vehicular Volume
LOCATION: **US Highway 2 @ 5th Ave NW**

Count Date: Estimated 2014 Volumes
Source:
Factor: 1.00
Population < 10,000? yes
Speed over 40 mph? NO

APPROACH	DESCRIPTION	NUMBER OF LANES	SPEED (MPH)
Major Approach 1	US Highway 2, East Approach, WB	2	35
Major Approach 3	US Highway 2, West Approach, EB	2	35
Minor Approach 2	5th Ave NW, South Approach, NB	1	25
Minor Approach 4	5th Ave NW, North Approach, SB	1	25

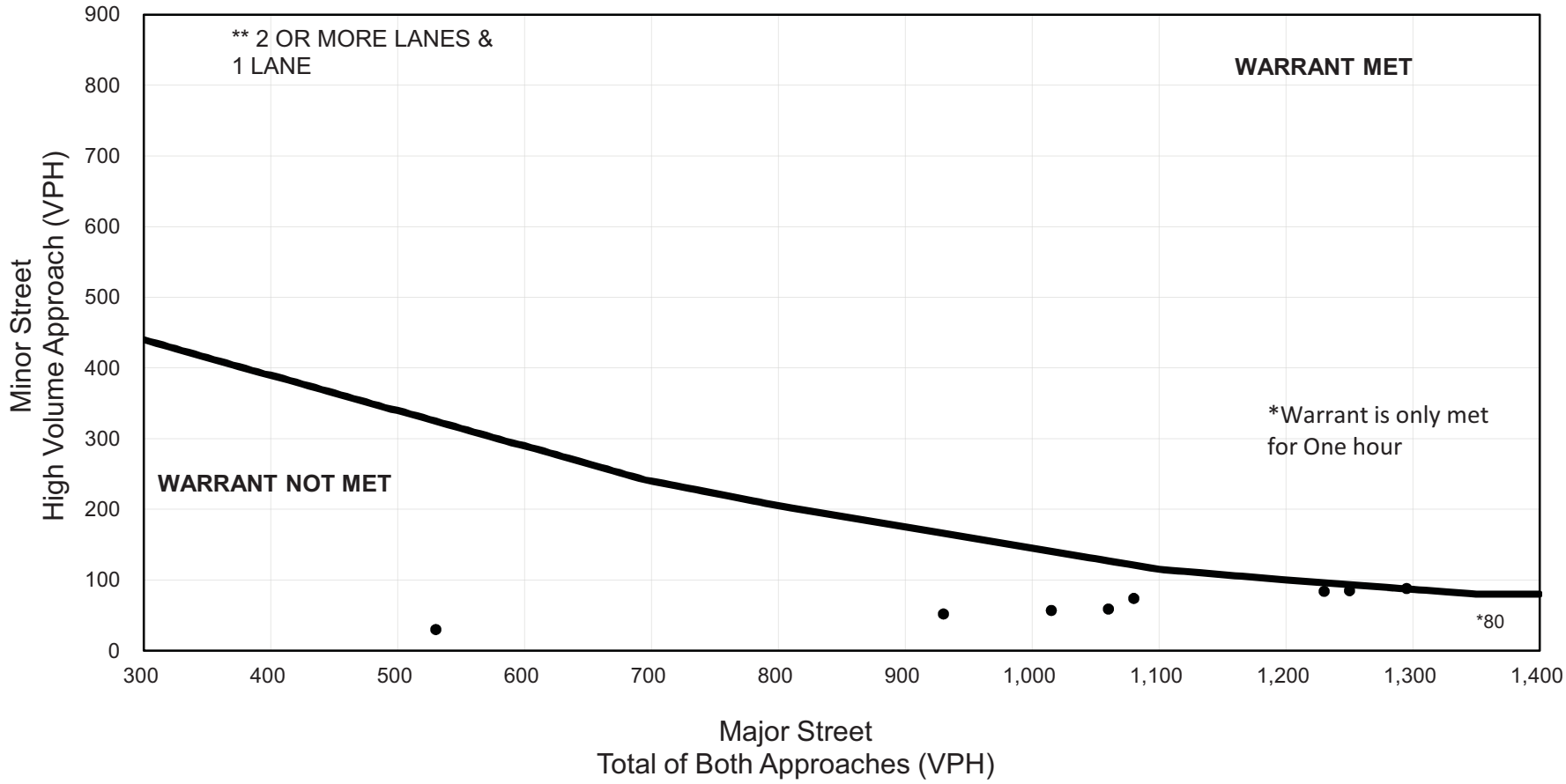
If population is less than 10,000; or the major street speed is over 40 mph, seventy percent factor can be applied. Apply seventy percent factor? No

	MAJOR STREET							MINOR STREET										WARRANT MET SAME HOURS ON MAJOR AND MINOR STREETS			
	APPROACH VOLUME			WARRANT MET *				APPROACH VOLUME		WARRANT MET APPROACH 2 *				WARRANT MET APPROACH 4 *							
				Cond. A	Cond. B	7 & (A&B) Comb.				Cond. A	Cond. B	7 & (A&B) Comb.		Cond. A	Cond. B	7 & (A&B) Comb.					
						80% of A	80% of B					80% of A	80% of B			80% of A	80% of B				
HOUR	1	3	TOTAL 1 + 3	600	900	480	720	2	4	150	75	120	60	150	75	120	60	Cond. A	Cond. B	7 & (A&B) Comb. 80% of A	7 & (A&B) Comb. 80% of B
12 - 1 AM			0																		
1 - 2 AM			0																		
2 - 3 AM			0																		
3 - 4 AM			0																		
4 - 5 AM			0																		
5 - 6 AM	251	279	530			X		30	17												
6 - 7 AM	352	390	742	X		X	X	41	24												
7 - 8 AM	503	557	1,060	X	X	X	X	59	34												
8 - 9 AM	440	488	928	X	X	X	X	52	30												
9 - 10 AM	419	465	884	X		X	X	49	29												
10 - 11 AM	432	479	911	X	X	X	X	51	29												
11 - Noon	481	534	1,015	X	X	X	X	57	33												
12 - 1 PM	493	587	1,079	X	X	X	X	74	31				X								X
1 - 2 PM	483	575	1,058	X	X	X	X	72	31				X								X
2 - 3 PM	473	564	1,037	X	X	X	X	71	30				X								X
3 - 4 PM	530	632	1,162	X	X	X	X	79	34		X		X						X		X
4 - 5 PM	591	704	1,296	X	X	X	X	88	38		X		X						X		X
5 - 6 PM	569	678	1,247	X	X	X	X	85	36		X		X						X		X
6 - 7 PM	562	669	1,231	X	X	X	X	84	36		X		X						X		X
7 - 8 PM	414	493	907	X	X	X	X	62	26				X								X
8 - 9 PM	296	352	648	X		X		44	19												
9 - 10 PM			0																		
10 - 11 PM			0																		
11 - Midnight			0																		

SUMMARY OF RESULTS:

Warrant 1 - Cond. A was	not met:	0	hours satisfied requirements
Warrant 1 - Cond. B was	not met:	4	hours satisfied requirements
Warrant 1 - Combine A & B was	not met:	0	hours satisfied requirements

Note:
* Warrant volume requirements are from the 2005 Minnesota Manual on Uniform Traffic Control Devices.



Warrant Not Met

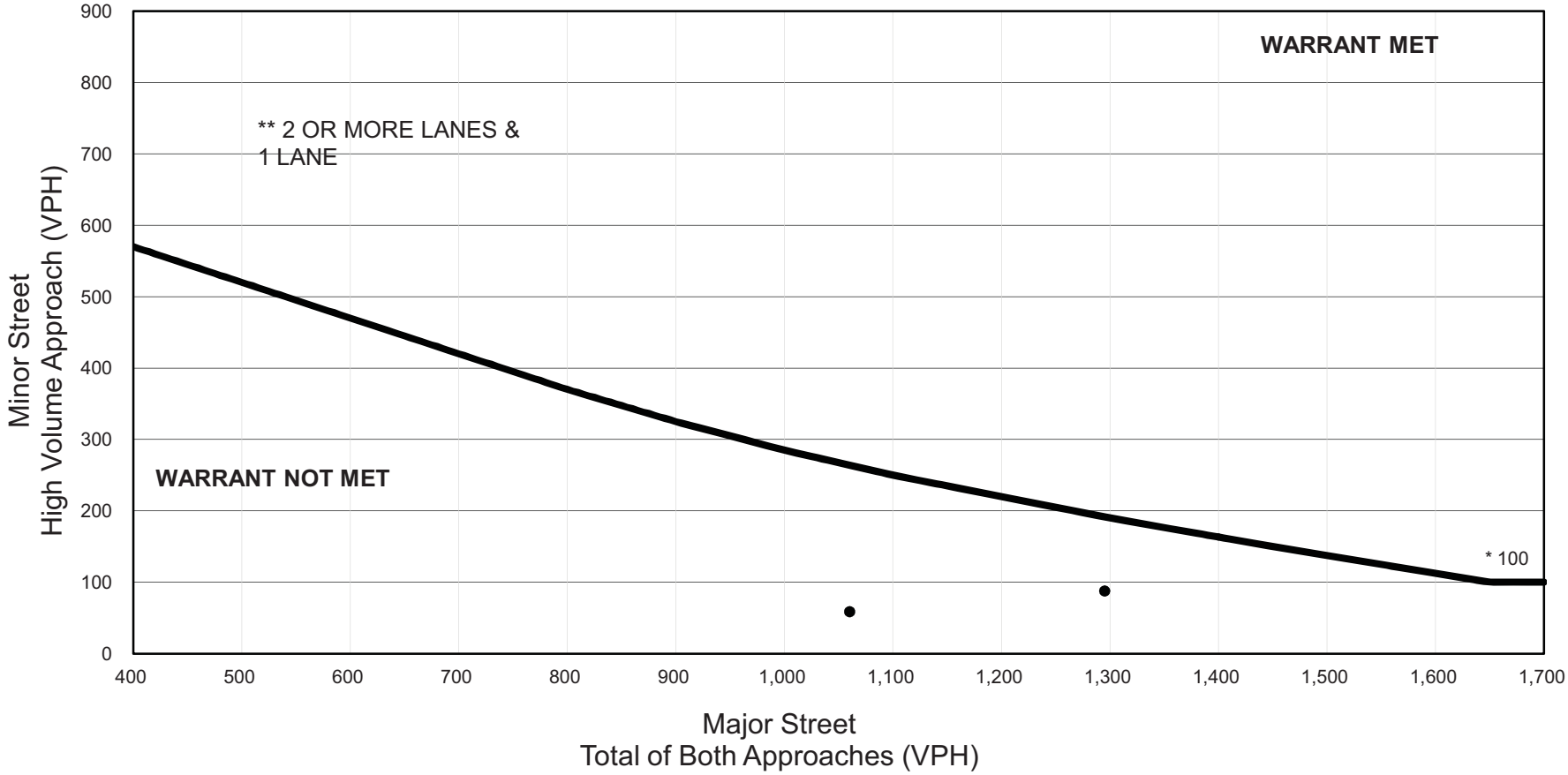
* NOTE: 80 vph applies as the lower threshold volume for a minor street approach with 1 lane (right turn lanes are not considered).

** The first number refers to the number of lanes of approach on the major street and the second number refers to the number of lanes of approach on the minor street.

APPENDIX D
US Highway 2 & 5th Ave NW
SIGNAL WARRANT ANALYSIS
Estiamted 2014 Traffic Volumes

Source: 2005 Minnesota Manual on Uniform Traffic Control Devices.

FOUR HOUR VOLUME WARRANT
WARRANT 2



Warrant Not Met

* NOTE: 100 vph applies as the lower threshold volume for a minor street approach with 1 lane (right turn lane was not considered) .

** The first number refers to the number of lanes of approach on the major street and the second number refers to the number of lanes of approach on the minor street.

APPENDIX D
US Highway 2 & 5th Ave NW
SIGNAL WARRANT ANALYSIS
Estiamted 2014 Traffic Volumes

Source: 2005 Minnesota Manual on Uniform Traffic Control Devices.

PEAK HOUR VOLUME WARRANT
WARRANT 3

APPENDIX D
SIGNAL WARRANT ANALYSIS
WARRANT 1 - Eight-Hour Vehicular Volume
LOCATION: **US Highway 2 @ 5th Ave NW**

Count Date: Estimated 2018 Volumes
Source:
Factor: 1.00
Population < 10,000? yes
Speed over 40 mph? NO

APPROACH	DESCRIPTION	NUMBER OF LANES	SPEED (MPH)
Major Approach 1	US Highway 2, East Approach, WB	2	35
Major Approach 3	US Highway 2, West Approach, EB	2	35
Minor Approach 2	5th Ave NW, South Approach, NB	1	25
Minor Approach 4	5th Ave NW, North Approach, SB	1	25

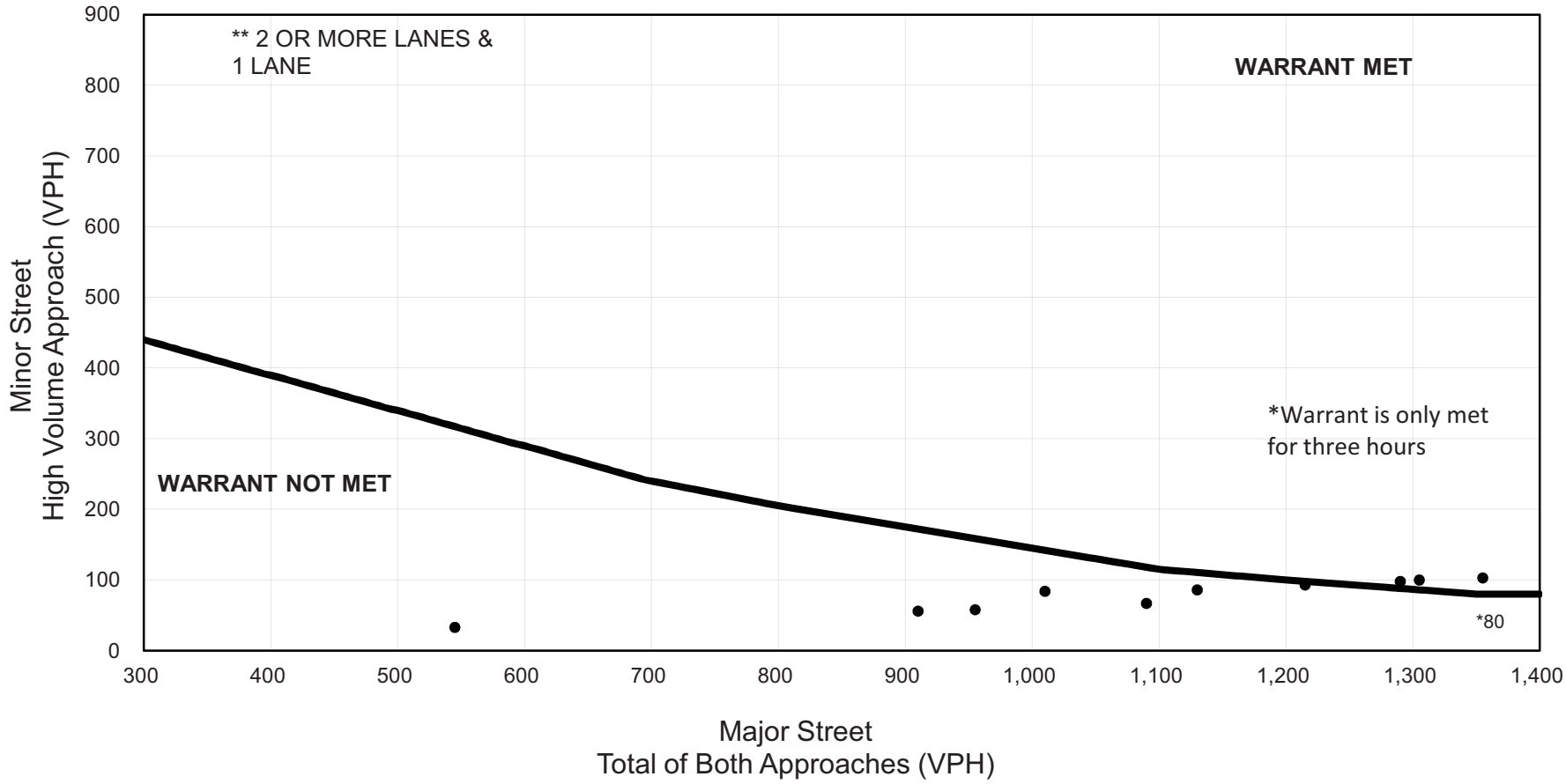
If population is less than 10,000; or the major street speed is over 40 mph, seventy percent factor can be applied. Apply seventy percent factor? No

	MAJOR STREET							MINOR STREET										WARRANT MET SAME HOURS ON MAJOR AND MINOR STREETS			
	APPROACH VOLUME			WARRANT MET *				APPROACH VOLUME		WARRANT MET APPROACH 2 *				WARRANT MET APPROACH 4 *							
				Cond. A	Cond. B	7 & (A&B) Comb.				Cond. A	Cond. B	7 & (A&B) Comb.		Cond. A	Cond. B	7 & (A&B) Comb.					
						80% of A	80% of B					80% of A	80% of B			80% of A	80% of B				
HOUR	1	3	TOTAL 1 + 3	600	900	480	720	2	4	150	75	120	60	150	75	120	60	Cond. A	Cond. B	7 & (A&B) Comb. 80% of A	7 & (A&B) Comb. 80% of B
12 - 1 AM			0																		
1 - 2 AM			0																		
2 - 3 AM			0																		
3 - 4 AM			0																		
4 - 5 AM			0																		
5 - 6 AM	261	284	546			X		33	20												
6 - 7 AM	366	398	764	X		X	X	47	28												
7 - 8 AM	523	568	1,091	X	X	X	X	67	40				X								X
8 - 9 AM	458	498	956	X	X	X	X	58	35												
9 - 10 AM	436	474	911	X	X	X	X	56	33												
10 - 11 AM	449	489	938	X	X	X	X	57	34												
11 - Noon	501	544	1,045	X	X	X	X	64	38				X								X
12 - 1 PM	517	612	1,129	X	X	X	X	86	32		X		X						X		X
1 - 2 PM	507	600	1,107	X	X	X	X	84	31		X		X						X		X
2 - 3 PM	497	588	1,085	X	X	X	X	83	30		X		X						X		X
3 - 4 PM	556	659	1,215	X	X	X	X	93	34		X		X						X		X
4 - 5 PM	621	735	1,355	X	X	X	X	103	38		X		X						X		X
5 - 6 PM	597	707	1,304	X	X	X	X	100	36		X		X						X		X
6 - 7 PM	590	698	1,287	X	X	X	X	98	36		X		X						X		X
7 - 8 PM	434	514	949	X	X	X	X	72	26				X								X
8 - 9 PM	310	367	678	X		X		52	19												
9 - 10 PM			0																		
10 - 11 PM			0																		
11 - Midnight			0																		

SUMMARY OF RESULTS:

Warrant 1 - Cond. A was	not met:	0	hours satisfied requirements
Warrant 1 - Cond. B was	not met:	7	hours satisfied requirements
Warrant 1 - Combine A & B was	not met:	0	hours satisfied requirements

Note:
* Warrant volume requirements are from the 2005 Minnesota Manual on Uniform Traffic Control Devices.



Warrant Not Met

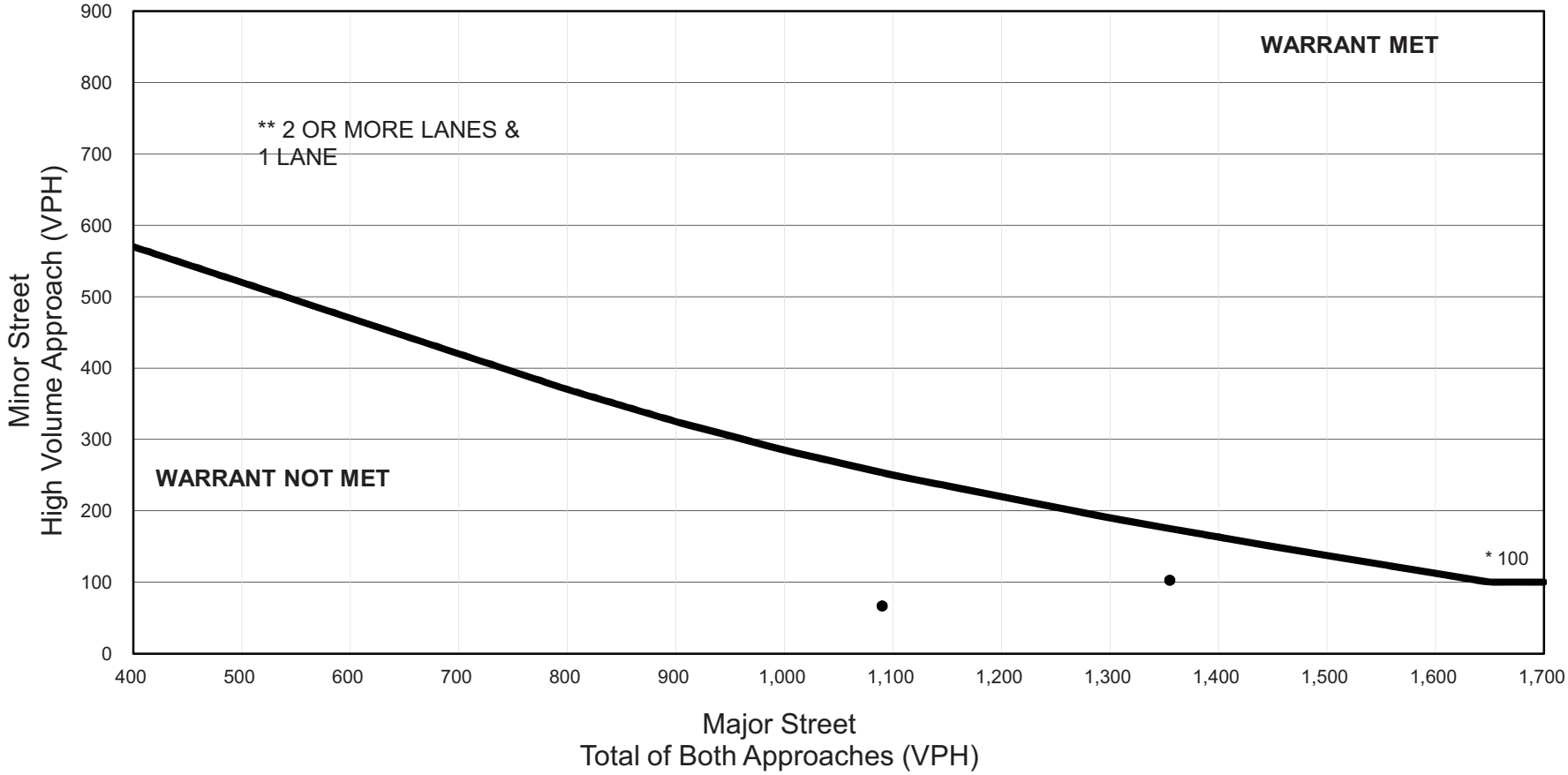
* NOTE: 80 vph applies as the lower threshold volume for a minor street approach with 1 lane (right turn lanes are not considered).

** The first number refers to the number of lanes of approach on the major street and the second number refers to the number of lanes of approach on the minor street.

APPENDIX D
US Highway 2 & 5th Ave NW
SIGNAL WARRANT ANALYSIS
Estiamted 2018 Traffic Volumes

Source: Minnesota Manual on Uniform Traffic Control Devices.

FOUR HOUR VOLUME WARRANT
WARRANT 2



Warrant Not Met

* NOTE: 100 vph applies as the lower threshold volume for a minor street approach with 1 lane (right turn lane was not considered) .

** The first number refers to the number of lanes of approach on the major street and the second number refers to the number of lanes of approach on the minor street.

APPENDIX D
US Highway 2 & 5th Ave NW
SIGNAL WARRANT ANALYSIS
Estiamted 2018 Traffic Volumes

Source: Minnesota Manual on Uniform Traffic Control Devices.

PEAK HOUR VOLUME WARRANT
WARRANT 3

APPENDIX D
SIGNAL WARRANT ANALYSIS
WARRANT 1 - Eight-Hour Vehicular Volume
LOCATION: **US Highway 2 @ 5th Ave NW**

Count Date: Estimated 2019 Volumes
Source:
Factor: 1.00
Population < 10,000? yes
Speed over 40 mph? NO

APPROACH	DESCRIPTION	NUMBER OF LANES	SPEED (MPH)
Major Approach 1	US Highway 2, East Approach, WB	2	35
Major Approach 3	US Highway 2, West Approach, EB	2	35
Minor Approach 2	5th Ave NW, South Approach, NB	1	25
Minor Approach 4	5th Ave NW, North Approach, SB	1	25

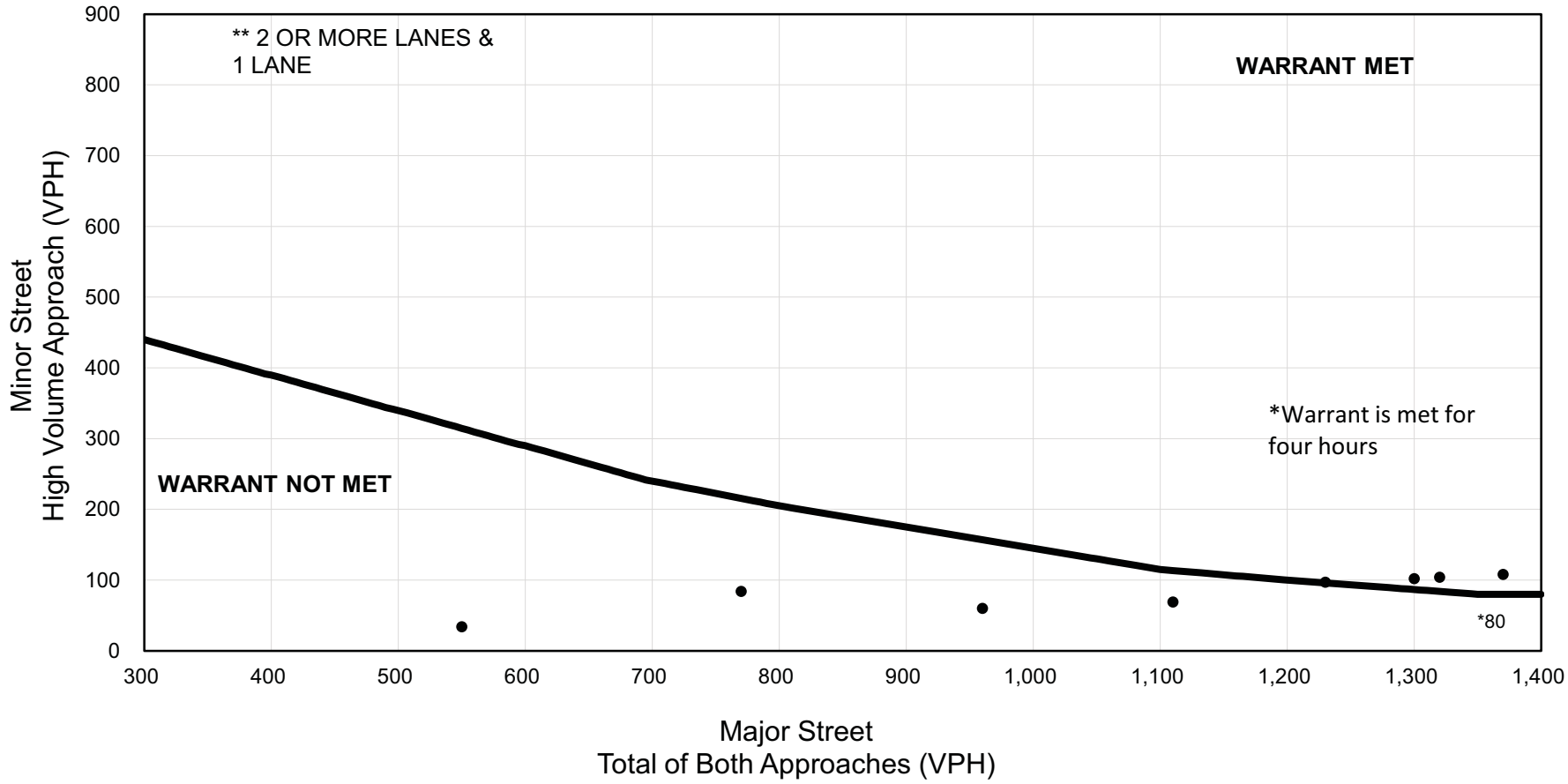
If population is less than 10,000; or the major street speed is over 40 mph, seventy percent factor can be applied. Apply seventy percent factor? No

	MAJOR STREET							MINOR STREET										WARRANT MET SAME HOURS ON MAJOR AND MINOR STREETS			
	APPROACH VOLUME			WARRANT MET *				APPROACH VOLUME		WARRANT MET APPROACH 2 *				WARRANT MET APPROACH 4 *							
				Cond. A	Cond. B	7 & (A&B) Comb.				Cond. A	Cond. B	7 & (A&B) Comb.		Cond. A	Cond. B	7 & (A&B) Comb.					
						80% of A	80% of B					80% of A	80% of B			80% of A	80% of B				
HOUR	1	3	TOTAL 1 + 3	600	900	480	720	2	4	150	75	120	60	150	75	120	60	Cond. A	Cond. B	7 & (A&B) Comb. 80% of A	7 & (A&B) Comb. 80% of B
12 - 1 AM			0																		
1 - 2 AM			0																		
2 - 3 AM			0																		
3 - 4 AM			0																		
4 - 5 AM			0																		
5 - 6 AM	264	286	550			X		34	21												
6 - 7 AM	370	400	770	X		X	X	48	29												
7 - 8 AM	528	571	1,099	X	X	X	X	69	42				X								X
8 - 9 AM	463	500	963	X	X	X	X	60	37				X								X
9 - 10 AM	441	477	917	X	X	X	X	57	35												
10 - 11 AM	454	491	945	X	X	X	X	59	36												
11 - Noon	506	547	1,053	X	X	X	X	66	40				X								X
12 - 1 PM	523	618	1,142	X	X	X	X	90	32		X		X						X		X
1 - 2 PM	513	606	1,119	X	X	X	X	88	31		X		X						X		X
2 - 3 PM	503	594	1,097	X	X	X	X	86	30		X		X						X		X
3 - 4 PM	563	666	1,229	X	X	X	X	97	34		X		X						X		X
4 - 5 PM	628	742	1,370	X	X	X	X	108	38		X		X						X		X
5 - 6 PM	605	715	1,319	X	X	X	X	104	36		X		X						X		X
6 - 7 PM	597	705	1,302	X	X	X	X	102	36		X		X						X		X
7 - 8 PM	440	520	959	X	X	X	X	76	27		X		X						X		X
8 - 9 PM	314	371	685	X		X		54	19												
9 - 10 PM			0																		
10 - 11 PM			0																		
11 - Midnight			0																		

SUMMARY OF RESULTS:

Warrant 1 - Cond. A was	not met:	0	hours satisfied requirements
Warrant 1 - Cond. B was	met:	8	hours satisfied requirements
Warrant 1 - Combine A & B was	not met:	0	hours satisfied requirements

Note:
* Warrant volume requirements are from the 2005 Minnesota Manual on Uniform Traffic Control Devices.



Warrant is Met (4 Hours)

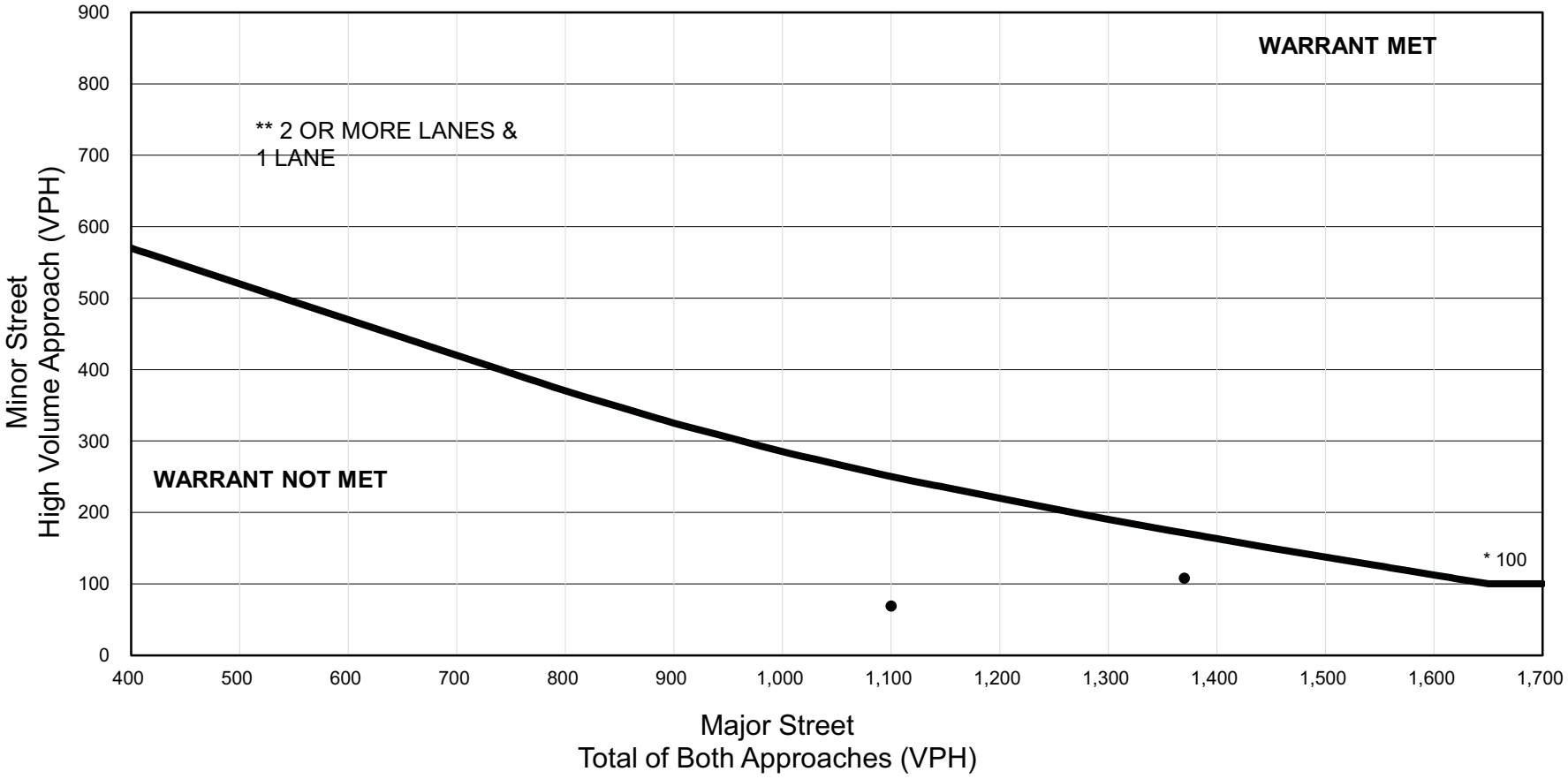
* NOTE: 80 vph applies as the lower threshold volume for a minor street approach with 1 lane (right turn lanes are not considered).

** The first number refers to the number of lanes of approach on the major street and the second number refers to the number of lanes of approach on the minor street.

APPENDIX D
US Highway 2 & 5th Ave NW
SIGNAL WARRANT ANALYSIS
Estiamted 2019 Traffic Volumes

Source: 2005 Minnesota Manual on Uniform Traffic Control Devices.

FOUR HOUR VOLUME WARRANT
WARRANT 2



Warrant Not Met

* NOTE: 100 vph applies as the lower threshold volume for a minor street approach with 1 lane (right turn lane was not considered) .

** The first number refers to the number of lanes of approach on the major street and the second number refers to the number of lanes of approach on the minor street.

APPENDIX D
US Highway 2 & 5th Ave NW
SIGNAL WARRANT ANALYSIS
Estiamted 2019 Traffic Volumes

Source: 2005 Minnesota Manual on Uniform Traffic Control Devices.

PEAK HOUR VOLUME WARRANT
WARRANT 3