9th Street Corridor Study

13th Avenue East to 12th Avenue Northeast
West Fargo, North Dakota

METROCOG
FM REGIONAL TRANSPORTATION PLANNING ORGANIZATION

City of WEST FARGO

Apex Engineering Group

Final Report
March 2020

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March 2020

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Introduction

The Metro GROW: 2045 Metropolitan Transportation Plan (MTP) identifies the 9th Street corridor for near mid-term (2026-2029) Preservation projects from 7th Avenue East to 12th Avenue Northeast. A long-term project (2036-2045) grade separation project is also included in the MTP at the 9th Street – BNSF crossing between Main Avenue and 12th Avenue Northeast.

A previous study was completed in 2012 that included this portion of 9th Street. However, the 2035 forecasted AADT for 9th Street from that study had been exceeded or nearly exceeded by AADT counts obtained in 2015. In addition, West Fargo 2.0, the City's new comprehensive plan was adopted in 2018 providing guiding principles for moving forward with new projects. City leaders recognized the importance of revisiting this information and focusing on this area of 9th Street as the horizon nears for necessary future improvements on the corridor.

The 9th Street Corridor Study includes three segments. The study area initially began at 7th Avenue East and ended at 12th Avenue Northeast (Segments 2 and 3). Segment 1 was added to the study after many comments were received from the public through Online Survey #1 regarding safety concerns from 13th Avenue East to 7th Avenue East.

PURPOSE AND NEED

The purpose of this study is to develop and refine alternatives that may be considered for future implementation along the 9th Street corridor between 13th Avenue East and 12th Avenue Northeast by evaluating the existing and future conditions using a context-sensitive approach that considers the needs and input of all users. The need to identify future alternatives is driven by ageing infrastructure, increasing traffic volumes and safety issues, and development of undeveloped land adjacent to the corridor.

Summary of Public Involvement

STUDY REVIEW COMMITTEE (SRC)

An SRC was formed to assist in the guidance and direction of this study, identify issues, evaluate public input, and review and recommend alternatives. The SRC consisted of members from Metro COG, City of West Fargo, and Apex Engineering Group and its subconsultants.

PUBLIC PARTICIPATION PLAN (PPP)

The study team developed a PPP document to guide the public engagement strategies for the study. The PPP identified the key stakeholders and outlined the various engagement tactics that would be used during the study.

PUBLIC INPUT MEETINGS

Two formal public input meetings (PIM) were held during the study:

- **PIM #1 June 13, 2019** at West Fargo City Hall
  - Open House Format
  - Informational Handouts and Exhibits
  - Formal Presentation
  - 7 Attendees
  - Media Coverage: West Fargo Pioneer, KVRR-TV
- **PIM #2 January 20, 2020** at West Fargo City Hall
  - Open House Format
  - Informational Handouts and Exhibits
  - No Formal Presentation
  - 50 Attendees (approximate)
  - Media Coverage: West Fargo Pioneer, KVLY-TV, KVRR-TV, WDAY-TV

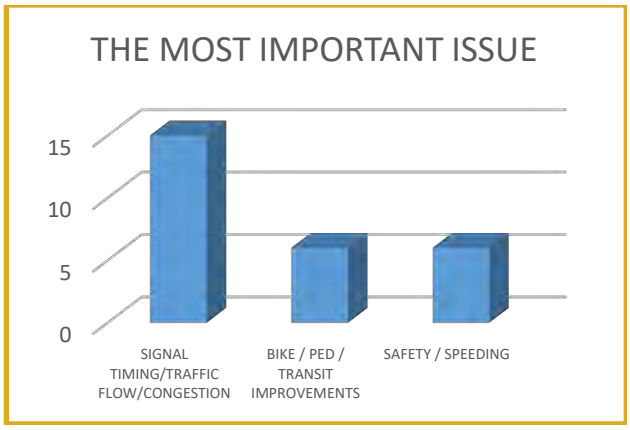
Two informal pop-up events were held to increase study awareness and gather stakeholder input:

- **January 21, 2020** at West Fargo High School (during WFHS Girls Basketball Game)
  - Informational Handouts and Exhibits
  - Online Survey Available
  - 20 Attendees
- **January 30, 2020** at Terracon Consultants Office (on 9th Street within Study Area)
  - Informational Handouts and Exhibits
  - Direct Engagement with Several Business Stakeholders and Property Owners in the Area

ONLINE SURVEYS

Two online public surveys were conducted during the study. The surveys were hosted on the SurveyMonkey platform and were accessible from weblinks on both the Metro COG and City of West Fargo websites, social media posts, and direct emails.

- **Online Survey #1** was available from June 19 – June 30, 2019. 77 responses were received. The most common corridor issues and needs identified by respondents were:
  - Traffic Signals/Enhanced Intersection Controls
  - Pedestrian/Bicycle/Transit Connectivity & Safety
  - Improving Congestion and Traffic Flow
  - Trees and Streetscaping

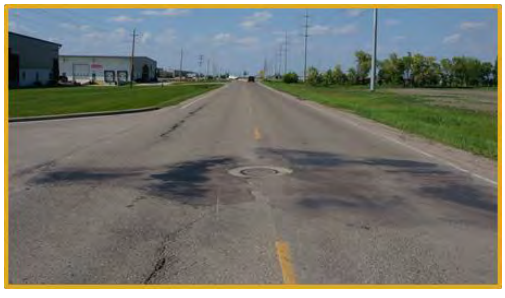


- **Online Survey #2** was available from January 20 – February 7, 2020, asked responders to rate alternatives. 221 responses were received with neutral to high support for the following alternatives:
  - Preserve 4-lane section from 13th Avenue East to 7th Avenue East (Segment 1)
  - Reconstruct 3-lane section from 7th Avenue East to Main Avenue East, widen existing sidewalk to 10' multi-use path (Segment 2)
  - Construct new 3-lane section with 10' multi-use path from Main Avenue East to 12th Avenue Northeast (Segment 3)
  - Traffic signal revisions at the Main Avenue Intersection to allow protected/permissive northbound and southbound left turns
  - Install enhanced pedestrian crossing beacons (Rapid Rectangular Flashing Beacon) systems at the pedestrian crossings at 10th Avenue East and 8th Avenue East
  - Install ¾ Median at the Prairie Parkway intersection

Existing Conditions

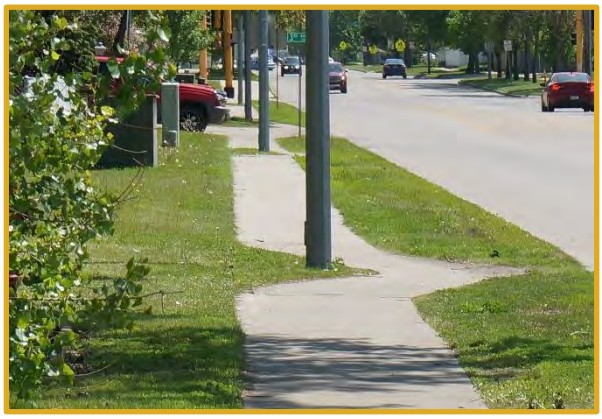
- **Traffic Conditions:**
  - Traffic operations throughout the corridor were found to be acceptable with all intersections operating at LOS C or better during the AM and PM peak hours.
  - A queuing issue was identified during the AM peak for the intersection at 4th Avenue East for the eastbound left-turn lane and through-lane.
  - Safety analysis determined that the intersections at 7th Avenue East, 4th Avenue East, and Main Avenue East have crash critical indexes over 1.0.
  - The intersection at 10th Avenue East has a serious and fatal crash critical index over 1.0.
  - The roadway segment of 9th Street from 13th Avenue East to 10th Avenue East has a crash critical index over 1.0.

- **Pavement Conditions:**
  - 13th Avenue East to Meyer Boulevard: New concrete pavement in good condition.
  - Meyer Boulevard to 7th Avenue East: Easternmost northbound lane is new concrete in good condition, remaining concrete pavement is average to below average condition.
  - 7th Avenue East to 1st Avenue East: Concrete pavement is in average to below-average condition.
  - Main Avenue East to 12th Avenue Northeast: Asphalt pavement is in average to poor condition.



- **Parking and Access:**
  - There is no parking along the corridor.
  - Access points north of 7th Avenue Northeast do not meet the City's spacing requirements.

- **Sidewalks and Paths:**
  - There is a sidewalk on the west side of 9th Street from 13th Avenue East to Main Avenue East, and on the east side from 4th Avenue East to Main Avenue East.
  - There is a 10' path on the east side of 9th Street from 13th Avenue East to 4th Avenue East.
  - There are no sidewalks or paths from Main Avenue East to 12th Avenue Northeast.



- **Utilities:**
  - Overhead power lines are present from 4th Avenue East to 2nd Avenue East and from 7th Avenue Northeast to 12th Avenue Northeast.
  - There are numerous underground utilities throughout the corridor.

- **Transit:**
  - MATBUS operates one route (route 20) which travels on 9th Street from 7th Avenue East to 4th Avenue East with no stops on 9th Street.

- **Trees:**
  - There are 94 existing trees along the corridor. 81 of them are Ash or Ash hybrid species. Most are in good condition.

- **Railroad Crossings:**
  - BNSF operates one crossing (071009F) with two tracks crossing perpendicular to 9th Street between Main Avenue East and 7th Avenue Northeast.

Future 2045 No Build Conditions

If no improvements were made to the corridor, under projected 2045 traffic conditions the following occurs:

- All intersections operate at LOS D or better during the AM and PM peak hours.
- During the AM peak at 10th Avenue East, the WB approach is operating at a LOS E.
- During the PM peak at 10th Avenue East, the WB approach is operating at LOS F, and the EB approach is operating at LOS E.
- During the PM peak at Main Avenue East, the SB approach is operating at a LOS E.
- A queuing issue was identified during the PM peak for the southbound left-turn lane of 9th Street at the intersection with Main Avenue East.

Issue Identification and Needs Assessment

Issues and needs that were identified through SRC discussion and public input include:

Traffic Operations and Roadway Geometrics:

- Rural two lane section north of Main Avenue East
- Delay for minor approaches at 10th Avenue East
- Delay and queueing at the Main Avenue Intersection

Traffic Safety and Access Management

- Crash Rate exceeding the critical rate at 13th Avenue East, Prairie Parkway, 7th Avenue East, 4th Avenue East and Main Avenue East intersections.
- Crash Rate exceeding the critical rate in the segment from 13th Avenue East to 10th Avenue East.
- Access congestion between 7th Avenue Northeast and 12th Avenue Northeast

BNSF Railroad Crossing

- Average of 68 trains per day
- 2045 exposure factor (Trains/Day x Vehicles/Day) near 460,000 could warrant a grade separation
- No safety accommodations for pedestrians and bicycles

Pedestrian and Bicycle Mobility

- Many public comments received were related to safety concerns for pedestrians, especially elementary and high school students, in Segments 1 and 2
- 10’ path does not extend north of 4th Avenue East
- ADA compliant curb ramp upgrades needed from Meyer Boulevard to Main Avenue East.
- Pedestrian crossings at 10th Avenue East and 8th Avenue East could be enhanced with Rectangular Rapid Flashing Beacons (RRFBs), along with consideration for pedestrians at the signalized intersections at 7th Avenue East and 4th Avenue East. The signs and flashers can be installed on both sides of the road or mast-arm mounted over the road for additional visibility.

Transit Facilities

- Ensure proper access and mobility at MATBUS stops adjacent to the corridor on 7th Avenue East and 4th Avenue East.

Freight Movement and Industrial Area Access

- Gap in the truck route system between 13th Avenue East and Main Avenue East

Study Recommendations

Based on input and analysis by the Study Review Committee along with public and stakeholder input, the following improvement alternatives are recommended for future implementation. It is assumed that the base alternatives 2A and 3A may be implemented within the next 5-10 years (mid-range).

The following is a summary of the preferred recommendations for the corridor.

SEGMENT 1: 13TH AVENUE EAST TO 7TH AVENUE EAST

Alternatives 1D2 and 1F should be implemented as a short-range project to install Rectangular Rapid Flashing Beacon (RRFB) systems at the pedestrian crossings at 10th Avenue East and 8th Avenue East. The existing electrical infrastructure can be used to quickly implement the improvements. This will provide an immediate safety improvement at the crossings.

The improvements completed in 2018 in this segment have addressed previous capacity issues and delayed the need for additional work. The base alternative, 1A: four lane reconstruction, should be considered for long-range implementation when warranted due to deteriorating pavement condition. Other alternatives that should be considered at that time include 1B: ¾ median at Prairie Parkway and 1D1: traffic signal at 10th Avenue East if warranted. The long-range project should also include consideration for removal of the pedestrian crossing at 8th Avenue East and enhancing the pedestrian safety features at the signalized 7th Avenue East intersection and directing pedestrians to cross at that intersection.

SEGMENT 2: 7TH AVENUE EAST TO MAIN AVENUE EAST

The base alternative, 2A: three lane reconstruction, should be considered for mid-range implementation when warranted due to deteriorating pavement condition. This option includes extension of the existing 10 foot shared used path from 4th Avenue East to Main Avenue East. Improvements at the 4th Avenue East intersection should consider pedestrian safety as a priority when this segment is reconstructed. Alternative 2F: 1st Avenue East reconstruction is recommended to be included as part of the long-range project.

The access control/median options in this segment are not recommended at this time as they were not highly rated in the public survey, but they should be considered in the future if there is a crash problem.

SEGMENT 3: MAIN AVENUE EAST TO 12TH AVENUE NORTHEAST

A short-range project should be planned to implement alternative 3B: traffic signal revisions for left turns at the Main Avenue East intersection. This alternative was rated the highest by the public responses to the online survey.

A mid-range project should be programmed to include the base 3A: three lane reconstruction with a 10-foot shared use path. This project should also include alternative 3C: quiet zone crossing to enhance the safety of the BNSF Railroad crossing.

A long-range project for a grade separation at the BNSF Railroad crossing should be kept in the Metropolitan Transportation Plan. If funding for such a project becomes available sooner, this project could be advanced and possibly constructed with the mid-range three lane reconstruction.

Estimated Costs for Recommended Improvements

The preferred options are listed below. All costs are 2020 dollars.

9th Street Recommended Alternatives			
Alternative	**Short-Range Estimated Cost**	**Mid-Range Estimated Cost**	**Long-Range Estimated Cost**
Segment 1: 13th Avenue East to 7th Avenue East – Recommended Alternatives			
1A – Four Lane Reconstruction			$3,461,000
1B – ¾ Median at Prairie Parkway			$9,500
1D1 – Traffic Signal at 10th Avenue East			$300,000
1D2 – Enhanced Ped Beacon at 10th Avenue East	$21,500		
1F – Enhanced Ped Beacon at 8th Avenue East	$21,500		
Subtotal	*$43,000*		*$3,770,500*
Segment 2: 7th Avenue East to Main Avenue East – Recommended Alternatives			
2A – Three Lane Reconstruction		$4,193,000	
2B – ¾ Median at Sommerset Drive			$33,500
2F – 1st Avenue East Reconstruction		$210,000	
Subtotal		*$4,403,000*	*$33,500*
Segment 3: Main Avenue East to 12th Avenue Northeast – Recommended Alternatives			
3A – Three Lane Reconstruction		$7,870,000	
3B – Traffic Signal Revisions at Main Avenue East	$150,000		
3C – Quiet Zone Crossing		$400,000	
BNSF Railroad Underpass			$20,000,000
Subtotal	*$150,000*	*$8,270,000*	*$20,000,000*
Totals	**$193,000**	**$12,673,000**	**$23,804,000**

1.0 INTRODUCTION

1.1 Study Background

The Fargo-Moorhead Metropolitan Council of Governments (Metro COG) and the City of West Fargo (City) commissioned a study of the 9th Street corridor between 13th Avenue East and 12th Avenue Northeast in West Fargo. The Metro GROW: 2045 Metropolitan Transportation Plan (MTP) classifies 9th Street in West Fargo as a Minor Arterial. The MTP also identifies this corridor for near mid-term (2026-2029) Preservation projects from 7th Avenue East to 12th Avenue Northeast. A long-term project (2036-2045) grade separation project is also included in the MTP at the 9th Street – BNSF crossing between Main Avenue and 12th Avenue Northeast.

A previous study was completed in 2012 that included this portion of 9th Street along with a larger area of 9th Street and Veterans Boulevard throughout the City of West Fargo. The 2012 study focused primarily on the rapidly developing area along Veterans Boulevard south of I-94. Recommendations were provided for 9th Street as part of the study, however, the 2035 forecasted AADT for 9th Street from that study had been exceeded or nearly exceeded by AADT counts obtained in 2015. In addition, West Fargo 2.0, the City's new comprehensive plan was adopted in 2018 providing guiding principles for moving forward. City leaders recognized the importance of revisiting this information and focusing on this area of 9th Street as the horizon nears for necessary future improvements on the corridor.

PURPOSE AND NEED

The purpose of this study is to develop and refine alternatives that may be considered for future implementation along the 9th Street corridor between 13th Avenue East and 12th Avenue Northeast by evaluating the existing and future conditions using a context-sensitive approach that considers the needs and input of all users. The need to identify future alternatives is driven by ageing infrastructure, increasing traffic volumes and safety issues, and development of undeveloped land adjacent to the corridor.

1.2 Study Location

9th Street is a north-south corridor through the City of West Fargo. South of Main Avenue, the corridor is a designated as 9th Street East and the corridor is designated as 9th Street Northeast on the north side of Main Avenue. **Both segments will be referred to as 9th Street for the purpose of this study.**

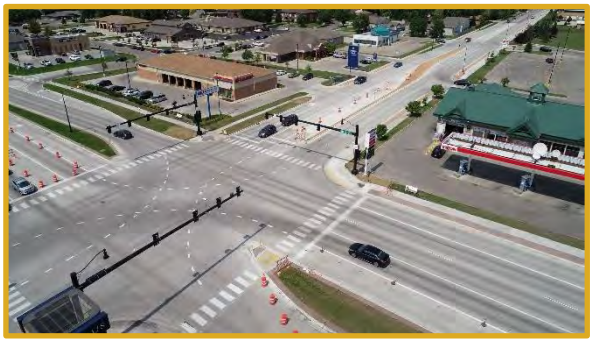
Figure 1.1: Study Location

The various typical sections throughout the corridor include:

- **13th Avenue East to Meyer Boulevard:** 4-lane urban concrete street with turn lanes and a center median. The posted speed is 30 mph. There is a sidewalk on the west side and shared-use path on the east side. This segment is primarily bordered by retail businesses such as gas and service stations, and grocery and hardware stores.
- **Meyer Boulevard to 7th Avenue East:** 2+1+1 urban concrete street configuration with two northbound lanes, one southbound lane and a center two-way left-turn lane (TWLTL). The posted speed is 30 mph. There is a sidewalk on the west side and shared-use path on the east side. This segment is surrounded by a mix of land uses including single and multi-family residential housing and West Fargo High School campus.
- **7th Avenue East to Main Avenue:** 3-lane urban concrete street with one northbound lane, one southbound lane, and a center TWLTL with a posted speed limit of 30 mph. There is a sidewalk on the west side and shared-use path that transitions to a sidewalk on the east side. Here, the adjacent land use includes single family and mobile home residential, West Fargo City Hall, and heavy commercial/retail within a block of Main Avenue.
- **Main Avenue to 12th Avenue Northeast:** 2-lane rural asphalt roadway with narrow shoulders. The posted speed is 35 mph. There are no pedestrian or bicycle facilities. The surrounding land use along this segment is industrial with businesses ranging from gas distribution to auto salvage. At the time of this report writing, construction of a 200,000 square foot distribution center is under way at the northwest corner of the intersection of 9th Street and Main Avenue.

Key intersections along the corridor include:

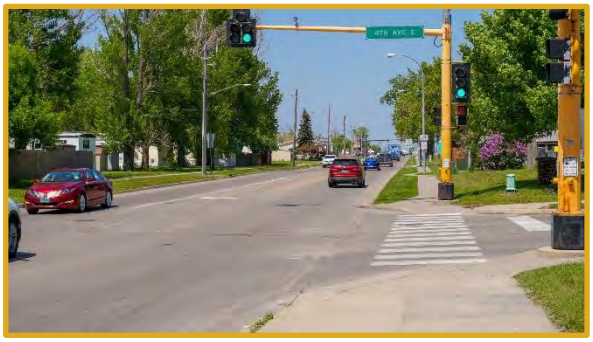
13th Avenue East – Minor Arterial



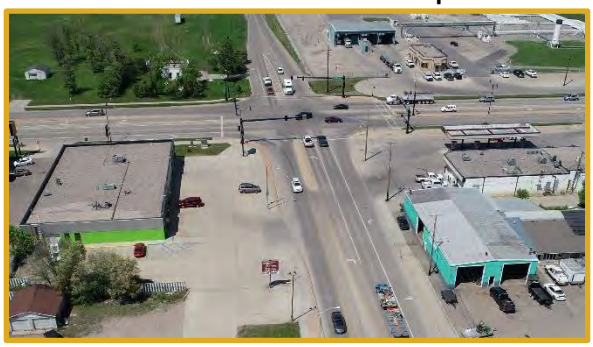
10th Avenue East - Collector

7th Avenue East - Collector

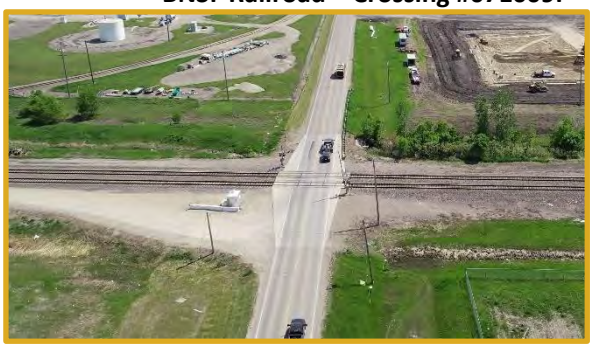
4th Avenue East - Collector



Main Avenue – Principal Arterial



BNSF Railroad – Crossing #071009F



7th Avenue Northeast – Minor Arterial

12th Avenue Northeast – Minor Arterial

2.0 SUMMARY OF PUBLIC INVOLVEMENT

2.1 Study Review Committee Meetings

A Study Review Committee (SRC) was formed at the beginning of the Study process to provide general guidance on the direction of the study, to assist in identifying issues and reviewing alternatives, to evaluate information prior to public viewing, and to relay information back to other members of their respective agency.

- The SRC included participation from the following agencies and individuals:

Metro COG
Adam Altenburg

City of West Fargo
Dustin Scott
Tim Solberg
Andrew Wrucke
Callie Roth

Apex Engineering Group
Brent Muscha
Matt Kinsella

Stonebrooke Engineering
Kate Miner

Flint Group
Melissa Reichert

Hanson Design Associates
Jim Hanson

- A total of four in-person meetings and one conference call were held with the SRC during the study.
  - **SRC Meeting #1: April 3, 2019 |** Kickoff meeting including SRC member introductions and initial discussions on issues, needs, data collection and analysis, alternative development, and public input.
  - **SRC Meeting #2: August 7, 2019 |** The SRC debriefed on Public Meeting #1 and reviewed public comments received both at the meeting and through online Survey #1. After review of the responses to Survey #1, the SRC discussed expanding the study to include 9th Street from 13th Avenue East to 7th Avenue East as part of the corridor study to address public comments primarily regarding pedestrian movement and safety concerns in the area.
  - **SRC Conference Call: September 5, 2019 |** The SRC reviewed and discussed the results of the safety review and future 2045 no-build traffic analysis. It was agreed by the SRC members at this time to expand the study to 13th Avenue East.
  - **SRC Meeting #3: December 19, 2019 |** The SRC finalized the purpose and need statement and reviewed and accepted the final safety and traffic analysis for existing and future conditions. Alternatives were discussed throughout the corridor and the group reviewed the plan for the upcoming Public Meeting #2.
  - **SRC Meeting #4: February 28, 2020** | The SRC debriefed on Public Meeting #2, reviewed public comments received both at the meetings and through online Survey #2, reviewed and discussed the comments on the Draft Corridor Study Report and finalized arrangements for presentations to boards and councils to obtain approval for the Final Study Report.

2.2 Public Participation Plan

The study team developed a Public Participation Plan (PPP) document to guide the public engagement strategies for the 9th Street study. A copy of the full PPP document can be found in **Appendix A**.

The PPP identified the key stakeholders and outlined the various engagement tactics that would be used during the study.

2.3 Public Input Meetings

Two formal public input meetings were held during the study at West Fargo City Hall. Both meetings were advertised and promoted through several media channels including:

- Print ad in the West Fargo Pioneer and Forum newspapers
- Posts on Metro COG and the City's websites
- Emailed notices through the City's alert system
- Boosted posts on Facebook and on Metro COG and City social media channels
- Posts to Nextdoor neighborhood social network app
- Notices included with the City's mailed and emailed utility bills
- Emails from the MATBUS rider alert system
- Geofenced internet ads
- Shareable emails and alerts were provided to partners such as NDDOT Fargo District, BNSF, MATBUS, West Fargo High School, Cass County Commission, and members of the local freight/trucking industry.

The first meeting was held after existing conditions were analyzed and the second meeting was near the end of the study. The first meeting included an open house format with informational handouts and displayed exhibits, as well as a formal presentation.

Different tactics were used for the second round of public input. In an effort to increase attendance and exposure the study team developed an approach that brought the study information to where people would already be gathering, while also making the process more convenient and comfortable to provide feedback. The second meeting was entirely open house format with handout, exhibits, and one-on-one discussion. In addition to the second formal meeting, two informal pop-up events were held to gain additional exposure an input – one at West Fargo High School during a girls' basketball game and one at Terracon's office on 9th Street Northeast.

➥ *Public Input Meeting #1 – June 13, 2019*

The goal of the first meeting was to hear from the public regarding what they viewed as the key issues and needs along the corridor. Information presented included existing roadway conditions, tree inventory, and traffic analysis. Approximately seven members of the public attended the meeting along with a media reporter from the West Fargo Pioneer. Meeting materials and a transcript of comments received during and after the meeting can be found in **Appendix B**.

➥ *Public Input Meeting #2 – January 20, 2020*

At the second meeting, the study team presented the complete existing and forecasted 2045 traffic analysis, safety review, and proposed alternatives for the corridor. The goal was to present the issues and needs discovered through study and receive feedback from the public on their support or preference for the proposed alternatives. Approximately 50 members of the public, City Commission, and various stakeholder groups attended the meeting along with media reporters from KVLY, KVRR, WDAY, and West Fargo Pioneer. Meeting materials and a transcript of comments received during and after the meeting can be found in **Appendix B.**

➥ *Pop-up Engagement Events – January 21 and January 30, 2020*

Additional pop-up events were held after the second Public Input Meeting as a way to present the study information and gather feedback from a focused audience group. The first pop-up event on January 21st was during a girls' basketball game at West Fargo High School. Team members were on-hand to present and discuss the study alternatives with the public and encourage them to participate in the online survey. Approximately 20 members of the public stopped by the pop-up event, several of them being employees of the school district.

The second pop-up event was held on the afternoon of January 30th at Terracon's office at 890 9th Street Northeast. This location provided a convenient opportunity for business partners in the industrial area of the corridor study to view, discuss, and provide feedback on the project alternatives that directly affected them. Stakeholders from Terracon, Magellan Pipeline, Hazer Auto & Truck Parts, and Midland Garage Door / The Nordick Group were in attendance.

2.4 Online Surveys

Two online surveys were available to the public during the course of the study. The surveys were hosted on the SurveyMonkey platform and were accessible from weblinks on both the Metro COG and City of West Fargo websites, social media posts, and direct emails.

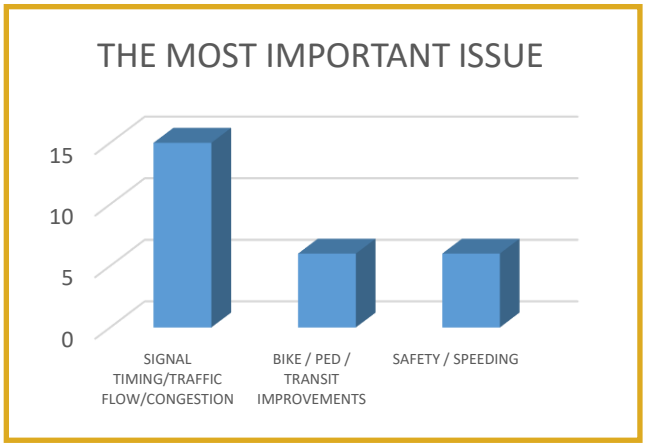
➥ *Online Survey #1*

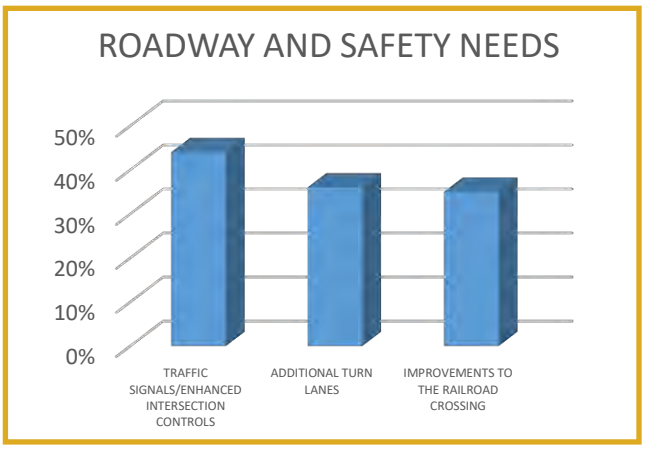
Online Survey #1 was available from June 19 – June 30, 2019, opening shortly after Public Input Meeting #1. The survey consisted of 12 general questions about the responder's demographics, how and why they currently use the 9th Street corridor, and what they view as the primary needs and issues.

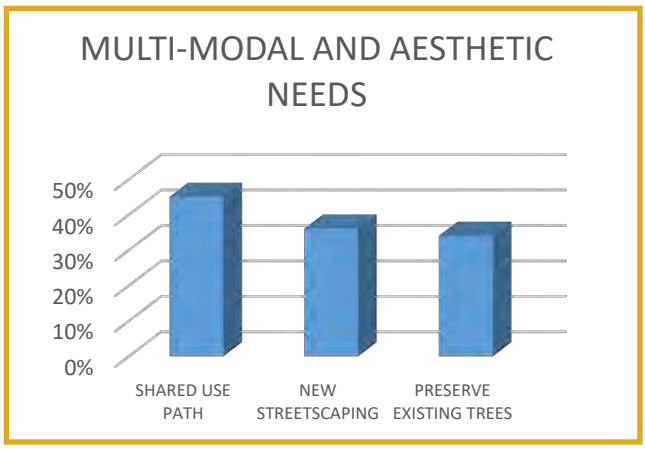
77 survey responses were received. Over one-third of the responders lived within one-half mile of the corridor and use it multiple times per day. 100% of the responders travel 9th Street by vehicle. Overall, the most common topics commented on by responders were:

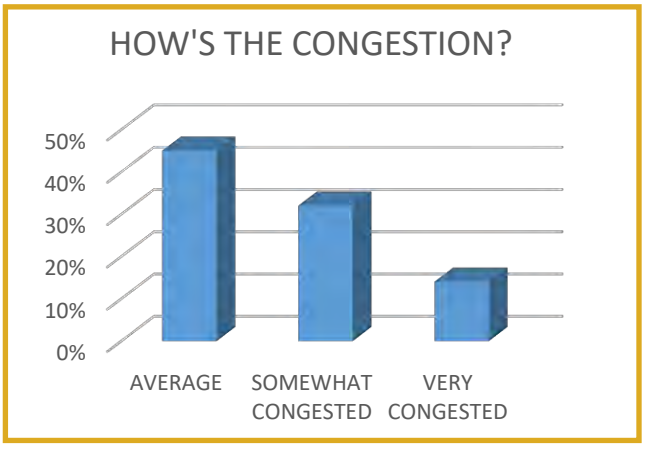
- Traffic Signals/Enhanced Intersection Controls
- Pedestrian/Bicycle/Transit Connectivity & Safety
- Improving Congestion and Traffic Flow
- Trees and Streetscaping

Figure 2.1: Most Common Concerns Reported in Survey #1









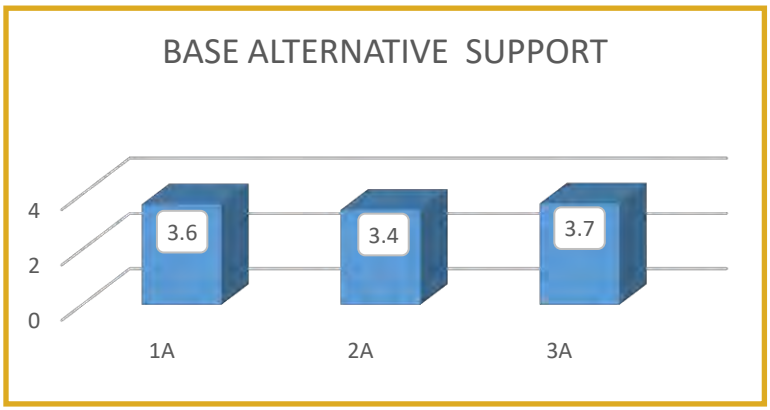
A complete summary of the survey questions and responses can be found in **Appendix C.**

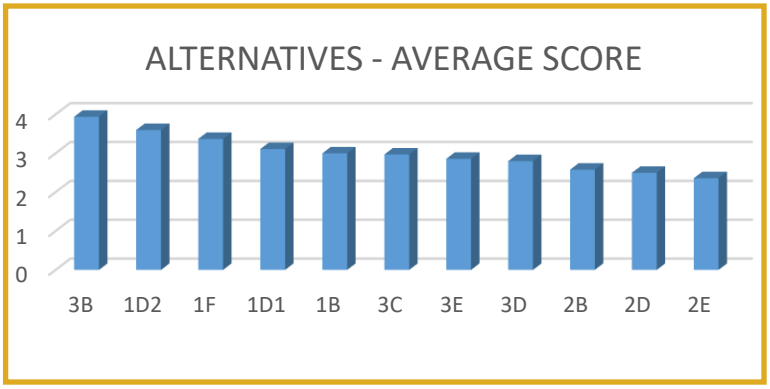
Online Survey #2

Online Survey #2 was available from January 20 – February 7, 2020, kicking-off with Public Input Meeting #2 and coinciding with the Alternative Development and Evaluation phase of the study. The survey consisted of 18 questions asking the responder to rate the various proposed improvement alternatives on a scale of one to five stars. A score of 5 is high support, 3 is neutral, and 1 is low support for the alternative.221 survey responses were received. A breakdown of alternative support can be in **Figure 2.2**.

A complete summary of the survey questions and responses can be found in **Appendix C.**

Figure 2.2: Alternative Development Survey Statistics Online Survey #2





3.0 EXISTING CONDITIONS

3.1 Traffic Operations

This section is intended to summarize the description of data collection, methodologies for modeling the corridor, as well as operational, queuing, and safety analysis for the Existing Conditions. The following six intersections were identified and evaluated along the 9th Street corridor:

1. 10th Avenue East
2. 7th Avenue East
3. 4th Avenue East
4. Main Avenue
5. 7th Avenue Northeast
6. 12th Avenue Northeast

3.1.1 DATA COLLECTION

In an effort to obtain the data along the corridor necessary for analyzing both existing and proposed conditions, 12-hour turning movement counts for 7th Avenue East, 4th Avenue East, and 7th Avenue Northeast were collected in April 2019 and collected for 10th Avenue East in October 2019. Count data was provided by Metro COG and the City at 12th Avenue Northeast and Main Avenue. The 2018 Average Annual Daily Traffic (AADT) volumes were collected from NDDOT GIS layers.

Crash data was obtained for the last 5-year period, June 1, 2014- May 31, 2019 from NDDOT.

Figure 3.1 displays the existing AM and PM turning movement counts for each intersection along the study corridor.

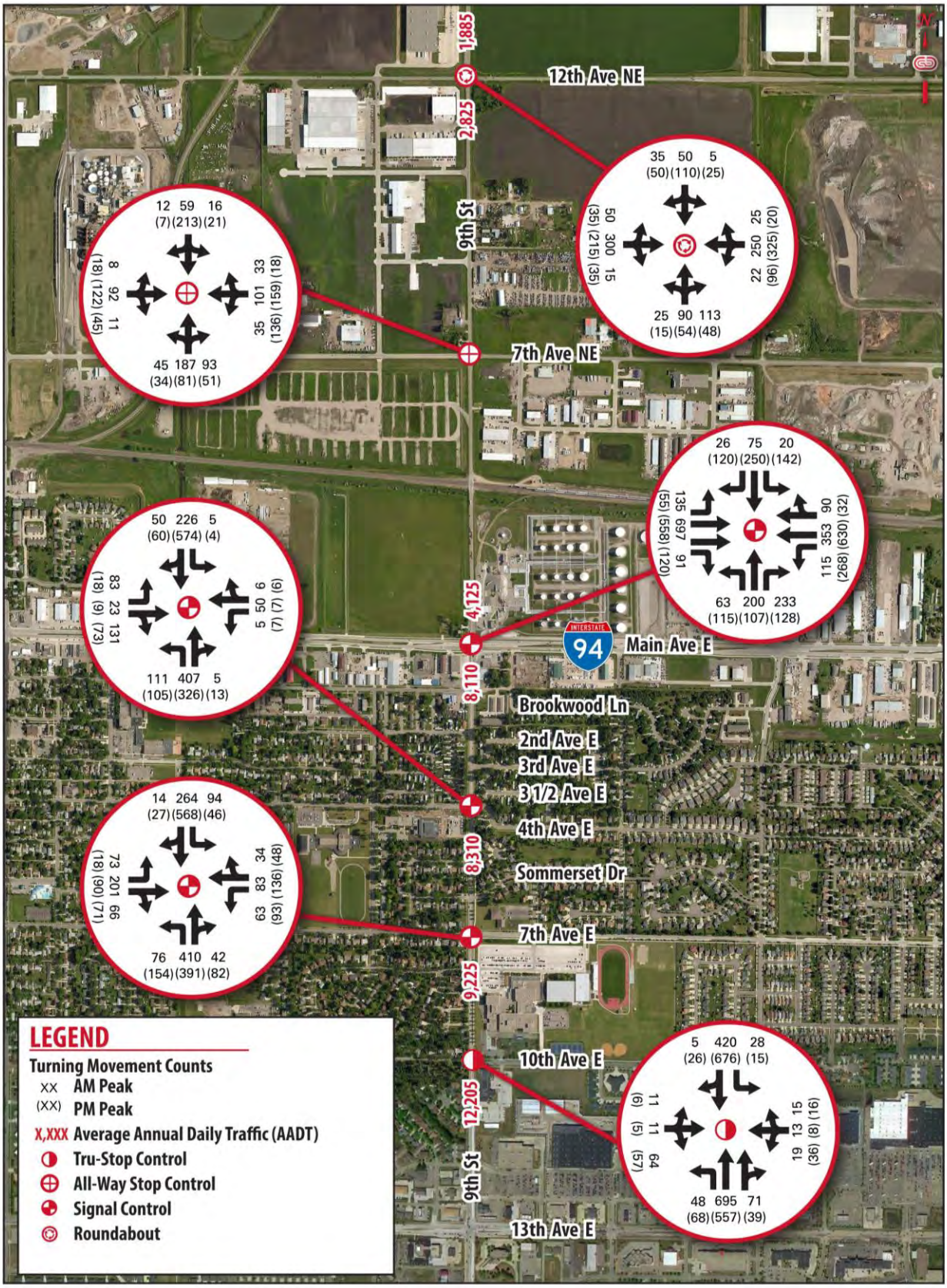
Table 3.1 presents the existing daily pedestrian volumes for the intersections along the study corridor.

Table 3.1: Existing Daily Pedestrian Volumes

Intersection with 9th Street E	Intersection Leg Peds Crossing			
	South	West	North	East
7th Ave NE	0	0	0	0
4th Ave E	31	14	35	34
7th Ave E	77	13	9	29
10th Ave E	6	16	32	33

Notes:
(1) Ped counts not available for Main Ave and 12th Ave NE intersections

Figure 3.1: Existing 2019 Traffic Volumes - 9th Street (13th Ave E to 12th Ave NE)



3.1.2 MODEL SET UP

An existing conditions traffic model in Synchro was created, which included in-place geometry such as number of through lanes and turn lanes, storage lengths for turn lanes, link distances, speed limits, and existing signal timing parameters. Separate files were created for the AM Existing Conditions and PM Existing Conditions, using the turning movement counts collected. Following creation of the models in Synchro, the files were output to SimTraffic for further analysis.

SimTraffic is a microsimulation software package that is the companion to Synchro. SimTraffic uses network seeding and microsimulation to predict and analyze traffic operations. Analysis results are generally based on actual observations of the modeled conditions, not on calculated values based on Highway Capacity Manual (HCM) formulas.

Results of the analysis are displayed as measures of effectiveness (MOE). MOEs establish quantitative information about the performance of an intersection. The primary MOEs that are used in the study are delay, level of service (LOS), and queue lengths.

3.1.3 EXISTING CONDITIONS

Existing conditions include operational and queuing analysis of 2019 conditions as represented by the turning movement counts collected in April 2019. Safety analysis includes data from the last five-year period June 1, 2014 to May 31, 2019. The following section includes methodology and results for operational, queuing, and safety analysis.

3.1.4 OPERATIONAL AND QUEUING ANALYSIS

The traffic operations analysis is based on methodologies documented in the Highway Capacity manual (HCM). The HCM contains analysis techniques for evaluating the operations of transportation facilities under various conditions, such as roadway and intersection configuration, intersection traffic control, type of roadway, number and type of lanes, impact due to presence of pedestrians, and many other factors.

➥ *Delay and Level of Service*

Operational analysis results are described in terms of Level of Service (LOS) ranging from "A to F" with "A" operating with the least delay and "F" operating with the most delay. LOS is determined based on methodology from the HCM, which defines LOS based on control delay. Control delay is the wait time experienced by vehicles slowing down for a signal, roundabout, or stop sign plus the stop time and the time for a vehicle to speed up and traverse the intersection control into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersections on all approaches for a signalized or all-way stop intersection.

Intersection delay and corresponding LOS for signalized and unsignalized all-way stop intersections, as defined by HCM are presented in **Table 3.2**. The LOS delay thresholds for unsignalized intersections are lower than signalized intersections which accounts for the fact that drivers tend to accept longer delays at signals compared to stop or yield signs.

Based on standard practice in the traffic engineering industry, as well as guidance from the American Association of State Highway and Transportation Officials (AASHTO) and conformance with MnDOT, the threshold for acceptable level of intersection operations is commonly taken to be the border between LOS D and LOS E. LOS D is considered acceptable and LOS E is considered unacceptable during the peak hour.

Table 3.2: Intersection Control Delay and Level of Service Definitions

Level of Service (LOS)	Average Delay (seconds/vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

➥ *Queuing Analysis*

Queuing at intersections can have serious traffic safety implications if expected queues exceed available storage. For example, if projected queuing for a left turning movement exceeds available storage in the turn lane, the queue can extend into the through lane and cause safety concerns with potential rear end crashes. Excessive queuing can also impede business, other private, or public access to and from the road. Finally, queuing analyses can determine whether queues are expected to dissipate during a signal cycle or on stop condition approaches, which can inform on the potential need for additional through lanes or other improvements.

Queuing values were taken from SimTraffic for average queue length and 95th percentile modeled queue length. The following criteria was used to identify "queuing issues" for particularly movements. A queueing issue was identified if any of the three conditions were met at a signalized intersection:

- Condition 1: 95th percentile queue length exceeds storage length and the movements operate at LOS E or LOS F
- Condition 2: Average queue length exceeds storage length
- Condition 3: 95th percentile queue length blocks upstream full access intersection

And at a stop-controlled intersection if the following was met:

- Condition 4: 95th percentile queue length exceeds 500 feet on a stop-controlled approach

➥ *Existing Intersection Traffic Operations Analysis Results and Conclusions*

Table 3.3 displays a summary of AM and PM peak hour intersection delay by approach and by intersection, as well as their respective LOS. **Figure 3.2** displays the AM and PM peak hour LOS by movement and by intersection. The reported approach and intersection delay were taken from SimTraffic and is based on the average of ten 60-minute simulation runs. Note that intersection LOS is not defined by the HCM for through-stop control intersections. This is because the minor approaches with relatively low percentages of overall traffic could experience excessive delay, while the mainline could experience little or no delay. The result likely would be low overall intersection delay, which on its face would indicate acceptable operations, when individual stop-controlled movements could be failing.

All intersections currently operate at LOS C or better during AM and PM Peak. During the PM Peak at 7th Avenue East, the EB approach is operating at a LOS E with a delay of 73 sec/vehicle.

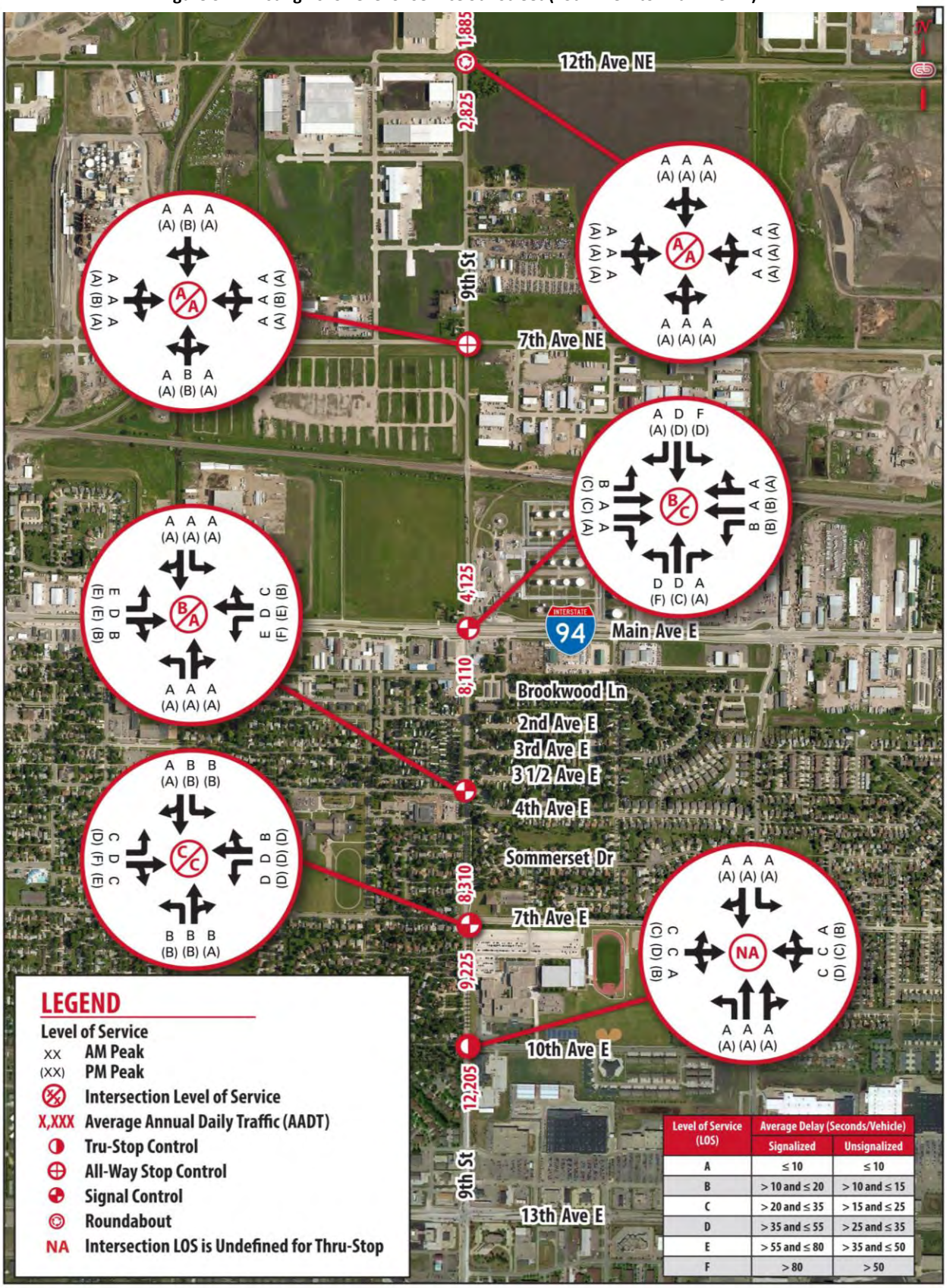
Table 3.3: 2019 AM and PM Level of Service and Delay[1]

Intersection			AM Peak Hour				PM Peak Hour			
Control	Location	Approach	LOS by Approach (Sec/Veh)		LOS by Intersection (Sec/Veh)		LOS by Approach (Sec/Veh)		LOS by Intersection (Sec/Veh)	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Single - Lane Roundabout	12th Ave NE	NB	8	A	6	A	6	A	6	A
		WB	6	A			6	A		
		SB	4	A			5	A		
		EB	6	A			6	A		
All-Way Stop	7th Ave NE	NB	9	A	8	A	8	A	9	A
		WB	7	A			10	A		
		SB	7	A			11	B		
		EB	8	A			9	A		
Signalized	Main Ave	NB	29	C	15	B	37	D	21	C
		WB	6	A			12	B		
		SB	37	D			31	C		
		EB	8	A			17	B		
Signalized	4th Ave E	NB	5	A	15	B	3	A	7	A
		WB	49	D			43	D		
		SB	4	A			5	A		
		EB	42	D			27	C		
Signalized	7th Ave E	NB	13	B	21	C	10	B	24	C
		WB	32	C			51	D		
		SB	11	B			10	B		
		EB	37	D			73	E		
Thru-Stop	10th Ave E	NB	1	A	2	N/A[2]	1	A	3	N/A[2]
		WB	15	B			24	C		
		SB	1	A			2	A		
		EB	9	A			12	B		

[1] Delay for all movements taken from SimTraffic reports.

[2] Intersection LOS is undefined for two-way stop control

Figure 3.2: Existing 2019 Level of Service 9th Street (13th Ave E to 12th Ave NE)



➥ *Existing Queuing Analysis Results and Conclusions*

Synchro uses HCM based equations to determine queues. SimTraffic is a microscopic model that uses observations based on simulation to measure queues. For its robust features, we have used SimTraffic tool for reporting average queue and 95th percentile queue by turning movements for each of the five key intersections.

Tables 3.4 and 3.5 display a summary of existing storage lengths, average queues lengths, and 95th percentile modeled queue lengths for the AM and PM Peak Hours, respectively. Based on queueing analysis methodology previously identified, the following queuing issue was identified:

- AM peak: the 95th percentile queue exceeds the storage length for 4th Avenue East eastbound left-turn lane and through-lane. These movements are operating at LOS E for left-turns and LOS E for through-traffic, which would correspond to Condition 1 queuing issues using the methodology previously identified.
- During the PM peak, the 95th percentile queues for the Main Avenue southbound right-turn lane exceeds the storage lengths. Because this movement is operating at LOS A, a queuing issue was not identified here.

Queue lengths exceeding storage lengths are highlighted red in **Tables 3.4 and 3.5.**

Table 3.4: 2019 AM Queuing Summary

Scenario		Distance to Upstream Street (ft)	2019 Existing Conditions								
			Storage (ft)			Average Queue (ft)[1]			95th % Queue (ft)[1]		
Intersection	Appr		LT	TH	RT	LT	TH	RT	LT	TH	RT
12th Ave NE (Single-Lane Roundabout)	EB	800	-	800	-	-	18	-	-	58	-
	WB	1500	-	1500	-	-	24	-	-	65	-
	NB	800	-	800	-	-	34	-	-	74	-
	SB	1000	-	1000	-	-	12	-	-	40	-
7th Ave NE (All-Way Stop)	EB	800	-	800	-	-	44	-	-	73	-
	WB	500	-	500	-	-	49	-	-	81	-
	NB	2500	-	2500	-	-	71	-	-	112	-
	SB	2500	-	2500	-	-	37	-	-	59	-
Main Ave (Signal Control)	EB	500	275	500	250	54	98	20	107	170	48
	WB	1300	400	1300	1300	35	36	25	71	80	67
	NB	350	250	350	325	45	118	57	96	217	108
	SB	2500	200	2500	150	23	55	15	62	103	43
4th Ave E (Signal Control)	EB	120	150	120	-	76	86	-	156	205	-
	WB	800	100	800	-	4	49	-	23	103	-
	NB	475	200	475	-	33	62	-	76	147	-
	SB	325	150	325	-	2	42	-	14	97	-
7th Ave E (Signal Control)	EB	525	225	525	-	46	153	-	90	261	-
	WB	550	225	550	-	45	59	-	88	122	-
	NB	300	175	300	300	41	138	15	110	230	43
	SB	300	150	300	-	41	80	-	85	150	-
10th Ave E (Thru-Stop)	EB	350	-	350	-	-	38	-	-	65	-
	WB	1150	-	1150	-	-	30	-	-	59	-
	NB	500	500	500	-	15	2	-	42	25	-
	SB	725	675	725	-	14	3	-	41	23	-

[1] Queue for the movements taken from SimTraffic reports (60 min run)

[2] Thru Lane storage is taken as the distance to the prior intersection

Table 3.5: 2019 PM Queuing Summary

Scenario		Distance to Upstream Street (ft)	2019 Existing Conditions								
			Storage (ft)			Average Queue (ft)[1]			95th % Queue (ft)[1]		
Intersection	Appr		LT	TH	RT	LT	TH	RT	LT	TH	RT
12th Ave NE (Single-Lane Roundabout)	EB	800	-	800	-	-	29	-	-	69	-
	WB	1500	-	1500	-	-	29	-	-	81	-
	NB	800	-	800	-	-	15	-	-	48	-
	SB	1000	-	1000	-	-	29	-	-	66	-
7th Ave NE (All-Way Stop)	EB	800	-	800	-	-	58	-	-	97	-
	WB	500	-	500	-	-	72	-	-	123	-
	NB	2500	-	2500	-	-	53	-	-	89	-
	SB	2500	-	2500	-	-	59	-	-	94	-
Main Ave (Signal Control)	EB	500	275	500	250	34	147	32	73	219	58
	WB	300	400	1300	1300	91	86	66	151	153	137
	NB	350	250	350	325	94	54	32	178	119	64
	SB	2500	200	2500	150	106	154	66	197	269	157
4th Ave E (Signal Control)	EB	120	150	120	-	18	46	-	50	88	-
	WB	800	100	800	-	8	15	-	32	43	-
	NB	475	200	475	-	34	27	-	70	78	-
	SB	325	150	325	-	2	88	-	15	228	-
7th Ave E (Signal Control)	EB	525	225	525	-	19	148	-	90	326	-
	WB	550	225	550	-	68	121	-	142	240	-
	NB	300	175	300	300	68	103	20	136	195	53
	SB	300	150	300	-	24	132	-	76	258	-
10th Ave E (Thru-Stop)	EB	350	-	350	-	-	35	-	-	64	-
	WB	1150	-	1150	-	-	39	-	-	75	-
	NB	500	500	500	-	24	0	-	54	7	-
	SB	725	675	725	-	6	2	-	26	16	-

[1] Queue for the movements taken from SimTraffic reports (60 min run)

[2] Thru Lane storage is taken as the distance to the prior intersection

3.1.5 SAFETY ANALYSIS

Crash data and traffic volume data were collected and analyzed for intersections along the corridor. Existing average daily traffic volumes were taken from NDDOT traffic volumes maps. The five intersections identified and evaluated along the 9th Street corridor include:

- 10th Avenue East (Through-stop)
- 7th Avenue East (Signal)
- 4th Avenue East (Signal)
- Main Avenue (Signal)
- 7th Avenue Northeast (All-way stop)

The intersection at 12th Avenue Northeast was reconstructed in November 2017 as a single-lane roundabout. Previously, it was through-stop controlled. Between November 2017 and May 2019, a total of 5 crashes occurred at this intersection: 4 property damage only type crashes and 1 non-incapacitating injury type crash.

➥ *Crash Severity*

Crashes are generally divided into five severity levels. Each severity level is defined below:

- Fatal (K) – One or more deaths resulted due to injuries sustained from the crash, either at the scene or within 30 days of the crash.
- Incapacitating injury (A) – This is a severe injury that prevents continuation of normal activities such as a broken bone.
- Non-Incapacitating Injury (B) – This is an evident injury such as bruising, abrasions or minor lacerations, which do not incapacitate the individual.
- Possible Injury (C) – This is an injury that is claimed, reported, or indicated by behavior but without any obvious wound. This includes limping or a simple complaint of pain.
- Property Damage Only (PDO) – This is a crash that results in no injuries and only damage to property.

➥ *Observed Crash Rate and Critical Crash Rate*

One measure to assess the safety performance at intersections is the crash rate, which is displayed as the number of crashes per million entering vehicles (MEV). Severity crash rate applies a weighted average to crashes more severe in nature, i.e. fatal crashes have the highest weighted multiplier. The observed crash rate at an intersection can be compared to a statewide crash rate at similar type intersections to see if it is operating as is expected.

A critical crash rate comparison is considered to be a highly effective technique for identifying hazardous locations. The critical crash rate accounts for key variables such as design of the facility, type of intersection control, amount of exposure and the random nature of crashes. The concept suggests that if an observed crash rate is above the critical rate then the location is unsafe and there is a high probability that conditions at the site are contributing to the higher crash rate.

➥ *Safety Analysis and Results and Conclusions*

Crashes from the five-year time period June 1, 2014- May 31, 2019 were obtained from NDDOT. The five-year Minnesota state average crash rates for different roadway intersections and segments were obtained from MnDOT's 2015 Intersection and Segment Toolkit and are listed in **Table 3.6**. These averages include intersections statewide in Minnesota. The table shows that three intersections (7th Avenue East, 4th Avenue East, and Main Avenue) have observed crash rates above the critical crash rate. This indicates that these intersections have a crash issue that could be contributed to site specific conditions. **Table 3.7** lists serious and fatal crash rates for the five-year time period. The table shows that the intersection at 10th Avenue East has an observed serious (Incapacitating Injury) and fatal crash rate above the critical crash rate, which indicates the intersection could have site specific issues contributing to severe crashes.

Table 3.8 lists segment crash rates for the five-year time period. The table shows that the segment of 9th Street, from 13th Avenue East to 10th Avenue East, has an observed crash rate above the critical crash rate. This indicates that this roadway segment has a crash issue that could be contributed to site specific conditions.

Table 3.6: Intersection Total Crash Rates (June 2014 to May 2019)

9th Street E Intersection with	Total Number of Crashes	Crash Types					Daily Entering Volume	Observed Crash Rate (crashes/ MEV)	Average Crash Rate (crashes/ MEV)	Critical Crash Rate (crashes/ MEV)	Critical Index[1]
		PDO	C	B	A	K					
7th Ave NE	8	7	0	1	0	0	7,065	0.62	0.35	0.82	0.76
Main Ave	44	31	7	5	1	0	22,530	1.07	0.70	1.05	1.02
4th Ave E	23	18	3	2	0	0	11,450	1.10	0.52	0.94	1.17
7th Ave E	48	37	4	6	1	0	16,130	1.63	0.52	0.87	1.87
10th Ave E	8	7	0	0	1	0	12,285	0.36	0.18	0.44	0.82

[1] A Critical Index greater than 1.0 indicates a crash problem

Table 3.7: Intersection Serious and Fatal Crash Rates (June 2014 - May 2019)

9th Street E Intersection with	Observed Crash Rate (crashes/ 100 MEV)	Average Crash Rate (crashes/ 100 MEV)	Critical Crash Rate (crashes/ 100 MEV)	Critical Index[1]
7th Ave NE	0.00	0.57	7.15	0.00
Main Ave	2.43	0.76	3.73	0.65
4th Ave E	0.00	0.42	4.64	0.00
7th Ave E	3.40	0.42	3.66	0.93
10th Ave E	4.46	0.33	4.10	1.09

[1] A Critical Index greater than 1.0 indicates a crash problem

Table 3.8: Segment Crash Rates (June 2014 - May 2019)

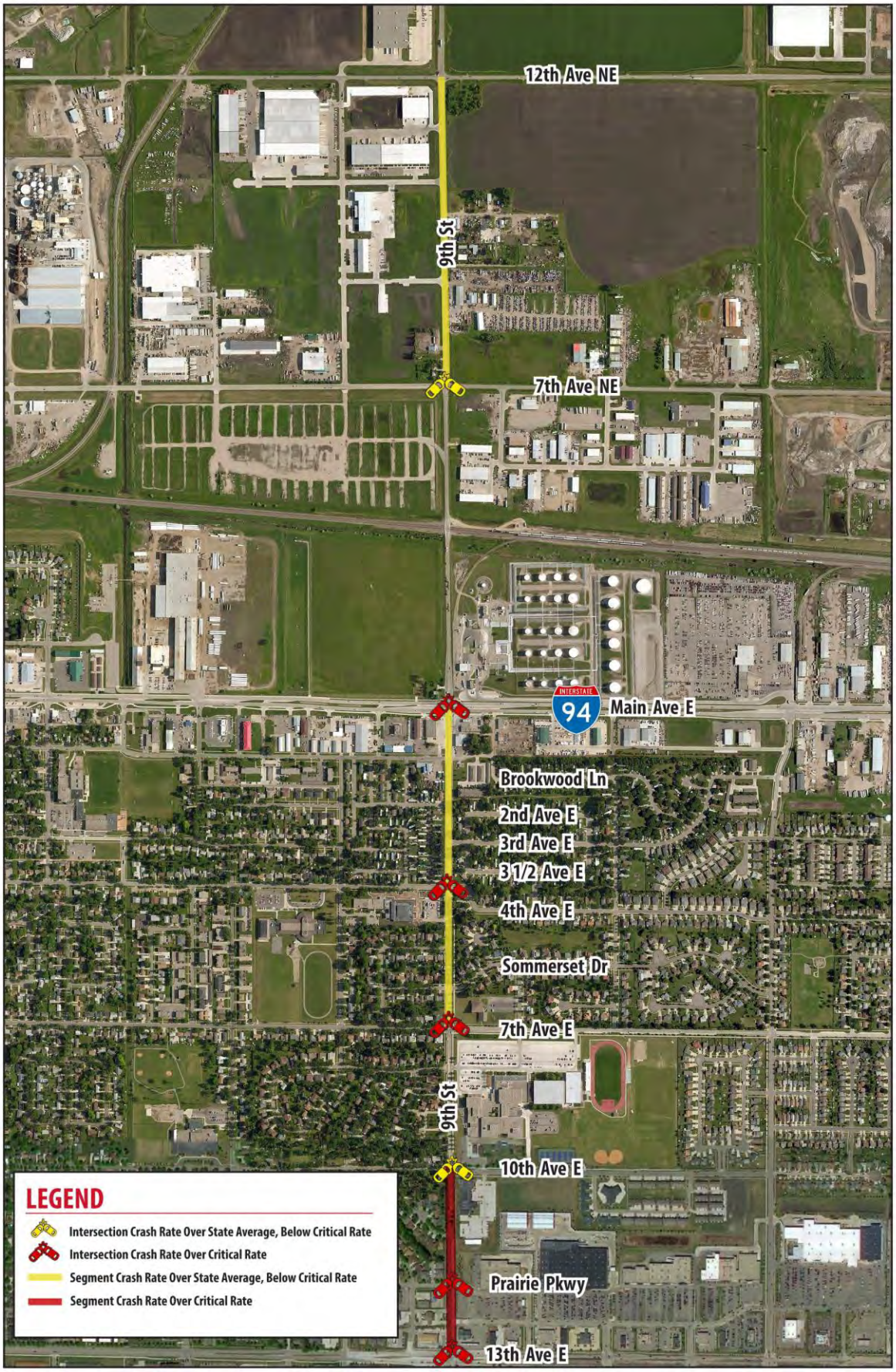
Segment	Length (miles)	Total Number of Crashes	Crash Types					AADT	Observed Crash Rate (crashes/ MVMT)	Average Crash Rate (crashes/ MVMT)	Critical Crash Rate (crashes/ MVMT)	Critical Index[1]
			PDO	C	B	A	K					
9th St E, 12th Ave NE to 7th Ave NE	0.48	1	1	0	0	0	0	2,825	0.40	0.31	1.42	0.28
9th St E, 7th Ave NE to Main Ave	0.48	1	1	0	0	0	0	4,125	0.28	0.31	1.20	0.23
9th St E, Main Ave to 4th Ave E	0.27	3	2	1	0	0	0	8,110	0.75	0.56	1.65	0.45
9th St E, 4th Ave E to 7th Ave E	0.21	4	3	0	1	0	0	8,310	1.26	0.56	1.80	0.70
9th St E, 7th Ave E to 10th Ave E	0.21	3	3	0	0	0	0	9,225	0.85	0.86	2.27	0.37
9th St E, 10th Ave E to 13th Ave E	0.27	18	14	3	0	1	0	12,205	2.99	0.86	1.92	1.56

[1] A Critical Index greater than 1.0 indicates a crash problem

Summary

The 9th Street corridor was analyzed for traffic operations and safety for the year 2019 with existing roadway conditions. Synchro software was used to model the 2019 existing conditions. Its companion software, Simtraffic, was used for reporting intersection delays and queuing. Traffic operations throughout the corridor were found to be acceptable with all intersections operating at LOS C or better during the AM and PM peak hours. Using the methodology identified in this report, a queuing issue was identified during the AM peak for the intersection at 4th Avenue East for the eastbound left-turn lane and through-lane. Safety analysis determined that the intersections at 7th Avenue East, 4th Avenue East, and Main Avenue have crash critical indexes over 1.0 which indicates crash issues that could be contributed to site specific conditions. The intersection at 10th Avenue East has a serious and fatal crash critical index over 1.0 which indicates a serious and fatal crash issue that could be contributed to site specific conditions. The roadway segment of 9th Street, from 13th Avenue East to 10th Avenue East, has a crash critical index over 1.0 which indicates a crash issue that could be contributed to site specific conditions.

Figure 3.3: 9th Street (13th Ave E to 12th Ave NE) Crash History (6/1/2014 to 5/31/2019)



3.2 Construction History

The available history of construction on the 9th Street corridor is shown in **Table 3.9.**

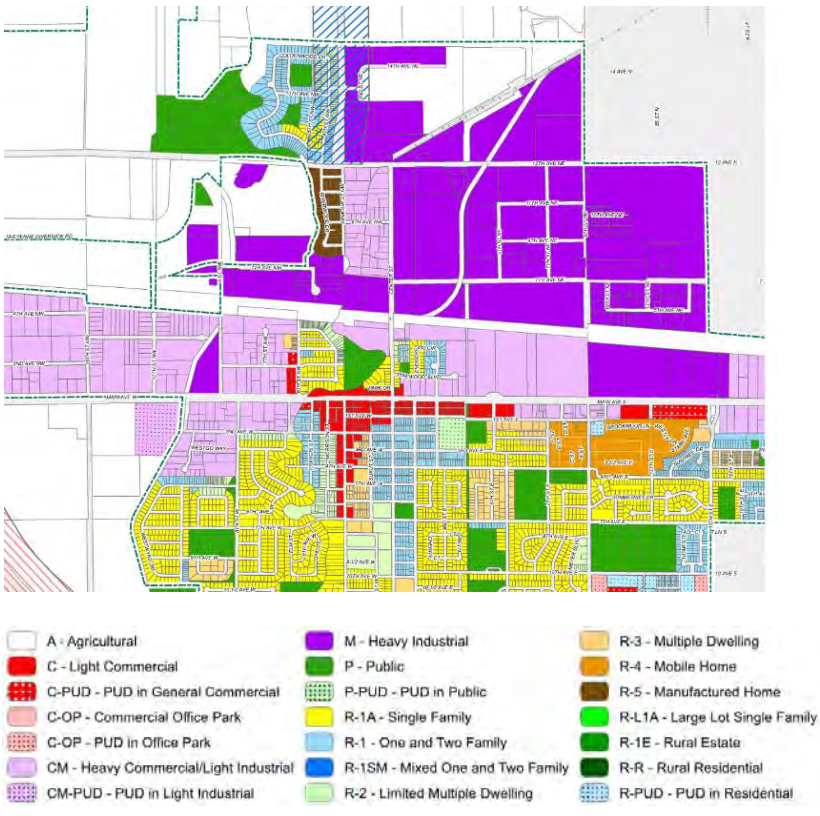
Table 3.9: Construction History

1997 Reconstruction	Pavement
13th Avenue East to Main Avenue	8” Concrete
1999 Reconstruction	**Pavement**
Main Avenue to 12th Avenue Northeast	10’ Asphalt
2012 Reconstruction	**Pavement**
1st Avenue East to north of Main Avenue	10” Concrete
2018 Reconstruction	**Pavement**
13th Avenue East to 7th Avenue East	8” Concrete

3.3 Land Use

Between 13th Avenue East and 4th Avenue East there is a mix of light commercial, single and multi-family dwelling and public/institutional use zoning areas. From 4th Avenue East to Main Avenue there is a mix of mobile home and heavy commercial property. Along the corridor from Main Avenue to 12th Avenue Northeast is predominately heavy industrial with a mix of light industrial. **Figure 3.4** shows the City’s zoning map along the 9th Street corridor.

Figure 3.4: West Fargo Zoning Map



3.4 Geometry

The horizontal alignment is straight on 9th Street, since it is a section line road. The vertical alignment is flat along the corridor.

3.5 Typical Section

The existing typical street sections found on the 9th Street corridor are shown in **Table 3.10.** All segments have sidewalks/paths on both sides of the street south of Main Avenue and there are no sidewalks/paths north of Main Avenue. There is no parking along the corridor.

Table 3.10: Typical Section

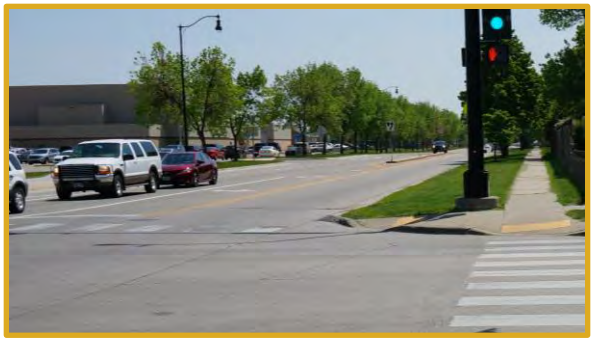
Note: Widths are from face of curb to face of curb.

Segment	Street Width	Notes
13th Avenue East to Meyer Blvd	67'-71'	• Multi-lane: 2 northbound lanes, 2 southbound lanes, turn lanes • 10' multi-use path on east side, 4.5' sidewalk on west side
Meyer Blvd to 7th Avenue East	54'	• 2+1+1: 2 northbound Lanes, 1 southbound lane, 1 shared left turn lane • 10' shared-use path on east side, 4.5' sidewalk on west side
7th Avenue East to 4th Avenue East	40'	• 3-lane: 1 northbound lane, 1 southbound lane, 1 shared left turn lane • 10' Shared-Use Path on east side, 4.5' Sidewalk on west side
4th Avenue East to 1st Avenue East	40'	• 3-lane: 1 northbound lane, 1 southbound lane, 1 shared left turn lane • 4.5 sidewalk on east and west side
1st Avenue East to Main Avenue East	58'	• 4-lane: 1 northbound lane, 2 turning lanes, 1 southbound lane • 4.5 sidewalk on east and west side
Main Avenue East to 7th Avenue East	26'	• 2-lane: 1 northbound lane, 1 southbound lane • No sidewalk
7th Avenue East to 12th Avenue Northeast	26'	• 2-lane: 1 northbound lane, 1 southbound lane • No sidewalk

3.6 Pavement Condition

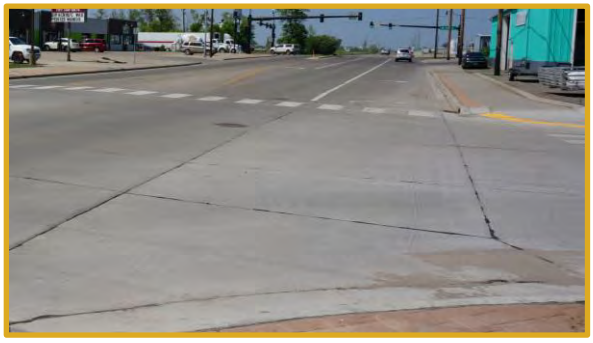
The following sections summarize the existing pavement condition within the 9th Street corridor. The information provided is based on visual observation and construction history data.

13th Avenue East to Meyer Boulevard | The existing pavement in this segment is concrete and in new condition. The 13th Avenue East to Meyer Boulevard segment was reconstructed in 2018. There are three driveways located in this section in new condition.

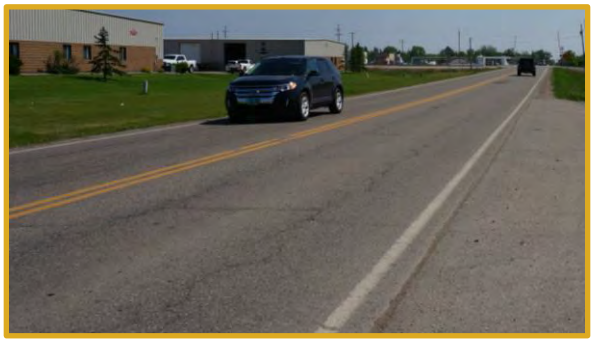


Meyer Boulevard to 7th Avenue East | The existing pavement in this segment is concrete. It is generally in average to below-average condition except for the easternmost northbound lane that was added in 2018 and is in new condition. There is one driveway located in this section in good condition.

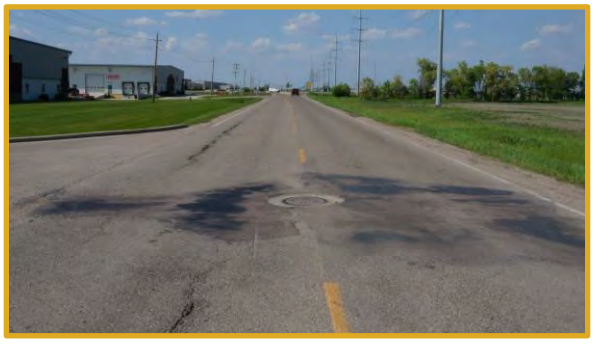
7th Avenue East to 1st Avenue East | The existing pavement in this section is concrete and was paved in 1997. It is generally in average to below-average condition, with areas of significant cracking and deterioration. There is one driveway located in this section in above average condition.



1st Avenue East to Main Avenue | The existing pavement in this section is concrete and was reconstructed in 2012. It is generally in above average to good condition. There are three driveways present in this section in good condition.



Main Avenue to 7th Avenue Northeast | The existing pavement in this section is asphalt with the exception of the 7th Avenue Northeast intersection. It is in below-average to poor condition, with areas throughout the stretch with particularly large longitudinal and lateral cracks in the asphalt. There are three driveways in this section of roadway in above average to good condition.



7th Avenue Northeast to 12th Avenue Northeast | The existing pavement in this section is asphalt. It is in poor to average condition, with areas throughout the stretch with some longitudinal and lateral cracks in the asphalt. There are 12 driveways in this section of roadway with concrete driveways in good condition while the gravel is poor to average condition.

3.7 Right of Way

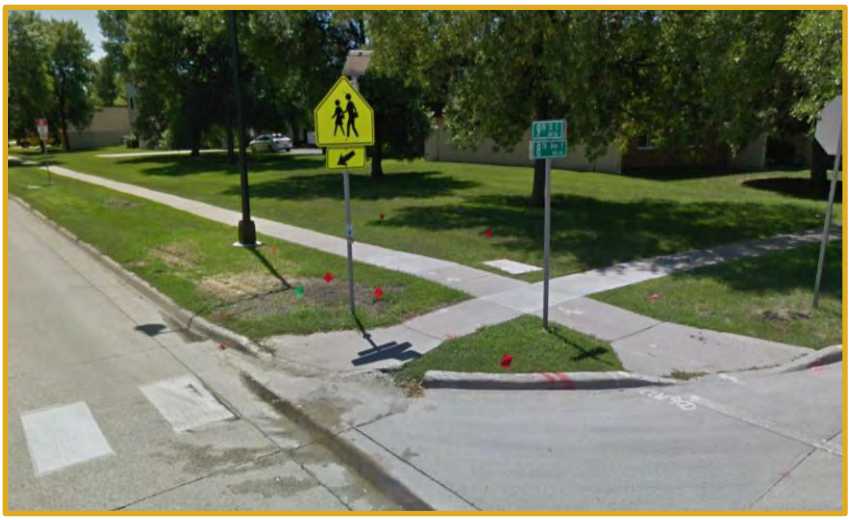
The existing right of way width, as measured from the centerline of 9th Street, varies throughout the corridor, as shown below in **Table 3.11**.

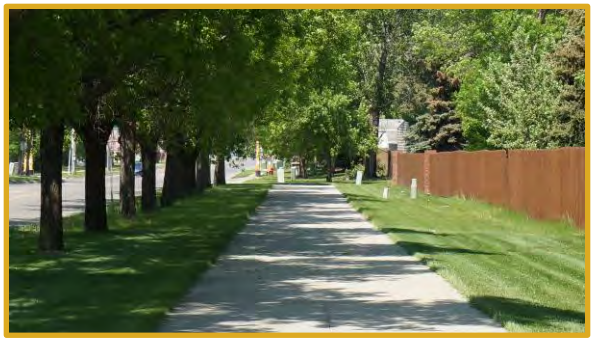
Table 3.11: Right of Way Width

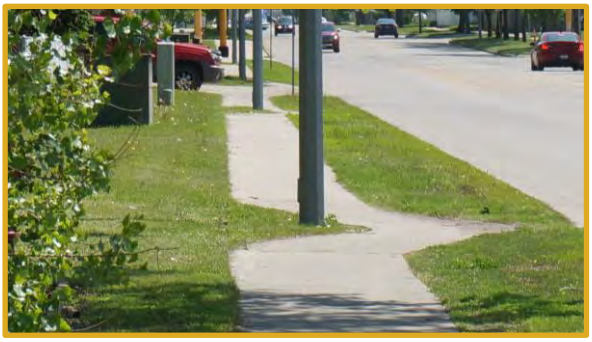
Segment	West ROW Width (typical)	East ROW Width (typical)
13th Avenue East to Frontage Rd	55’	50’
Frontage Rd to Prairie Pkwy	45’	50’
Prairie Pkwy to 10th Avenue East	40’	50’
10th Avenue East to 7th Avenue East	40’	40’
7th Avenue East to Police Station	40’	50’
Police Station to 4th Avenue East	40’	33’
4th Avenue East to 2nd Avenue East	33’	33’
2nd Avenue East to 1st Avenue East	33’	50’
1st Avenue East to Main Avenue East	33’	33’
Main Avenue to BNSF RR	60’	50’
BNSF RR to 7th Avenue Northeast	75’	75’
7th Avenue Northeast to Eagle Auto	33’	33’
Eagle Auto to 11th Avenue Northeast	60’	33’
11th Avenue Northeast to 12th Avenue Northeast	50’	33’

3.8 Pedestrian, Bicycle, and Transit Facilities

Figure 3.6 on Page 26 shows the Access Points and Sidewalk Use along the 9th Street corridor. The signals at the intersections with 13th Avenue East, 7th Avenue East, 4th Avenue East and Main Avenue East accommodate pedestrian crossings in each direction. In addition, there are pedestrian crosswalks at 10th Avenue East and 8th Avenue East that are signed with led flashing signs.







A 10-foot-wide **multi-use path** currently runs on the east side of 9th Street from 13th Avenue East to 4th Avenue East. The path continues from 4th Avenue East to Main Avenue as a 4.5-foot-wide pedestrian path. There is also currently a 4.5-foot-wide sidewalk that runs from Prairie Parkway to 1st Avenue East on the west side of 9th Street. There are no sidewalks from Main Avenue East to 12th Avenue Northeast.

Americans with Disabilities Act (ADA) compliance is followed in the newer sections of the corridor (13th Avenue East to Meyer Boulevard). Older sections of the corridor will need to be evaluated for compliance with current ADA standards (Meyer Boulevard to Main Avenue East). Pedestrian Access Route (PAR) widths at intersection ADA Ramp corners are not all compliant with current standards.

MATBUS operates one route in West Fargo that travels along or across the 9th Street corridor. Route 20 (Section C, D, F) – Crosses 9th Street at the 7th Avenue East, 4th Avenue East intersections and 13th Avenue East. This route has an existing stop on 7th Avenue East and on 4th Avenue East just off of 9th Street. **Figure 3.5** shows the route and designated bus stops.

Figure 3.5: MATBUS Route and Stops

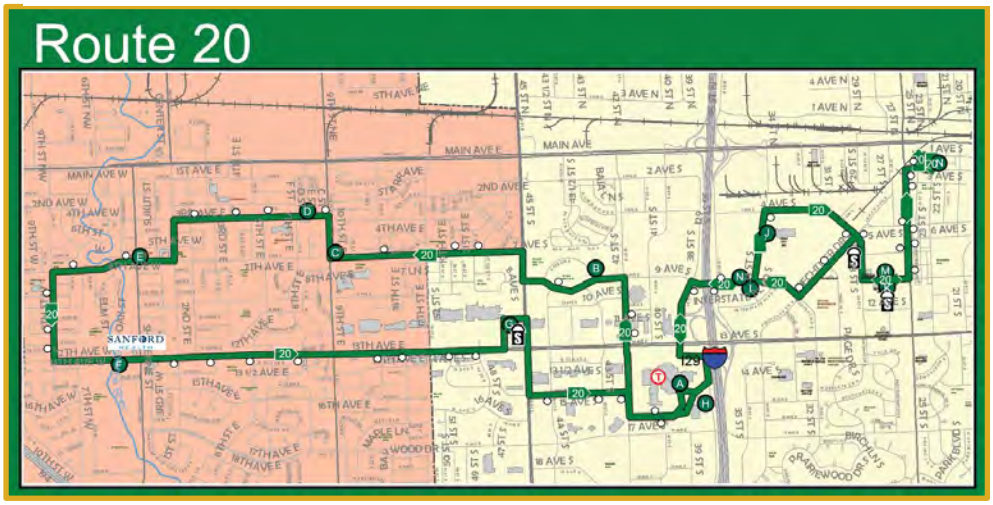
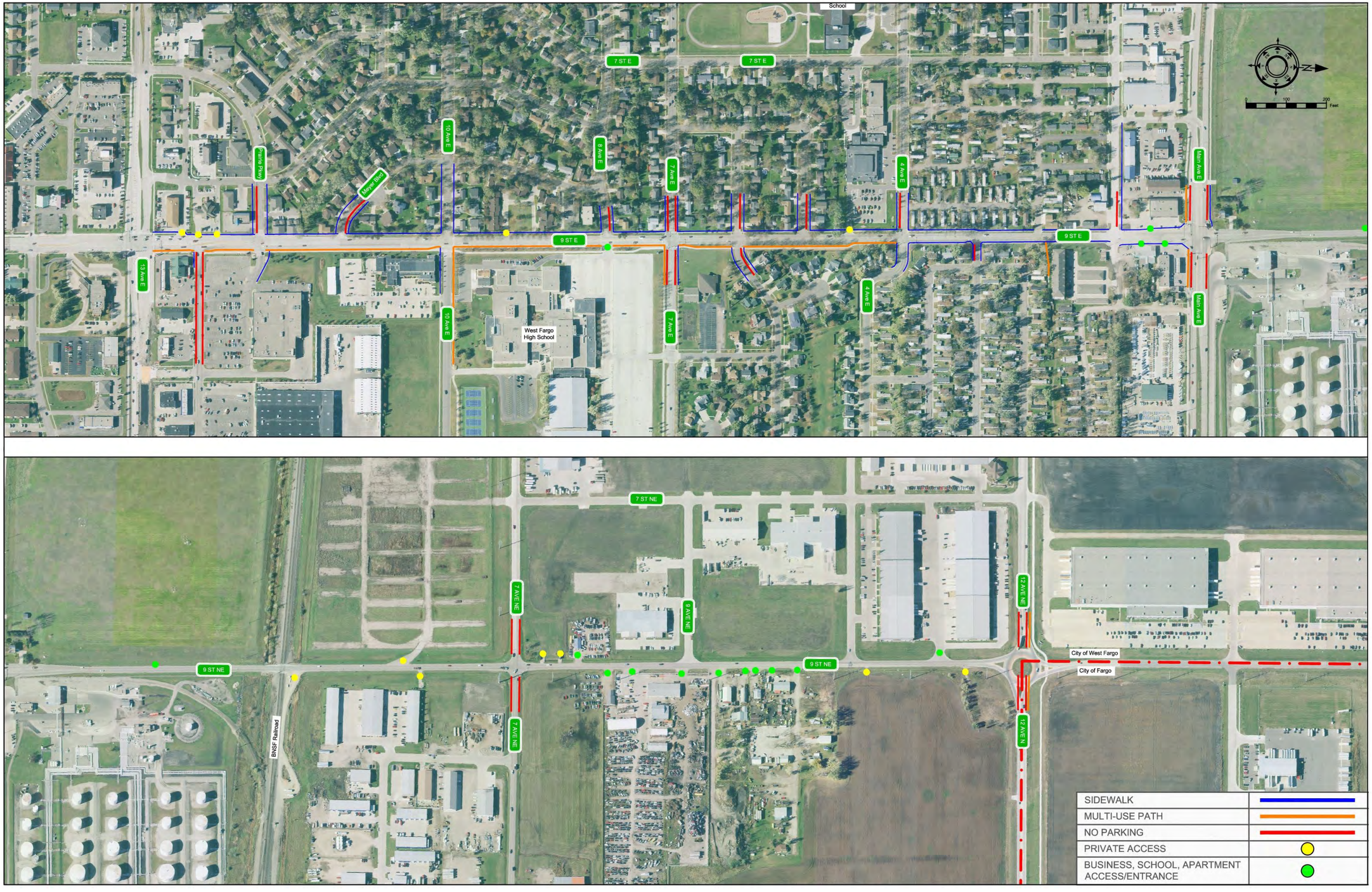


Figure 3.6: Access Points and Sidewalks along the 9th Street Corridor



3.9 Lighting

Lighting along the 9th Street corridor is summarized as follows:

- **13th Avenue to 7th Avenue East |** New streetlights are present on both the east and west side of the roadway.
- **7th Avenue East Intersection |** – Street lights are attached to signals at intersection.
- **7th Avenue East to 4th Avenue East |** Street lights are present on the both sides of the roadway.
- **4th Avenue East Intersection** – Street lights are attached to signals at intersection.
- **4th Avenue East to 2nd Avenue E |** Street lights are attached to OH power poles on west side of road. East side of road are independent light poles.
- **2nd Avenue East 1st Avenue East |** Street lights are present on west side of road.
- **1st Avenue East Main Avenue East |** Street lights are present on west side of road on independent poles. East side lights are located on overhead power poles.
- **Main Avenue East Intersection |** Streetlights are attached to signals at intersection.
- **7th Avenue Northeast Intersection |** Street lights are present on northwest and northeast quadrant of intersection.
- **9th Avenue Northeast Intersection |** A single streetlight is present on the northwest quadrant of the intersection.
- **11th Avenue Northeast Intersection |** A single streetlight is present on the southwest quadrant of the intersection.
- **12th Avenue Northeast Roundabout |** Entire roundabout is lit by streetlights.

3.10 Drainage/Storm Sewer

The storm sewer facilities within the corridor can be summarized as follows:

- **13th Avenue East to 10th Avenue East |** Storm sewer runs on the west side of the roadway with a 24-inch RCP pipe for this stretch of corridor. Storm Sewer is also present in the center of the roadway from 13th Avenue East to 10th Avenue East with RCP pipe that varies from 30 to 54 inches. Runoff is collected from adjacent streets and is moved along 9th Street eventually draining to an outfall in the Sheyenne River.

- **10th Avenue East to 4th Avenue East |** Storm sewer runs on the west side of the roadway with a 24-inch RCP pipe for this stretch of corridor. Storm Sewer is also present in the center of the roadway from Prairie Parkway to 10th Avenue East with RCP pipe that varies from 48 to 54 inches. Runoff is collected from adjacent residential properties and eventually drains along 9th Street to an outfall in the Sheyenne River.

- **4th Avenue East to Main Avenue East |** Storm sewer runs on both sides of the roadway with pipes that varies from 24 – 36-inch RCP pipe from 4th Avenue East to 1st Avenue East. Storm Sewer is also present in the center of the roadway from 4th Avenue East to 1st Avenue East with RCP pipe that is 60 inches. Runoff is collected from adjacent residential properties and eventually drains along 9th Street to Main Avenue that ends at an outfall in the Sheyenne River.

- **Main Avenue to 12th Avenue Northeast |** There are no storm sewer pipes along this stretch of roadway. There are multiple storm sewer crossings for this stretch of road, 54-inch RCP at 7th Avenue Northeast, 15-inch RCP at 11th Avenue Northeast and 15-inch RCP just to the north of Main Avenue intersection. There is also a storm sewer drain crossing 9th Street on the south side of the BNSF Railroad.

3.11 Utilities

3.11.1 SANITARY SEWER

The City sanitary sewer facilities within the corridor can be summarized as follows:

- **13th Avenue East to 7th Avenue East |** Sanitary sewer are intermittent though this segment. Sanitary sewer lines run along 9th Street from 13th Avenue East to Prairie Parkway and from 10th Avenue East to just south of 8th Avenue East. There is a Sanitary sewer 10" PVC Pipe crossing at 9th Street and 7th Avenue East intersection. Material is primarily polyvinyl chloride pipe (PVC) with an 8-inch size.

- **7th Avenue East to Main Avenue |** A sanitary sewer line crosses 9th Street at 4th Avenue East with an 8-inch ACP (Asbestos-Cement) pipe. The second crossing is at the intersection of 1st Avenue East with an 8-inch PVC pipe.

- **Main Avenue to 12th Avenue Northeast |** There are no sanitary sewer lines that run along 9th Street. There is one 12-inch PVC line that crosses at 7th Avenue Northeast.

3.11.2 WATERMAIN

The watermain facilities within the corridor can be summarized as follows:

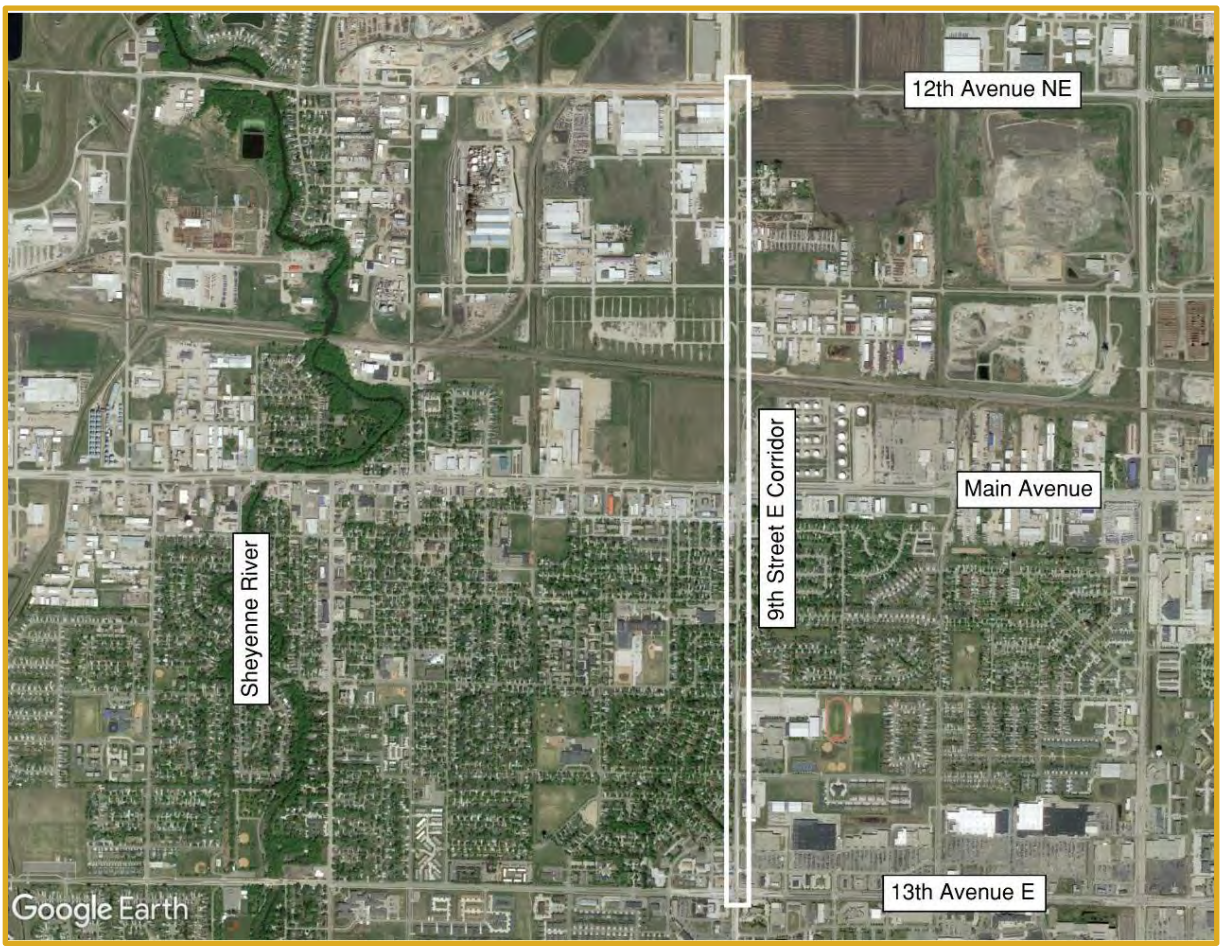
- **13th Avenue East to 10th Avenue East |** Water lines run along 9th Street from 13th Avenue East to 10th Avenue East, in the center of the roadway. Water main crossings of are present at each intersection. Material is a mix of C900 and PVC pipe, with sizes ranging from 6 to 12 inches.

- **10th Avenue East to Main Avenue East |** Water main runs along 9th Street from 10th Avenue East to Main Avenue in the center of the roadway. Water line crossings are present at all intersections except 2nd Avenue East. Material is all PVC pipe, with sizes ranging from 8 to 12 inches. There is a 16-inch PVC Pipe that crosses at Main Avenue East.

- **Main Avenue to 7th Avenue Northeast |**A 12-inch PVC run in the middle of 9th Street roadway. A 12-inch PVC crossing at 7th Avenue Northeast just south of the intersection.

- **7th Avenue Northeast to 12th Avenue Northeast |** New watermain is proposed for this segment in 2020. An existing 8-inch PVC transitions to a 12-inch PVC on the west side of the roadway from 11th Avenue Northeast to 12th Avenue Northeast.

Figure 3.7: Drainage Eventually Works its Way to the Sheyenne River



3.11.3 OTHER PUBLIC AND PRIVATE UTILITIES

Several overhead and underground public and private utilities are present within the corridor, as summarized below. The information provided is based on visual observation and available data.

- **Overhead facilities |** Xcel operates overhead power lines that run along the west right of way from 4th Avenue East to 2nd Avenue East and crosses over to the east side of 9th Street from 2nd Avenue East to Main Avenue. Minnkota Power Co-op has an overhead electric transmission line on the east side of 9th Street from 7th Avenue Northeast to 12th Avenue Northeast.

- **Underground facilities |** Several types of underground utilities are known to exist within the corridor. Exact location, ownership, and type of these facilities is undetermined. Some of the underground facilities believed to be present include:
  - Electric lines (Cass County Electric, Minnkota Power Co-op, Xcel)
  - Gas lines (Xcel, MDU)
  - Cable and/or fiber optic lines (Midcontinent Communications, Cable One, Century Link, Dakota Carrier Network, Enventis)

3.12 Railroad Crossings

One railroad line crosses 9th Street within the study corridor area:

3.12.1 BURLINGTON NORTHERN SANTA FE RAILWAY (BNSF)

- 2-track crossing located just North of Main Street intersection
- USDOT Crossing No. 071009F
- Approximately 68 trains per day

The crossing is signalized and gated. A photo of the crossing can be found to the right.

There have been two accidents at this crossing since 2005, according to the data provided on the Federal Railroad Administration's database. Of those two accidents, one resulted in a fatality.

BNSF RR Crossing North of Main Street Intersection

3.13 Trees and Landscaping

The purpose of the Street Tree Inventory is intended to be used as a resource while planning for improvements during the 9th Street corridor study, to help determine proposed corridor improvement impacts on the existing street trees. This report is not a recommendation for street tree removals.

The City Forestry Department has maintained and nurtured these trees to become an aesthetic, safe and integral part of the existing corridor. Impacts on existing street trees should be carefully evaluated before recommending removal and the City Forester and the community should be an integral part of those discussions. Community 'Ownership' of existing trees is common and often very sensitive issue to adjacent property owners and the neighborhood.

3.13.1 EXISTING STREET TREES

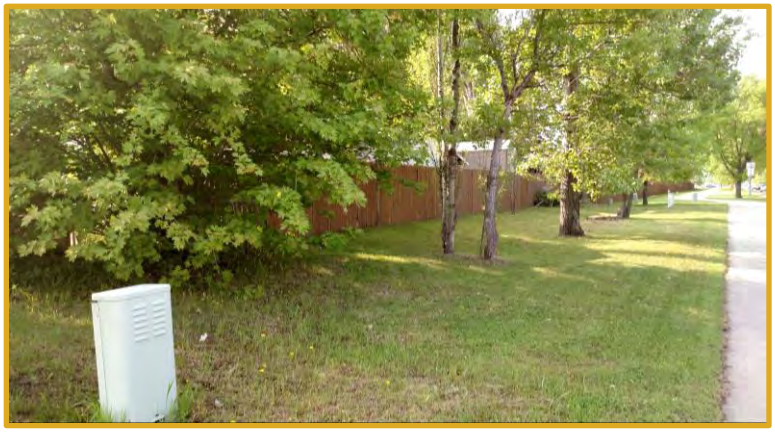
The 9th Street corridor from 13th Avenue East to 12th Avenue Northeast consists of 94 street trees. Species consist of 81 Ash/Ash hybrid street trees, 10 Littleleaf Linden and 3 Spring Snow Crab. The majority of the street trees are located in suitably wide boulevards, which has contributed to their overall good condition.

The street trees appear to be in good to very good condition, with 12 trees in moderate

Existing boulevard trees are in overall good condition in wide boulevards but are overwhelmingly Ash Trees.

condition. Sizes varies from 3" to 18" DBH (diameter at breast height), with the average ranging from 9" to 14" DBH (Diameter at Breast Height).

Existing trees act as a buffer to the adjacent mobile home community. Realigning the multi-use path will require the removal of some of these trees.



The section of the corridor south of 4th Avenue East, along the east side of 9th Street for approximately 100 yards, there are several Poplar, Green Ash and Maple that appear to have been planted by the adjacent mobile home community, as a planting buffer. These trees are not included in the inventory.

Ash make up 81 of the 94 street trees in the study corridor. Ash were very good street trees due to their suitability to our soils, climate and urban environmental conditions, and were commonly utilized as the replacement tree for the commonly planted American Elm street tree from the 70's until recently.

Ash are no longer recommended for use as street trees because of the Emerald Ash Borer, an invasive species from north-eastern Asia. Although Emerald Ash Borer has not been found in the local region, once it is, the borer will devastate the Ash species. It is a current, common practice to use opportunities such as roadway improvements, poor condition, inappropriate tree for the location, etc. to remove and replace with another tree species, such as Elm, Oak, Hackberry, Linden, etc. to reduce the eventual burden on municipalities when mass Ash tree removal will be done.

Chemical treatment to Ash trees can be applied to trees deemed important enough to warrant continued maintenance. However, once chemical applications are discontinued, the tree will eventually succumb to the borer.

The remainder of the corridor has few street trees due to insufficient, if any boulevards. There are a few locations where volunteer trees have established, or the adjacent property Owners have planted trees. These trees are not counted as existing street trees.

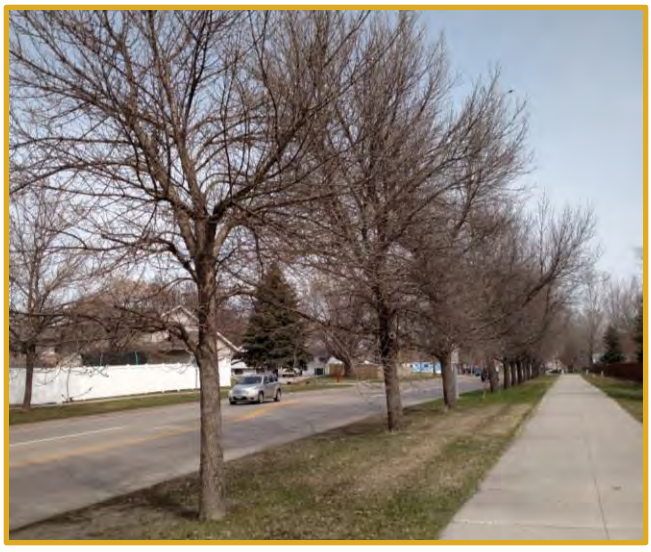


Figure 3.8: Trees along the 9th Street Corridor

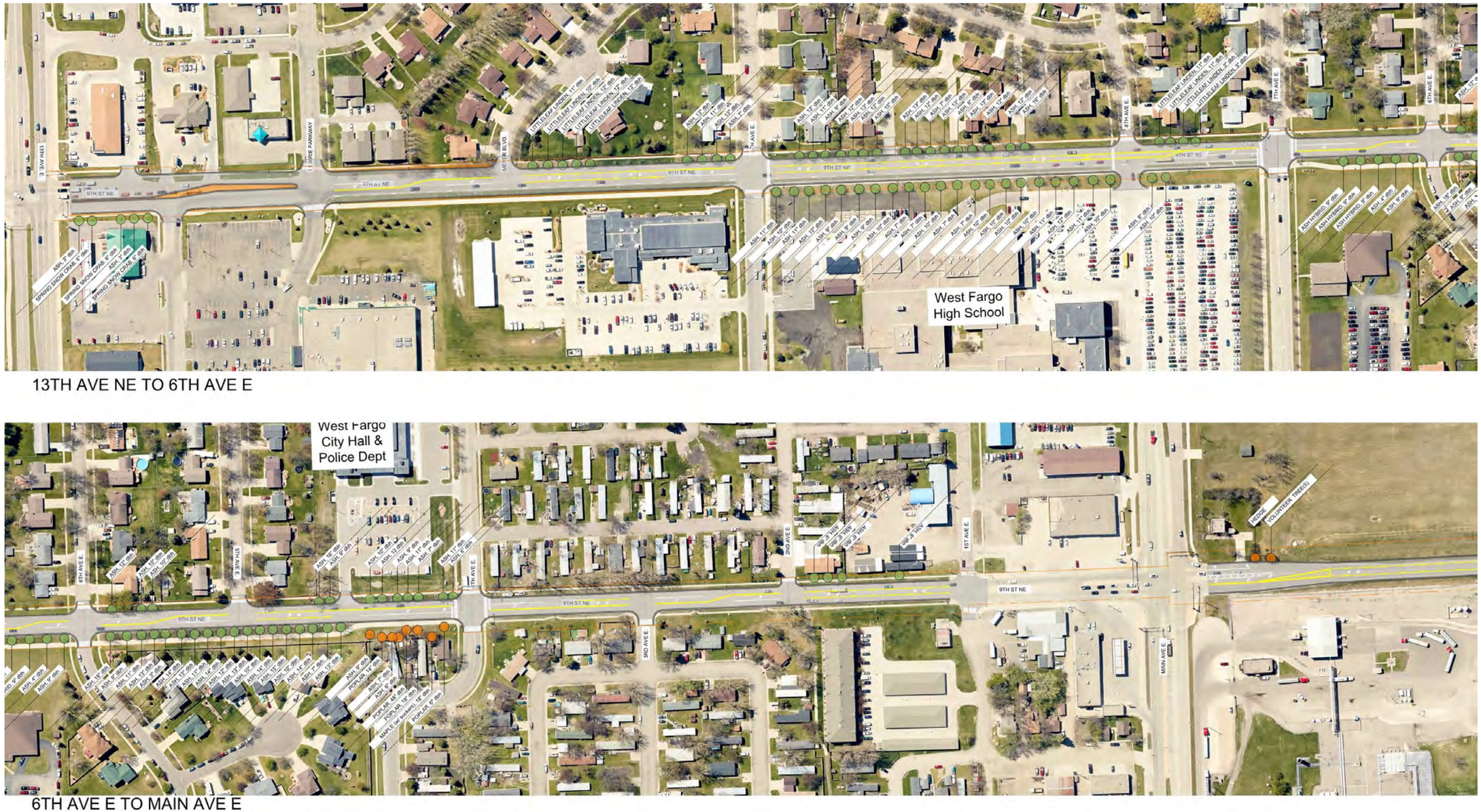


Figure 3.9: Trees along the 9th Street Corridor

MAIN AVE E TO 7TH AVE E

7TH AVE E TO 12TH AVE E

SYMBOL LEGEND

STREET TREES 1 (94 TOTAL)
ASH- 81
LITTLELEAF LINDEN- 10
SPRING SNOW CRAB- 3

MISC. TREES 2

N

100' 0 100' 200'
Scale Feet

Conceptual - Not for Construction

4.0 FUTURE 2045 NO BUILD CONDITIONS

4.1 Future 2045 No-Build Conditions

2045 was chosen as the analysis year so that analysis from this study will be consistent with regional planning Future 2045 no-build conditions are represented by the 2045 forecasted turning movement volumes and existing roadway geometrics. 2045 was chosen as the analysis year to be consistent with regional planning.

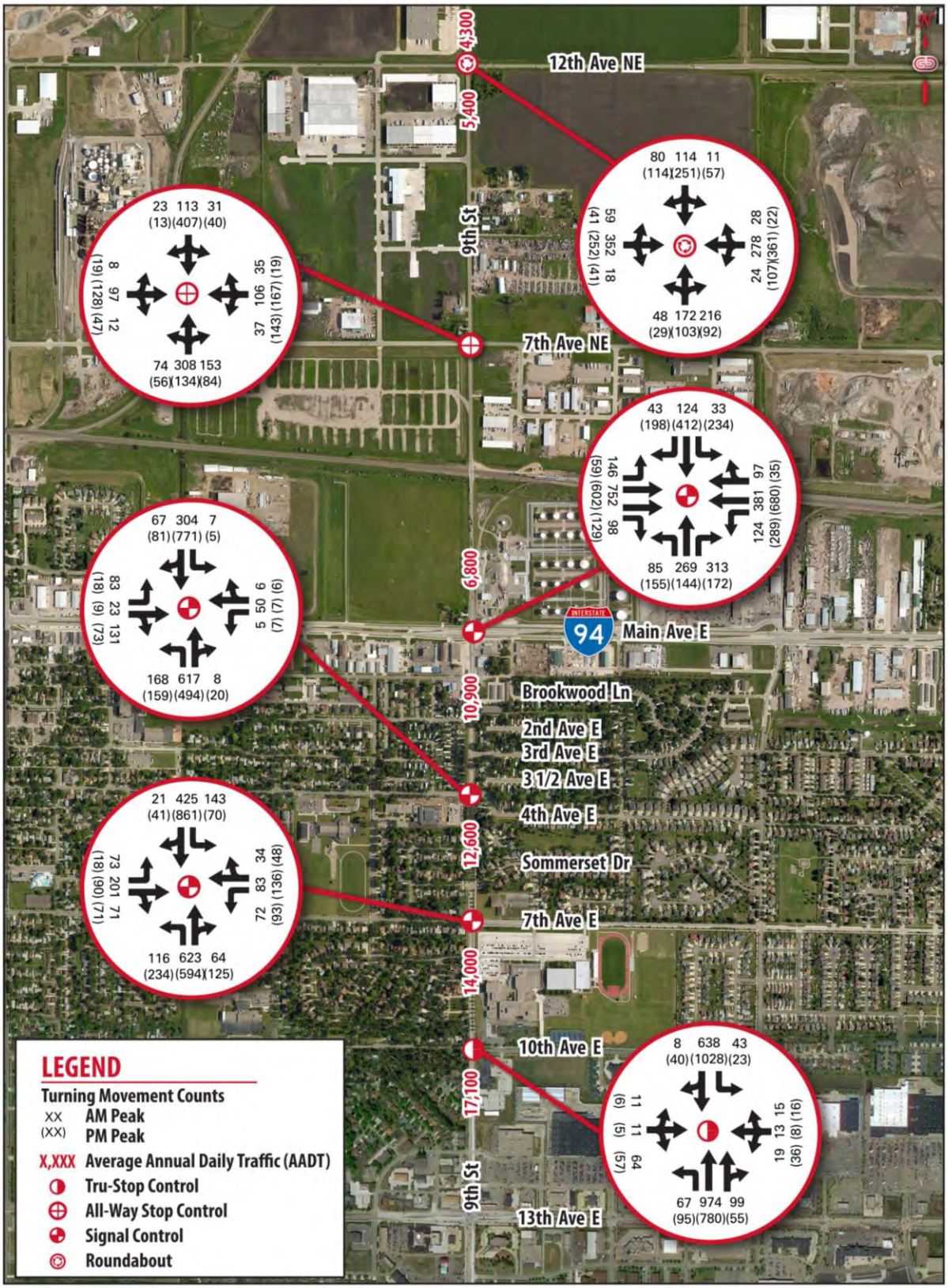
Using the 2018 and 2045 AADT volumes obtained from the Fargo-Moorhead Metro COG, an annual growth rate was calculated for each section of the corridor and the cross streets. This growth rate was applied to the 2019 existing turning movement counts to determine the future 2045 turning movement volumes. **Table 4.1** displays the calculated growth rates for each section. **Figure 4.1** displays the 2045 projected AM and PM turning movement volumes, 2045 segment AADTs and existing lane configuration for the intersections along the corridor. Supporting data for the traffic analysis can be found in **Appendix D.**

Table 4.1: Corridor Growth Rates

Roadway	Segment	Annual Traffic Growth Rate
9th Street E	13th Ave E to 10th Ave E	1.49%
	10th Ave E to 7th Ave E	1.93%
	7th Ave E to 4th Ave E	1.91%
	4th Ave E to Main Ave	1.27%
	Main Ave to 7th Ave NE	2.40%
	7th Ave NE to 12th Ave NE	3.38%
10th Avenue E	West of 9th St E	0.00%
	East of 9th St E	0.00%

Roadway	Segment	Annual Traffic Growth Rate
7th Avenue E	West of 9th St E	0.00%
	East of 9th St E	0.00%
4th Avenue E	West of 9th St E	0.00%
	East of 9th St E	0.00%
Main Avenue	West of 9th St E	0.29%
	East of 9th St E	0.29%
7th Avenue NE	West of 9th St E	0.19%
	East of 9th St E	0.18%
12th Avenue NE	West of 9th St E	0.64%
	East of 9th St E	0.41%

Figure 4.1: 2045 No-Build Traffic Volumes 9th Street (13th Ave E to 12th Ave NE)



4.2 Future 2045 No-Build Traffic Operations Analysis Results and Conclusions

Methodology for operational and queuing analysis was the same as that described in the *Existing Conditions Report* for the 9th Street Corridor Study. The geometric characteristics for the 2045 no-build models are the same as the 2019 existing conditions. Updated, projected 2045 turning movement volumes were input and model optimizations were completed for signal timings.

Table 4.2 displays a summary of AM and PM peak hour intersection delay by approach and by intersection, as well as their respective LOS. **Figure 4.2** displays the AM and PM peak hour LOS by movement and by intersection. The reported approach and intersection delay were taken from SimTraffic and is based on the average of ten, 60-minute simulation runs. Note that intersection LOS is not defined by the HCM for through-stop control intersections. This is because the minor approaches with relatively low percentages of overall traffic could experience excessive delay, while the mainline could experience little or no delay. The result likely would be low overall intersection delay, which on its face would indicate acceptable operations, when individual stop-controlled movements could be failing.

All intersections operate at LOS D or better during the AM and PM Peak for the 2045 no-build conditions. During the AM peak at 10th Avenue East, the WB approach is operating at a LOS E with a delay of 48 sec/vehicle. During the PM peak at 10th Avenue East, the WB approach is operating at LOS F with a delay of 126 sec/vehicle, and the EB approach is operating at a LOS E with a delay of 39 sec/vehicle. During the PM peak at Main Avenue, the SB approach is operating at a LOS E with a delay of 54 sec/vehicle.

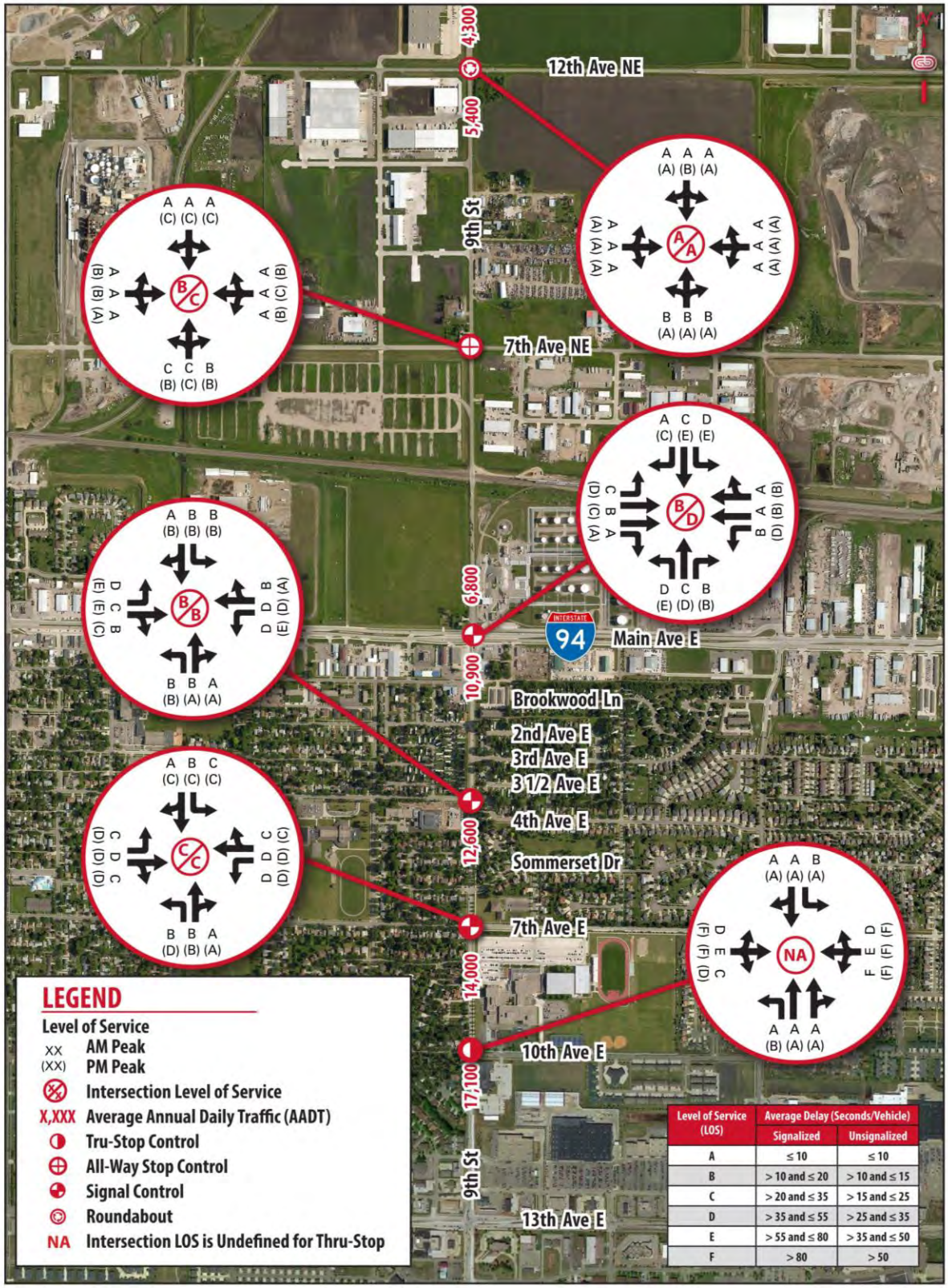
Table 4.2: 2045 No-Build AM and PM Level of Service and Delay[1]

Intersection			AM Peak Hour				PM Peak Hour			
Control	Location	Approach	LOS by Approach (Sec/Veh)		LOS by Intersection (Sec/Veh)		LOS by Approach (Sec/Veh)		LOS by Intersection (Sec/Veh)	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Single - Lane Roundabout	12th Ave NE	NB	11	B	8	A	7	A	8	A
		WB	6	A			8	A		
		SB	5	A			10	B		
		EB	7	A			7	A		
All-Way Stop	7th Ave NE	NB	16	C	12	B	14	B	18	C
		WB	8	A			15	B		
		SB	8	A			25	C		
		EB	8	A			11	B		
Signalized	Main Ave	NB	21	C	16	B	40	D	36	D
		WB	10	B			25	C		
		SB	22	C			54	E		
		EB	16	B			29	C		
Signalized	4th Ave E	NB	12	B	14	B	8	A	14	B
		WB	34	C			41	D		
		SB	10	B			15	B		
		EB	25	C			35	C		
Signalized	7th Ave E	NB	15	B	21	C	20	B	27	C
		WB	35	C			40	D		
		SB	14	B			27	C		
		EB	39	D			43	D		
Thru-Stop	10th Ave E	NB	1	A	4	N/A[2]	2	A	7	N/A[2]
		WB	48	E			126	F		
		SB	2	A			3	A		
		EB	23	C			39	E		

[1] Delay for all movements taken from SimTraffic reports.

[2] Intersection LOS is undefined for two-way stop control

Figure 4.2: 2045 No-Build Level of Service 9th Street (13th Ave E to 12th Ave NE)



4.3 Existing Queuing Analysis Results and Conclusions

Tables 4.3 and 4.4 display a summary of storage lengths, average queues lengths, and 95th percentile modeled queue lengths for the 2045 no-build AM and PM peak Hours, respectively. The following criteria was used to identify "queuing issues" for particularly movements. A queueing issue was identified if any of the three conditions were met at a signalized intersection:

- Condition 1: 95th percentile queue length exceeds storage length and the movements operate at LOS E or LOS F
- Condition 2: Average queue length exceeds storage length
- Condition 3: 95th percentile queue length blocks upstream full access intersection

And at a stop-controlled intersection if the following was met:

- Condition 4: 95th percentile queue length exceeds 500 feet on a stop-controlled approach

Based on this methodology, the following queuing issues were identified:

- During the PM peak, the 95th percentile queue exceeds the storage length for 9th Street southbound left-turn lane at the intersection with Main Avenue. This movement is operating at LOS E. This corresponds to a Condition 1 queuing issue.

Queue lengths exceeding storage lengths are highlighted red in **Tables 4.3 and 4.4.**

Table 4.3: 2045 No-Build Am Queuing Summary

Scenario		Distance to Upstream Street (ft)	2045 No Build Conditions								
			Storage (ft)			Average Queue (ft)[1]			95th % Queue (ft)[1]		
Intersection	Appr		LT	TH	RT	LT	TH	RT	LT	TH	RT
12th Ave NE (Single-Lane Roundabout)	EB	800	-	800	-	-	32	-	-	84	-
	WB	1500	-	1500	-	-	33	-	-	74	-
	NB	800	-	800	-	-	67	-	-	132	-
	SB	1000	-	1000	-	-	30	-	-	69	-
7th Ave NE (All-Way Stop)	EB	800	-	800	-	-	44	-	-	71	-
	WB	500	-	500	-	-	51	-	-	83	-
	NB	2500	-	2500	-	-	124	-	-	208	-
	SB	2500	-	2500	-	-	45	-	-	72	-
Main Ave (Signal Control)	EB	500	275	500	250	72	146	25	137	223	50
	WB	1300	400	1300	1300	44	55	37	83	105	86
	NB	350	250	350	325	55	130	84	117	220	157
	SB	2500	200	2500	150	25	60	20	63	110	55
4th Ave E (Signal Control)	EB	120	150	120	-	60	64	-	112	121	-
	WB	800	100	800	-	4	42	-	22	83	-
	NB	475	200	475	-	92	200	-	209	349	-
	SB	325	150	325	-	5	94	-	28	188	-
7th Ave E (Signal Control)	EB	525	225	525	-	47	161	-	96	266	-
	WB	550	225	550	-	42	62	-	85	128	-
	NB	300	175	300	300	78	203	20	189	306	50
	SB	300	150	300	-	73	113	-	145	209	-
10th Ave E (Thru-Stop)	EB	350	-	350	-	-	46	-	-	92	-
	WB	1150	-	1150	-	-	39	-	-	89	-
	NB	500	500	500	-	25	2	-	54	16	-
	SB	725	675	725	-	23	0	-	54	4	-

[1] Queue for the movements taken from SimTraffic reports (60 min run)

[2] Thru Lane storage is taken as the distance to the prior intersection

Table 4.4: 2045 No-Build PM Queuing Summary

Scenario		Distance to Upstream Street (ft)	2045 No Build Conditions								
			Storage (ft)			Average Queue (ft)[1]			95th % Queue (ft)[1]		
Intersection	Appr		LT	TH	RT	LT	TH	RT	LT	TH	RT
12th Ave NE (Single-Lane Roundabout)	EB	800	-	800	-	-	48	-	-	93	-
	WB	1500	-	1500	-	-	51	-	-	124	-
	NB	800	-	800	-	-	29	-	-	62	-
	SB	1000	-	1000	-	-	84	-	-	166	-
7th Ave NE (All-Way Stop)	EB	800	-	800	-	-	65	-	-	110	-
	WB	500	-	500	-	-	93	-	-	169	-
	NB	2500	-	2500	-	-	92	-	-	152	-
	SB	2500	-	2500	-	-	135	-	-	262	-
Main Ave (Signal Control)	EB	500	275	500	250	42	196	40	100	277	76
	WB	300	400	1300	1300	133	120	107	231	191	184
	NB	350	250	350	325	125	93	48	213	176	98
	SB	2500	200	2500	150	189	356	139	279	449	231
4th Ave E (Signal Control)	EB	120	150	120	-	20	56	-	54	107	-
	WB	800	100	800	-	8	11	-	29	40	-
	NB	475	200	475	-	73	90	-	138	212	-
	SB	325	150	325	-	6	260	-	53	409	-
7th Ave E (Signal Control)	EB	525	225	525	-	17	105	-	48	185	-
	WB	550	225	550	-	58	105	-	119	191	-
	NB	300	175	300	300	154	196	30	234	309	63
	SB	300	150	300	-	63	269	-	167	309	-
10th Ave E (Thru-Stop)	EB	350	-	350	-	-	49	-	-	98	-
	WB	1150	-	1150	-	-	78	-	-	183	-
	NB	500	500	500	-	41	0	-	81	6	-
	SB	725	675	725	-	14	2	-	39	13	-

[1] Queue for the movements taken from SimTraffic reports (60 min run)

[2] Thru Lane storage is taken as the distance to the prior intersection

4.4 Future 2045 No-Build Conditions Summary

The 9th Street corridor was analyzed for traffic operations for 2045 no-build conditions. All intersections operate at LOS D or better during the AM and PM peak hours. During the AM peak at 10th Avenue East, the WB approach is operating at a LOS E. During the PM peak at 10th Avenue East, the WB approach is operating at LOS F, and the EB approach is operating at LOS E. During the PM peak at Main Avenue, the SB approach is operating at a LOS E. Using the methodology identified in this report, a queuing issue was identified during the PM peak for the southbound left-turn lane of 9th Street at the intersection with Main Avenue.

5.0 ISSUE IDENTIFICATION AND NEEDS ASSESSMENT

The following issues have been identified along the corridor based on factors including stakeholder input, public input, existing conditions, and the 2045 projected traffic volumes. The study review committee met on several occasions to discuss the existing conditions, public input received, and streetscaping. Public input was gathered through open house meetings, formal presentations, focused audience pop-ups, and online surveys.

5.1 Traffic Operations and Roadway Geometrics

Of the six intersections evaluated along the corridor, all provided an acceptable Level of Service (LOS) of C or above in the existing and future condition analysis except the Main Avenue intersection. There are isolated LOS D and LOS E that can be improved with updated traffic signal systems and timing.

The rural two-lane section north of Main Avenue East does not accommodate turning movements, causing delay especially with heavier truck traffic in the area.

5.2 Traffic Safety and Access Management

The crash analysis performed indicated five intersections (13th Avenue East, Prairie Parkway, 7th Avenue East, 4th Avenue East, and Main Avenue East) have observed crash rates above the critical crash rate, indicating a crash problem at those intersections. The 10th Avenue East intersection has a serious and critical crash rate index over 1.0 indicating the crashes at this intersection have been more severe.

The segment from 13th Avenue East to 10th Avenue East also has an observed crash rate above the critical crash rate. This segment has the highest AADT of the study area. Between those two intersections there are seven access points. From 13th Avenue East to Prairie Parkway the center median extends northward and ends just before the Prairie Parkway intersection.

Example of ¾ Median Restricting Left Turns from Access Points

If accesses cannot be closed, an alternative to address safety concerns is to install a median barrier (full-median or ¾ median) so that traffic coming out of these access points are not making left turns across multiple lanes of traffic. An installation of some type of median would cause traffic to divert to other intersections where there are fewer turning conflicts.

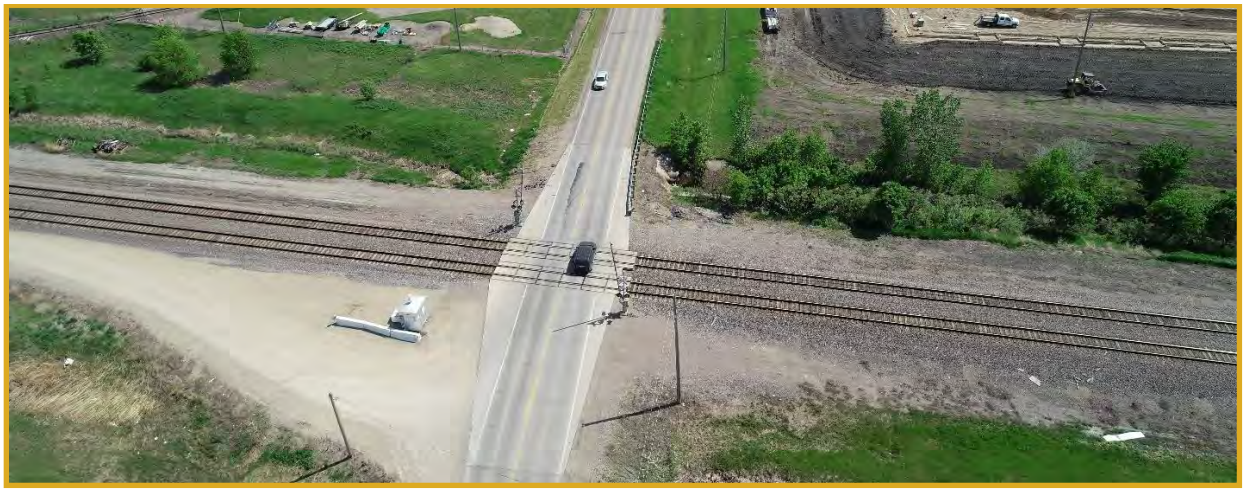
Reducing the amount of access points in certain areas on the 9th Street corridor would be another safety measure. The City of West Fargo's construction access code states that in no case will the aggregate width of the driveway(s) exceed ½ the width of that property. The area of concern is in Segment 3 of the corridor (Main Avenue to 12th Avenue Northeast). A reduction of access points in this stretch of road would help alleviate unnecessary confusion of where drivers are coming in and out of the properties, most notably on the east side of the road.

Speeds were not studied along the corridor; however, speed plays a factor in the severity of every crash and speed reduction should be evaluated as a safety measure. Different speed reduction measures taken to slow or "calm" traffic such as replacing an open center shared left turn lane with medians and turn bays will slow the speeds of through traffic as the corridor feels smaller and makes vehicle drivers naturally reduce speed. Adjusting speed limits throughout the corridor and patrolling and enforcing the speed limits can also help with speed reduction.

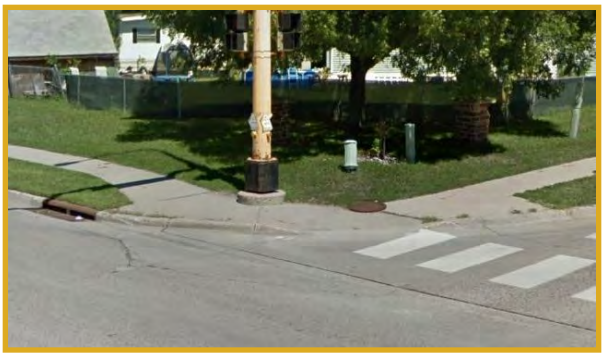
5.3 BNSF Railroad Crossing

The BNSF Railroad crossing north of Main Avenue should be considered for quiet zone improvements. With the addition of a path being installed on the west side of the tracks, quiet zone compliance could be implemented as a stand-alone project or as part of a larger project on 9th Street. This location has not been evaluated in a quiet zone study to date. Future improvements should be reflective of the increased pedestrian accessibility proposed on 9th Street.

The existing exposure factor (AADT X Trains/Day) for this crossing is over 280,000 and could increase to over 460,000 by the year 2045. The Federal Railroad Administration's guidelines for grade separations indicate that a separation should be considered at an exposure factor of 250,000 for rural areas and 1,000,000 for urban areas. Given this crossing is in an industrial area, additional factors should be considered with a potential grade separation project. The 2045 Metropolitan Transportation Plan identified a long-term (2036-2045) grade separation project for this crossing with an estimated future cost of $45,480,000 (approximately $20,000,000 in 2020 dollars).



5.4 Pedestrian and Bicycle Mobility



Providing a safe and connected system for pedestrians and bicycle users was a clear concern since the corridor runs next to the West Fargo High School. Stakeholders also desired a path connection to 12th Avenue Northeast where a 10-foot shared use path was completed in 2017. A long-range project was included in the 2016 FM Metro Bicycle and Pedestrian plan to connect a shared use path from 4th Avenue East to 19th Avenue Northeast.

Most of the sidewalk curb ramps in the southern part of the corridor meet ADA standards as they were just built in 2018. The older part of the corridor sidewalks and curb ramps do not meet current ADA design guidelines. There are also curb ramps that could be moved to improve crossing locations, and some that could be removed as there is no connecting ramp on the other side of the roadway.

An overall pedestrian safety and path continuation plan will support enhanced recreational opportunities for the 9th Street. This need was further supported through public input gathered with over 40% of responses to the first online survey in support of shared use path improvements. As a result, the proposed study alternatives include a 10-foot shared use path through the 9th Street corridor that connects from 13th Avenue East to 12th Avenue Northeast.

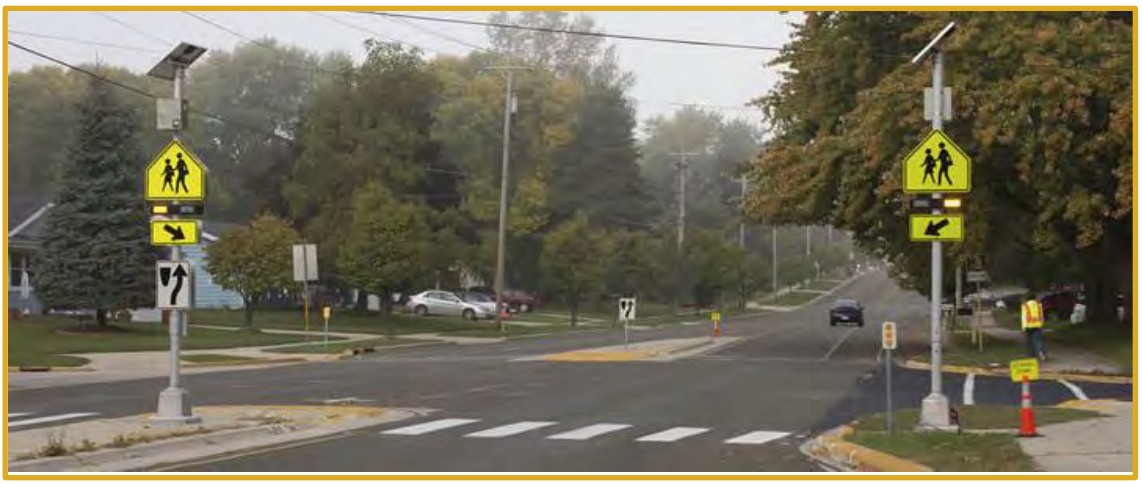
An additional focal point for pedestrian safety is related to crossing the 9th street corridor. Numerous comments were received regarding safety concerns, especially for students, crossing at the intersections of 10th Avenue East, 8th Avenue East, 7th Avenue East, and 4th Avenue East. Although the crosswalks at 10th Avenue East and 8th Avenue East have pushbutton-activated LED blinking signs they are not as effective as Rectangular Rapid Flashing Beacons (RRFBs).

Figure 5.1: Pedestrian Crossing Options

The Federal Highway Field Guide for Selecting Countermeasures at Uncontrolled Pedestrian Crossings provides several solutions shown in **Figure 5.1**. RRFBs may be implemented along with other measures shown for crosswalk visibility enhancement, raised crosswalks, and pedestrian refuge islands.

	Safety Issue Addressed				
Pedestrian Crash Countermeasure for Uncontrolled Crossings	Conflicts at crossing locations	Excessive vehicle speed	Inadequate conspicuity/ visibility	Drivers not yielding to pedestrians in crosswalks	Insufficient separation from traffic
Crosswalk visibility enhancement	✓	✓	✓	✓	✓
High-visibility crosswalk markings*	✓		✓	✓	
Parking restriction on crosswalk approach*	✓		✓	✓	
Improved nighttime lighting*	✓		✓		
Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line*	✓		✓	✓	✓
In-Street Pedestrian Crossing sign*	✓	✓	✓	✓	
Curb extension*	✓	✓	✓		✓
Raised crosswalk	✓	✓	✓	✓	
Pedestrian refuge island	✓	✓	✓		✓
Pedestrian Hybrid Beacon	✓	✓	✓	✓	
Road Diet	✓	✓	✓		✓
Rectangular Rapid-Flashing Beacon	✓		✓	✓	✓

RRFBs are user-activated amber LED lights that attach to pedestrian warning signs and use an irregular flash pattern similar to emergency vehicles. Additional signs and markings can be used to increase the effectiveness of these systems. Previous national studies have shown motorists yielding to pedestrians 88 percent of the time with the activation of a four-beacon system (two beacons and a sign on each side of the crossing). These signs and flashers can also be mast-arm mounted over the roadway for additional visibilty.



5.5 Transit Facilities

The existing MATBUS stops do not have shelters. MATBUS considers shelters for locations meeting a variety of criteria including open areas, available parking, surrounding amenities, commercial/educational/ government/medical facility areas, high density, low income, and high ridership areas. The cost to install a new shelter can range from $10,000-$15,000. The stop at 7th Avenue East has an average ridership and is near school property and is a good candidate for a shelter. Many public input comments were received regarding the stops around the 9th Street corridor. Although there is not currently high enough ridership to warrant a shelter along the corridor, other enhancements can provide better access and mobility at the stop.

5.6 West Fargo High School

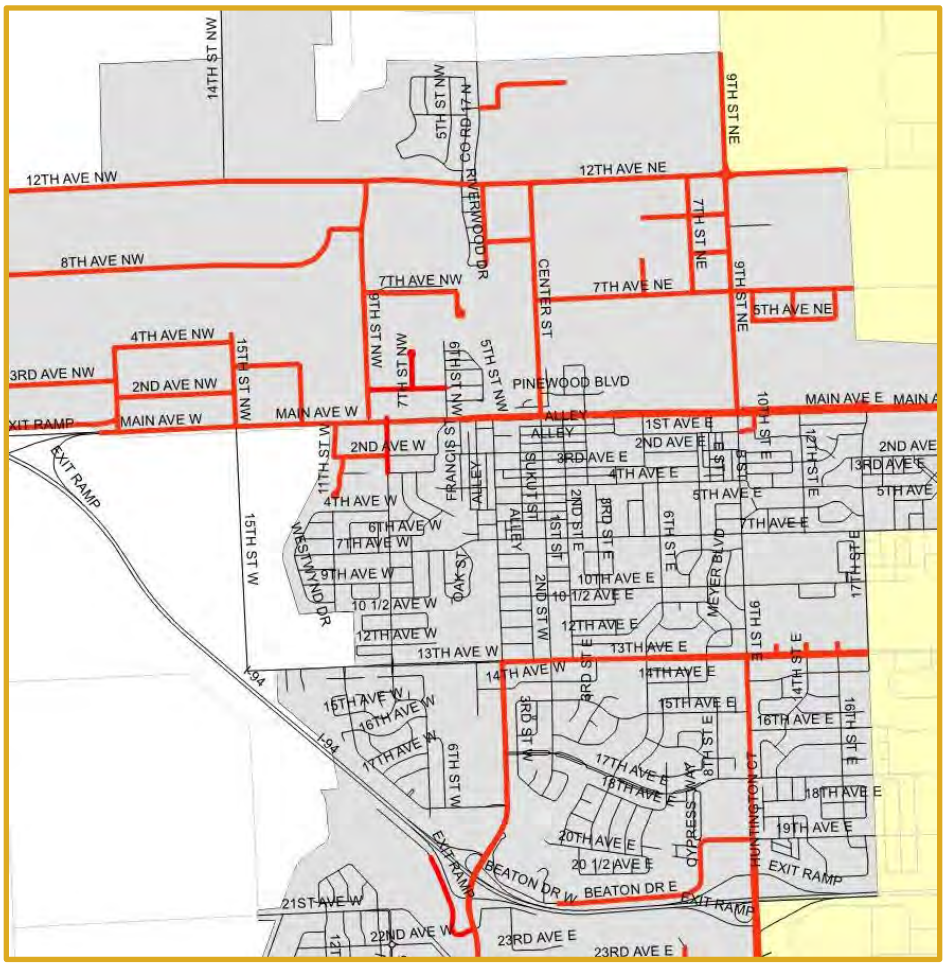
The West Fargo High School is a significant stakeholder in Segment 1 of the 9th Street Corridor Study area. Roadway improvements are an opportunity to enhance the campus visibility and pedestrian circulation across 9th Street. This can be accomplished by keeping pedestrian safety and accessibility as a focal point when looking at alternatives.

5.7 Freight Movement and Industrial Area Access

The segment of 9th Street between 13th Avenue East and Main Avenue is not on the City's designated truck route map and there is currently no north/south connection between 13th Avenue East and Main Avenue in West Fargo. According to the 2017 FM Regional Freight Plan, truck drivers identified this gap in the truck routing system as a concern and identified the 9th Street corridor as a potential connection.

The concept of adding this segment of 9th Street as a designated truck route was discussed among the SRC members and with members of the trucking and industrial industries. While adding the segment to the truck route system would make some freight movements more convenient, increasing truck traffic through an area that is largely residential and next to a public school is not desirable. Industry stakeholders also provided feedback that truckers may still be more likely to use routes along Main Avenue and 45th Street (Fargo) that area already on the truck route system.

Figure 5.2: Designated Truck Traffic Routes In/Around the 9th Street Corridor



6.0 FUTURE BUILD ALTERNATIVES

Based on the 2045 projected traffic volumes, the existing lane configurations of the 9th Street corridor meet the planning-level capacity requirements south of Main Avenue. As such, the future build alternatives assume that the existing lane configurations will be maintained. North of Main Avenue, traffic volume projections indicate the segment could benefit from expansion to a 3-lane section with center shared left turn lane. The alternatives have been grouped into three segments or the corridor, based on the unique issues and needs within each segment:

- *Segment 1: 13th Avenue East to 7th Avenue East*
- *Segment 2: 7th Avenue East to Main Avenue*
- *Segment 3: Main Avenue to 12th Avenue Northeast*

The costs presented are planning level construction estimates and do not include engineering fees, right of way purchase, extensive utility relocations, or other unknown design details.

6.1 Segment 1 Overview

This concrete roadway segment was expanded to add vehicle traffic capacity in 2018. The new reconstruction area added an additional northbound lane on 9th Street. The primary areas of concern for this segment of 9th Street are access management, intersection safety, and pedestrian safety.

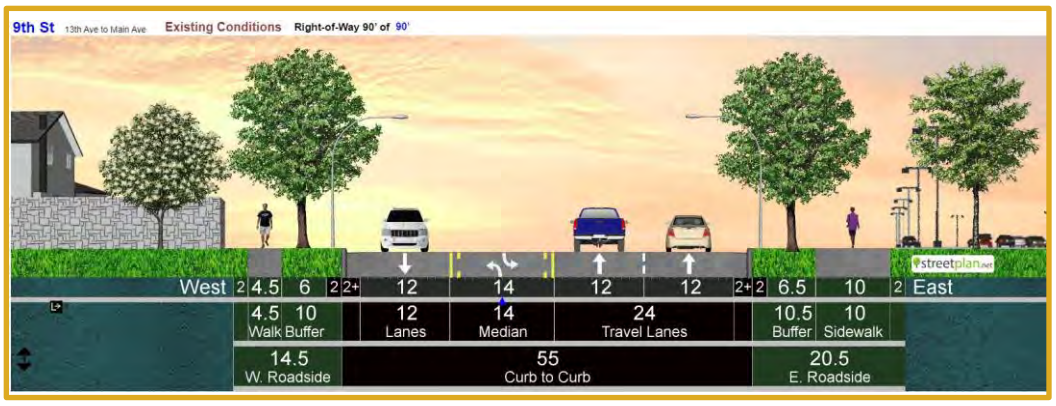
The intersections for alternatives 1B, 1C and 1E could benefit from access control to reduce conflict points. To achieve this a full median or ¾ median would be installed to restrict turning movements. Access control at Prairie Parkway would address vehicle safety and could deter pedestrians crossing at an unmarked location.

While the 10 foot path on the east side of the road is new up to 7th Avenue East, the sidewalk on the west side of the road is not up to ADA standards from Prairie Parkway to 7th Avenue East. Curb Ramp and sidewalk removal and replacement would fix this problem.

To address pedestrian safety concerns at 10th Avenue East and 8th Avenue East, a Rectangular Rapid Flashing Beacon (RRFB) would help facilitate the large number of pedestrians during the school year. These devices can replace the existing LED flashing signs in the same location, or be mast-arm mounted over the roadway. The cost of mast arms in not included in the estimated cost. If a traffic signal is warranted at 10th Avenue East in the future, it would be a preferred alternative. These options are alternatives 1D1, 1D2, and 1F.

Figure 6.1: Segment 1 Proposed Base Alternative 1A

The proposed alternatives for Segment 1 are shown in **Figures 6.1 and 6.2.** and listed in **Table 6.1**.

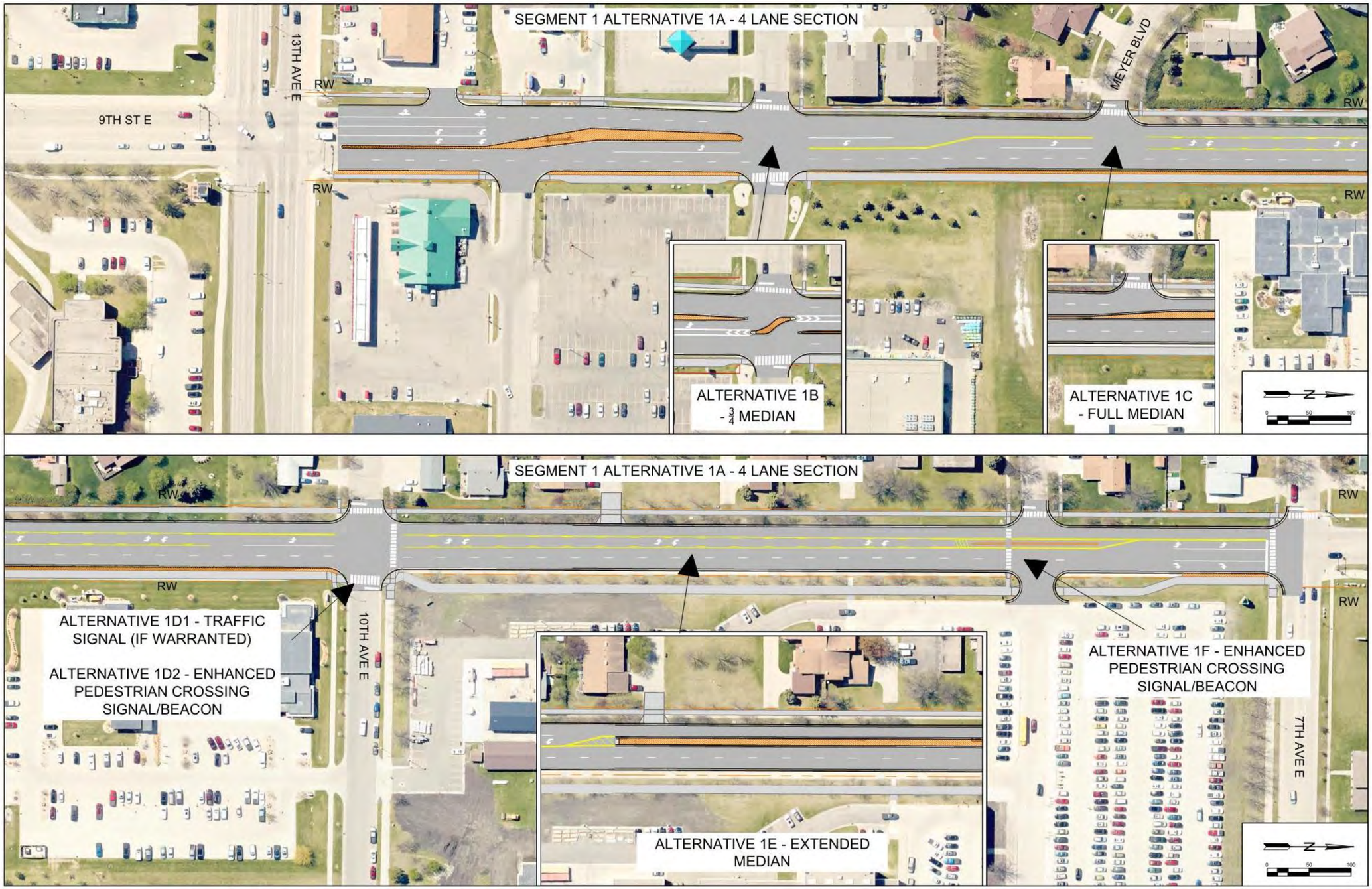


6.1.1 13TH AVENUE EAST TO 7TH AVENUE EAST

Table 6.1: Segment 1 Alternative Summary Table

Segment 1: 13th Avenue East to 7th Avenue East				
Improvement Alternative	**Issue/Need Addressed**	**Estimated Cost**	**Impacts**	**SRC Recommendation**
1A: Four Lane Reconstruction *Figure 9*	Base Option - Traffic Operations and Roadway Geometrics	$3,461,000	High: Reconstruction, install 6' path on west side of corridor and reset 10' path on east side	Preferred – Long Range
Estimated Costs of each alternative is to be added to the cost of 1A if selected				
1B: Install ¾ Median at Prairie Parkway and 9th Street Intersection *Figure 9*	Safety, Access Management	$9,500	Medium: Restricts left turns onto 9th Street from Prairie Parkway	Preferred – Long Range
1C: Install Full Median between Prairie Parkway and 10th Ave E *Figure 9*	Safety, Access Management	$14,500	Low: Restricts Meyer Blvd to right turn only	Not Preferred
1D1: Traffic Signal (If Warranted) *Figure 9*	Safety, Traffic Operations	$300,000	Medium: Install new Traffic Signal, Relocate utilities in way	Preferred – Long Range
1D2: Enhanced Pedestrian Crossing Signal/Beacon *Figure 9*	Safety, Ped/Bike Mobility	$21,500	Medium: Added Flashers at crosswalk/ Relocate utilities in way	Preferred – Short Range
1E: Extend Median between 10th Avenue East to 7th Avenue East *Figure 9*	Safety, Access Management	$15,500	Low: Right turn only for private drive and 8th Avenue East	Not Preferred
1F: Enhanced Pedestrian Crossing Signal/Beacon *Figure 9*	Safety, Ped/Bike Mobility	$21,500	Medium: Added Flashers at crosswalk along with a raised section of concrete to put emphasis on the crossing	Preferred – Short Range

Figure 6.2: Segment 1 Alternatives



6.2 Segment 2 Overview

This segment of roadway has not been updated since its concrete reconstruction in 1997. The areas of concern for this segment of road are access management, roadway geometrics, and pedestrian safety. There are access areas that could benefit from separating/restricting left turns onto 9th Street.

The 10-foot path on the east side of 9th Street connects to a 4.5-foot path from 4th Avenue East to Main Avenue. This would be upgraded to a 10 foot path throughout. Permanent or temporary easements may be needed to accommodate the wider path. Areas in the older sidewalk portions in general do meet ADA compliance.

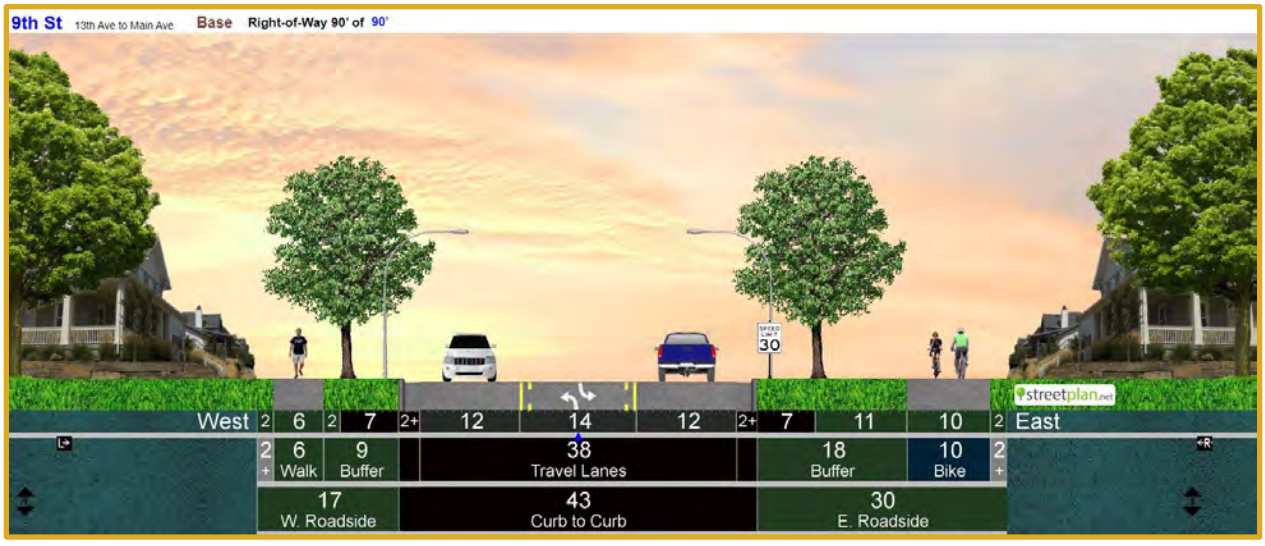
To accommodate the median alternatives, the east curbline should be shifted 3-4 feet to provide the required median and driving lane widths. With this option the existing trees boulevard trees may be impacted. The trees could be replaced with more appropriate size and species of tree.

Installation of a median at the Sommerset Drive intersection was not ranked highly by the public, however this alternative should be considered in the future. This intersection is in close proximity to the 7th Avenue East intersection and could experience queueing and congestion under future traffic conditions.

1st Avenue East is currently an undeveloped gravel roadway between 9th Street and 10th Street. It is likely that the City would like to reconstruct this block to a concrete roadway with a future project.

The proposed alternatives for Segment 2 are shown in **Figures 6.3 and 6.4** and listed in **Table 6.2**.

Figure 6.3: Segment 2 Proposed Base Alternative 2A

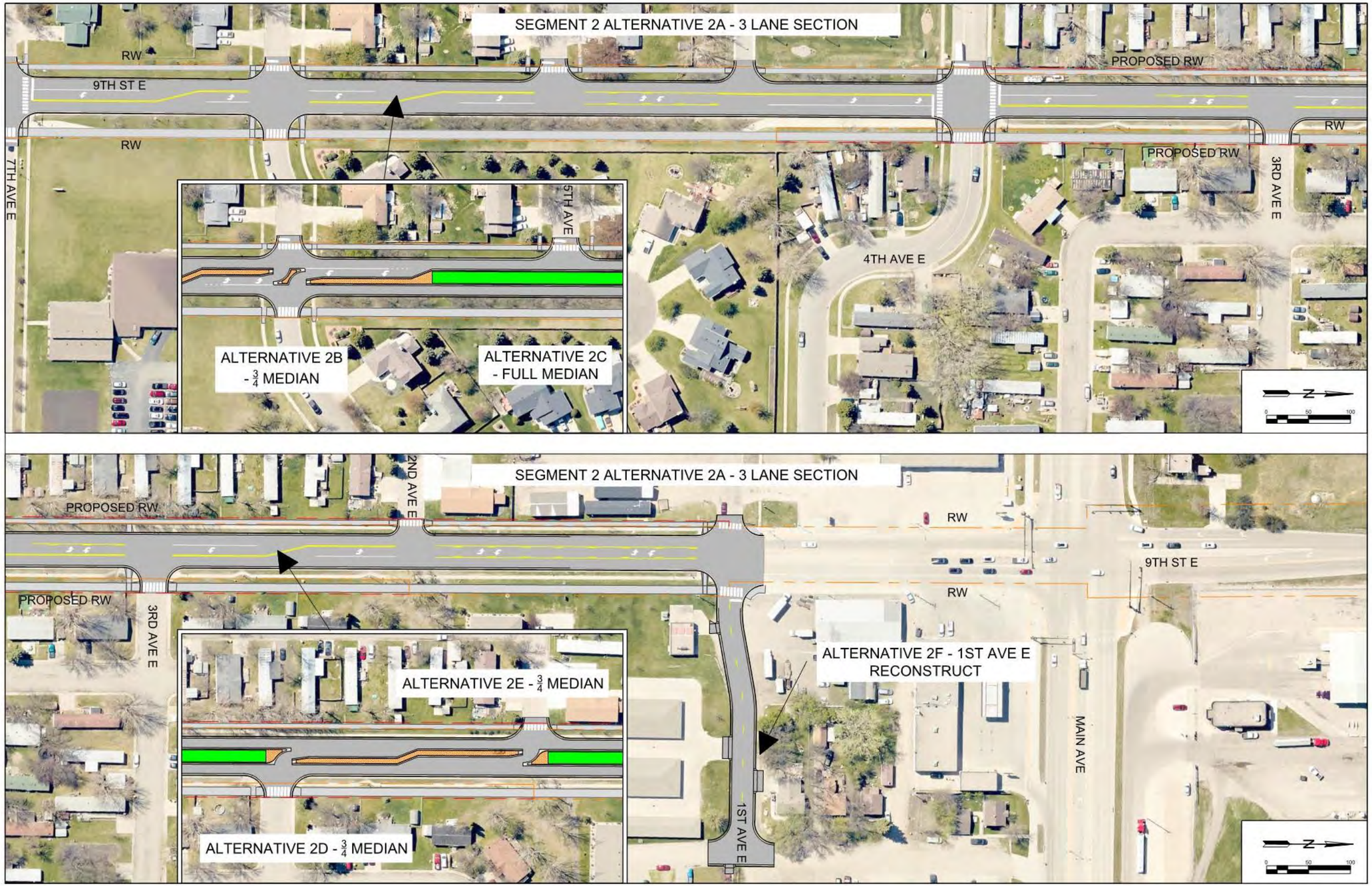


6.2.1 7TH AVENUE EAST TO 1ST AVENUE EAST

Table 6.2: Segment 2 Alternative Summary Table

Segment 2: 7th Avenue East to 1st Avenue East				
Improvement Alternative	**Issue/Need Addressed**	**Estimated Cost**	**Impacts**	**SRC Recommendation**
2A: Reconstruct three lane section *Figure 11*	Base Option - Traffic Operations and Roadway Geometrics, Bike/Ped Mobility	$4,193,000	High: Reconstruct entire roadway curb to curb, install 6' and 10' sidewalk	Preferred – Mid Range
Estimated costs of each alternative is to be added to the cost of 2A if selected.				
2B: ¾ Median at Sommerset Drive and 9th Street *Figure 11*	Safety, Access Management	$33,500	Low: Restricts left turns onto 9th Street from Sommerset Drive	Preferred – Long Range
2C: Full Median between Sommerset Drive and 4th Avenue East *Figure 11*	Safety, Access Management	$-14,000	Medium: Right turn only at 5th Ave East and Police Station, Extend Road width, R/W and Tree Impacts	Not Preferred
2D: ¾ Median at 3rd Avenue East and 9th Street Intersection *Figure 11*	Safety, Access Management	$2,300	Medium: Restricts left turns onto 9th Street from 3rd Avenue East, Extend Road Width, R/W and Tree Impacts	Not Preferred
2E: ¾ Median at 2nd Ave East and 9th Street Intersection *Figure 11*	Safety, Access Management	$3,500	Medium: Restricts left turns onto 9th Street from 2nd Avenue East, Extend Road Width	Not Preferred
2F: 1st Avenue East Reconstruction *Figure 11*	Traffic Operations and Roadway Geometrics	$210,000	Low: Realign 1st Ave East to line up with intersection, install curb and gutter and define East Intersection	Preferred – Mid Range

Figure 6.4: Segment 2 Proposed Alternatives



6.3 Segment 3 Overview

This segment of roadway has not been maintained since a thin lift overlay in 1999. The areas of concern for this segment of road are traffic capacity, access management, railroad crossing safety, and bicycle and pedestrian facilities.

There is no sidewalk on this portion of the roadway but adding a shared-use path on the west side of the road would connect Main Avenue to 12th Avenue Northeast. A continuous 10-foot shared use path on the west side of the corridor would increase pedestrian and bicycle safety by removing any pedestrian and bicycle traffic from the road or side of the road to the shared use path.

Along with adding a path on the west side of the road, a pedestrian crossing would be installed at the railroad tracks and an option to make the area quiet zone compliant could be achieved by adding pedestrian stop arm gates and emergency exit routes as indicated with Alternative 3C.

A grade separation at the railroad crossing should be considered for a long-range project. This option has a higher upfront cost, but it is the safest option as it eliminates any pedestrian and vehicle conflict with the railroad. Issues that would be encountered with a grade separation include stormwater drainage, an underground pipeline, and limited right of way. Installing a grade separation would better prepare West Fargo for any additional urbanization to the north.

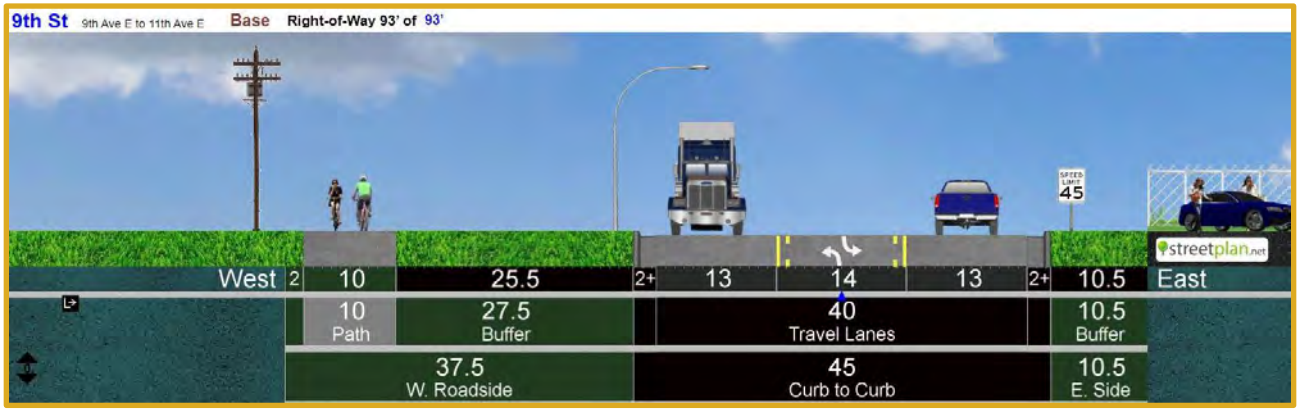
Private property access points between 7th Avenue Northeast and 12th Avenue Northeast would likely be replaced to their existing widths in their existing locations, however future development could provide an opportunity to consolidate or remove driveways. The reduction of access points provides a more predictable area of potential conflicts for through traffic. This is shown in alternative 3E.

Traffic signal revision is also an area of concern at 9th Street and Main Avenue. There were numerous public comments about left turns from 9th Street onto Main Avenue and the queueing and delay that result from not having a dedicated left turn phase. This can be addressed by installing new signal heads at the intersection and is shown in alternative 3B.

A roundabout at 7th Avenue East was evaluated. The roundabout would be similar to the 12th Avenue Northeast roundabout. Though the intersection operates at an acceptable level in 2045 no-build conditions, a roundabout could reduce delay through the intersection.

The proposed alternatives for Segment 3 are shown in **Figure 6.5, 6.6 and 6.7** and listed in **Table 6.3**.

Figure 6.5: Segment 3 Proposed Base Alternative 3A



6.3.1 MAIN AVENUE TO 12TH AVENUE NORTHEAST

Table 6.3: Segment 3 Alternative Summary Table

Segment 3: Main Avenue to 12th Avenue Northeast				
Improvement Alternative	**Issue/Need Addressed**	**Cost**	**Impacts**	**SRC Recommendation**
3A: Reconstruct 3 Lane Section with 10' Path Installed *Figure 13*	Base Option - Traffic Operations and Roadway Geometrics, Bike/Ped Mobility	$7,870,000	High: Reconstruct entire roadway, install 10' shared use path and install curb and gutter	Preferred – Mid Range
Estimated costs of each alternative is to be added to the cost of 3A if selected.				
3B: Traffic Signal Revisions for Left Turns *Figure 13*	Traffic Operations and Roadway Geometrics	$150,000	Medium: Install new signal heads at intersection and reconfigure traffic phasing	Preferred – Short Range
3C: Quiet Zone Crossing *Figure 13*	Safety, Bike/Ped Mobility	$400,000	High: Install new crossing arms and install pedestrian crossing gate on shared use path	Preferred – Mid Range
3D: Roundabout *Figure 14*	Safety, Traffic Operations and Roadway Geometrics	$621,000	High: Install Roundabout to alleviate traffic backups at intersection	Not Preferred
3E: Remove/Realign Driveways *Figure 14*	Safety, Access Management	-$12,000	Low: Driveways are to be installed; final location of driveways will determine price	Not Preferred
Grade Separation At BNSF Railroad Crossing	Safety, Freight Movement, Traffic Operations and Roadway Geometrics	$20,000,000	High: Adjust utilities, move culverts, adjust elevation of roadway, R/W impacts	Preferred – Long Range

Figure 6.6: Segment 3 Proposed Alternatives

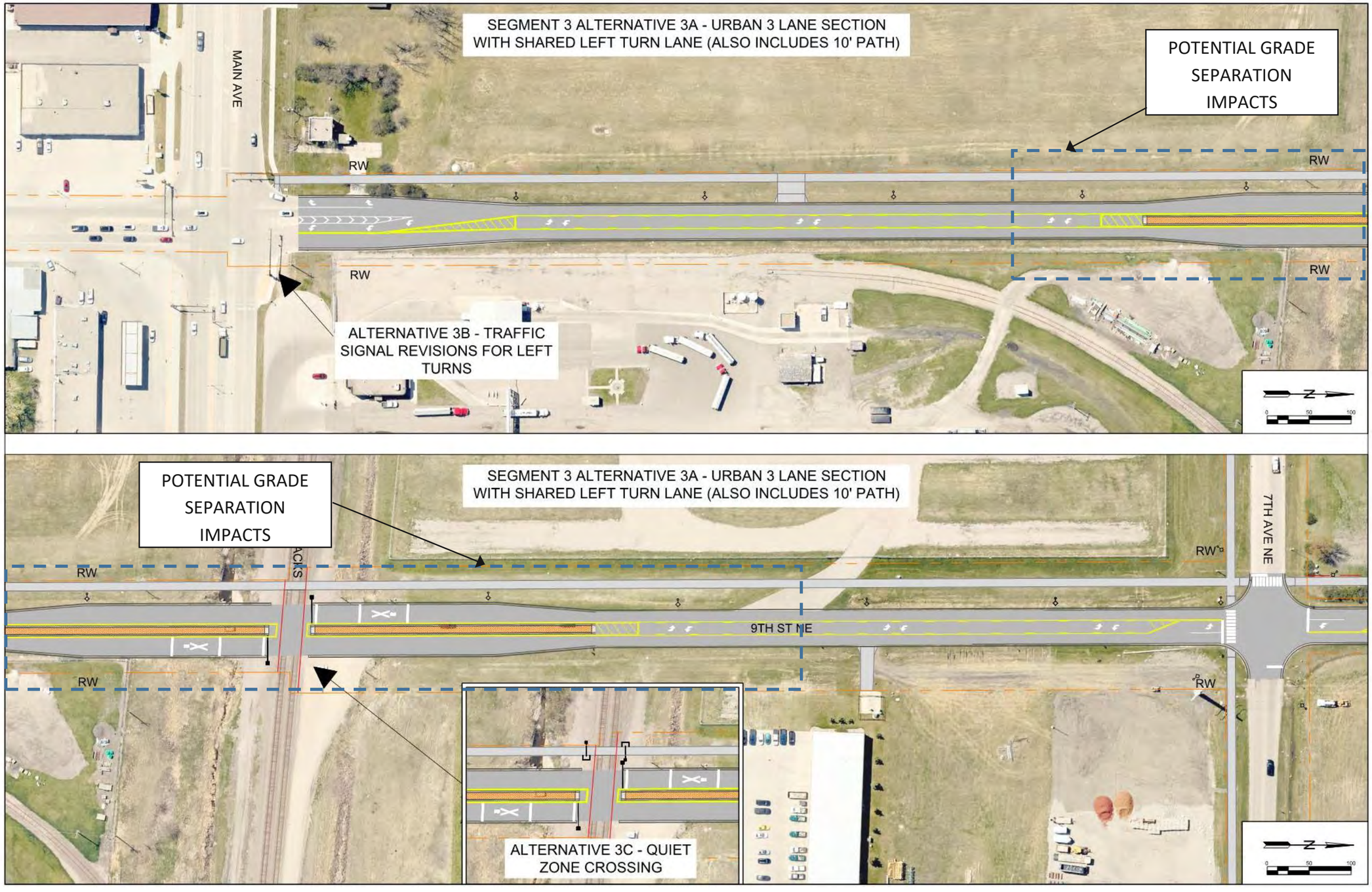
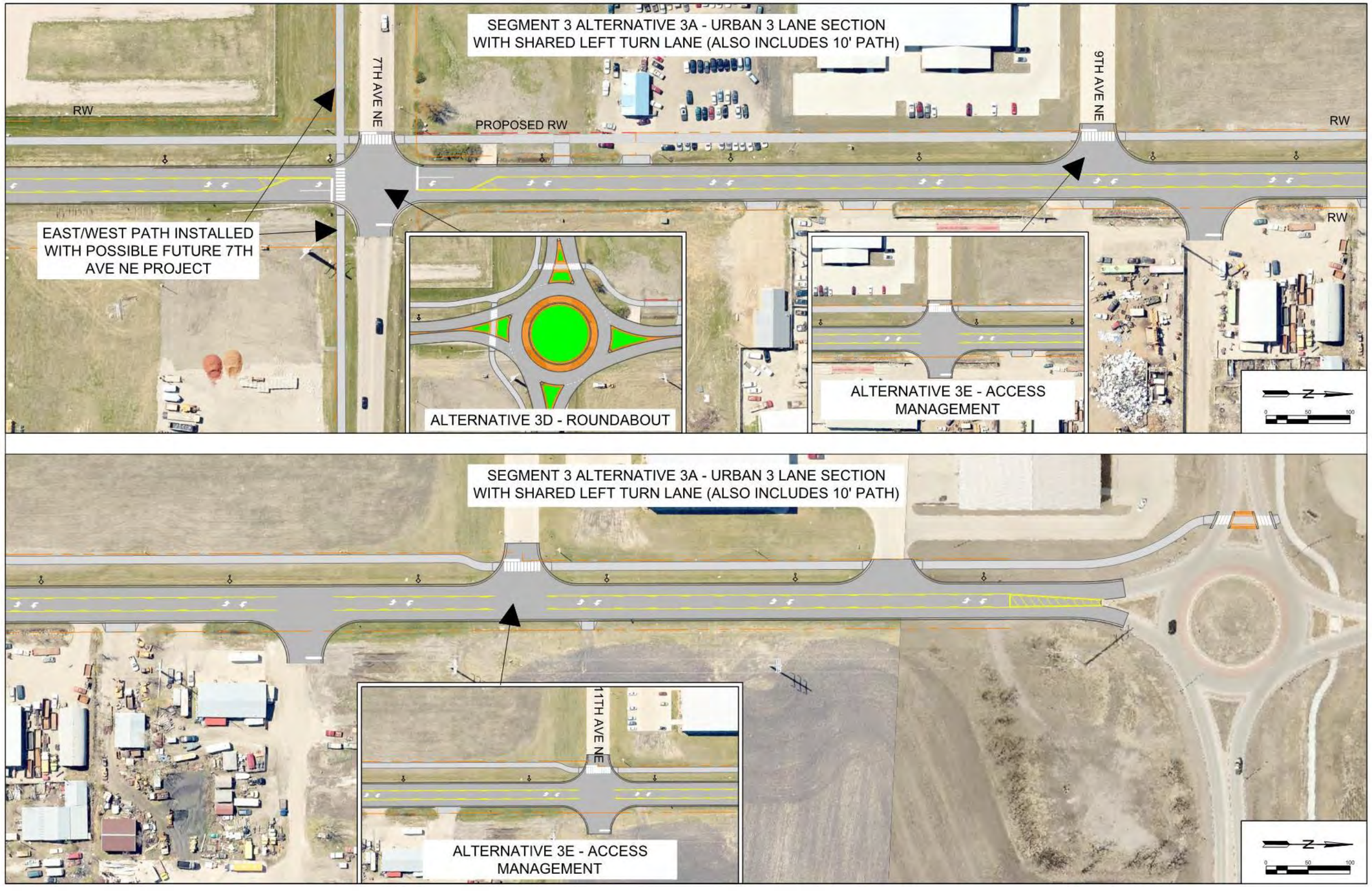


Figure 6.7: Segment 3 Proposed Alternatives



6.4 Streetscaping And Trees

6.4.1 13TH AVENUE EAST TO MAIN AVENUE

From 13th Avenue East to Main Avenue the proposed corridor improvements include narrowing of boulevards, addition of median islands and re-alignment of sidewalks/multi use paths. This section of the corridor study includes the 94 existing street trees listed earlier in this report.

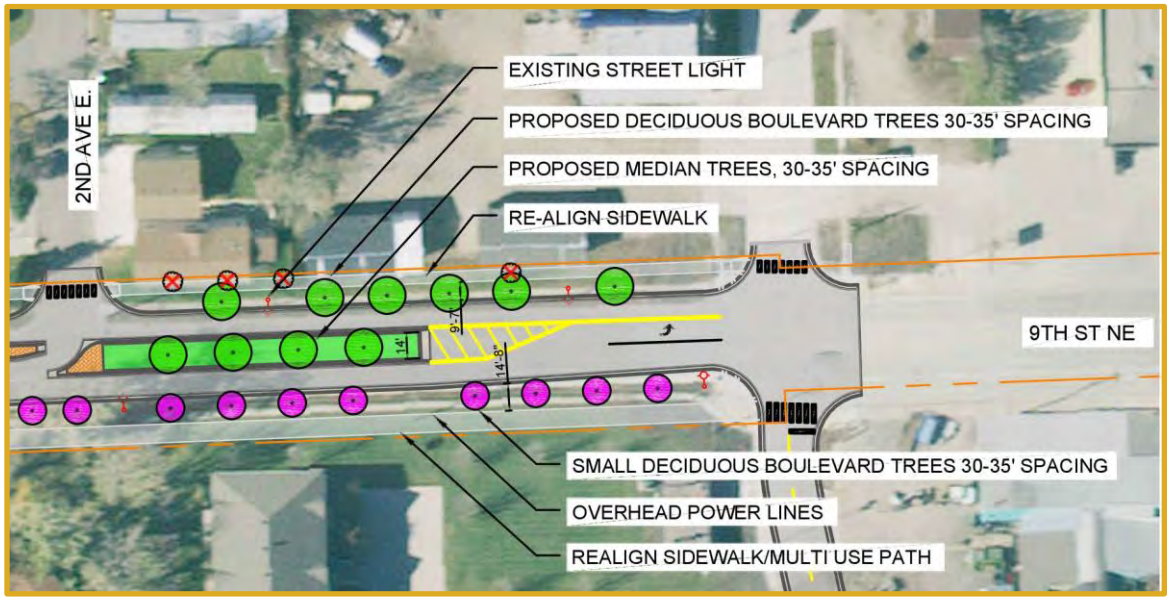
The proposed street improvements should have nominal impact on the majority of the existing trees within the existing boulevards. Boulevards that are narrowed should still be sufficiently wide (9' and wider). Widening the streets will have some impact on existing tree roots, but there should be sufficient width where the existing roots will be able to adapt to the narrower width. The tree canopies will be closer to the street in these locations and may require some tree branch pruning to maintain a safe clearance for vehicles.

While the majority of the existing street trees are Ash and will be impacted by Emerald Ash Borer, it is not recommended that these trees be removed as a part of this project. The existing trees are contributing to great deal to the corridor aesthetics.

Trees are proposed in new boulevard opportunities where the sidewalk and/or multi use path is re-located away from the street allowing for the new boulevards. Where the boulevards are 9' and greater, new street trees are proposed.

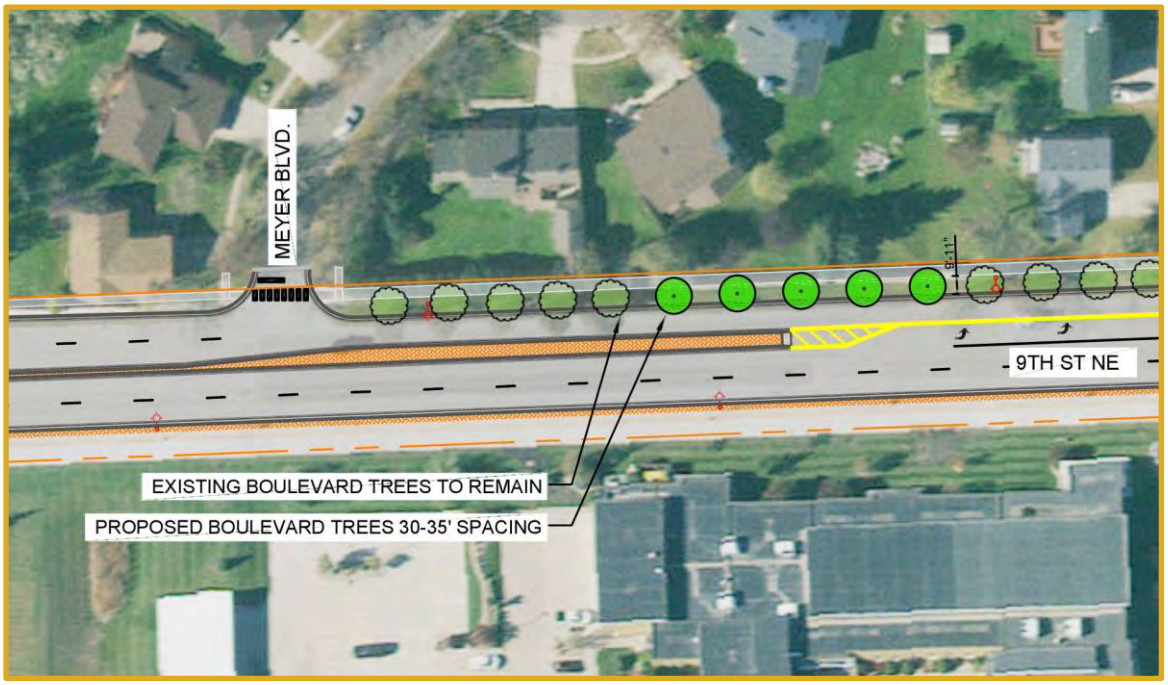
Median islands are proposed to be sufficiently wide and long enough to propose median tree plantings. Trees in the medians will help to visually break-up the width of the street and promote a residential character.

Figure 6.8: Proposed Street Trees, Median Trees and Trees Beneath Powerlines



Within the existing street trees, there are gaps where street trees are missing. New street trees should be planted within these gaps.

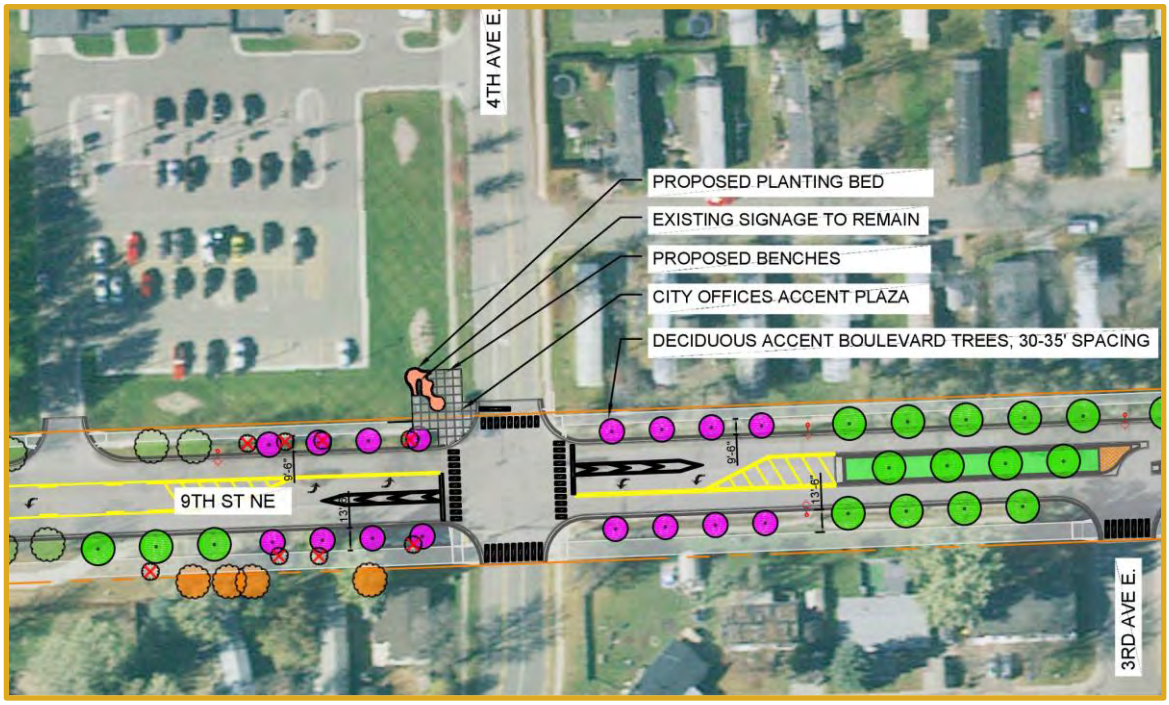
Figure 6.9: Typical 'on-fill' Street Trees between Existing Street Trees



The intersection of 9th Street and 4th Avenue East is a significant 'Gateway' intersection used to access the City of West Fargo City Offices and the Police Department. This intersection can be improved to help distinguish the entry to the area through the use of site amenities such as accent trees, decorative pavement and site furnishings. The concept proposes incorporating those elements while utilizing the existing city monument signage.

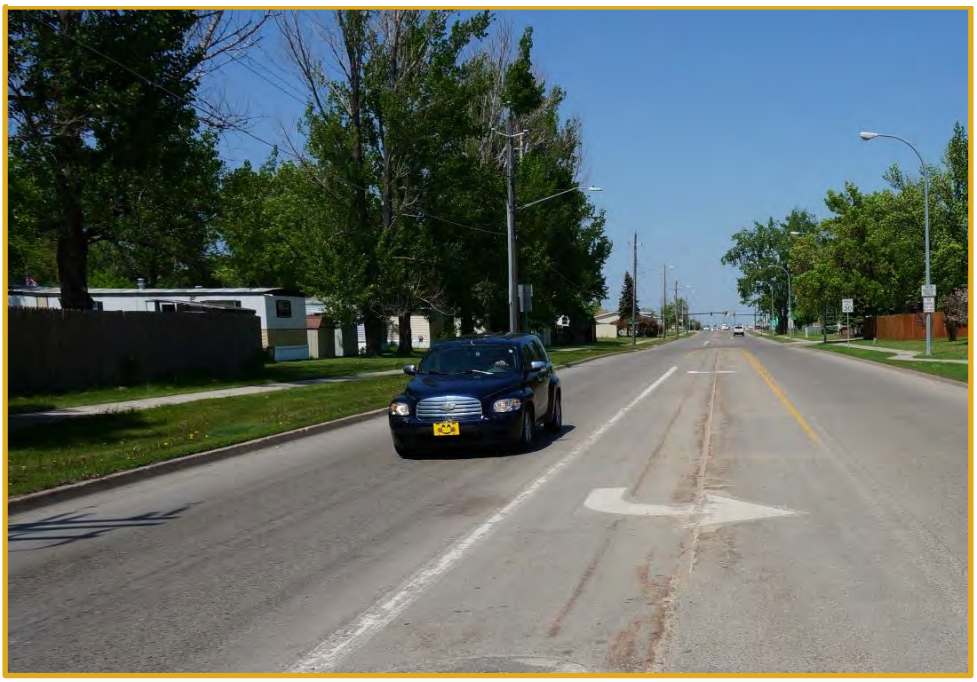
The Northeast corner of the City of West Fargo Offices block can be enhanced with landscape elements.

Figure 6.10: Accent Plaza Concept at City Building Intersection of 9th Street and 4th Ave East



A final issue that impacts not only trees, but also several other areas of need is the presence of overhead power lines owned by Cass County Electric from 4th Avenue East to Main Avenue. Existing trees require continual trimming to prevent limbs from damaging the lines. The location of the poles in the boulevard also limits the feasibility of any significant improvements or changes to the west or east side of 9th Street.

Figure 6.11: Overhead Power Lines Strung through the 9th Street Corridor



6.4.2 MAIN AVENUE TO 12TH AVENUE NORTHEAST

The proposed street corridor improvements from Main Avenue to 12th Avenue Northeast include changing the street section from a rural section to an urban section that include curb and gutter, boulevards, roundabout and sidewalks/multi use paths. This corridor section contains no existing boulevard trees.

Boulevards that are proposed with a sidewalks and/or multi-use path and will be 9' and wider, large deciduous street trees are proposed. Boulevards that do not have sidewalks and/or multi-use paths, street trees are also proposed. Where there are existing business access and usage, no boulevard trees are proposed at this time.

Figure 6.12: Large deciduous boulevard trees proposed in proposed boulevards. Trees should be spaced evenly between streetlights while maintaining good clearance from the streetlights and fire hydrants.

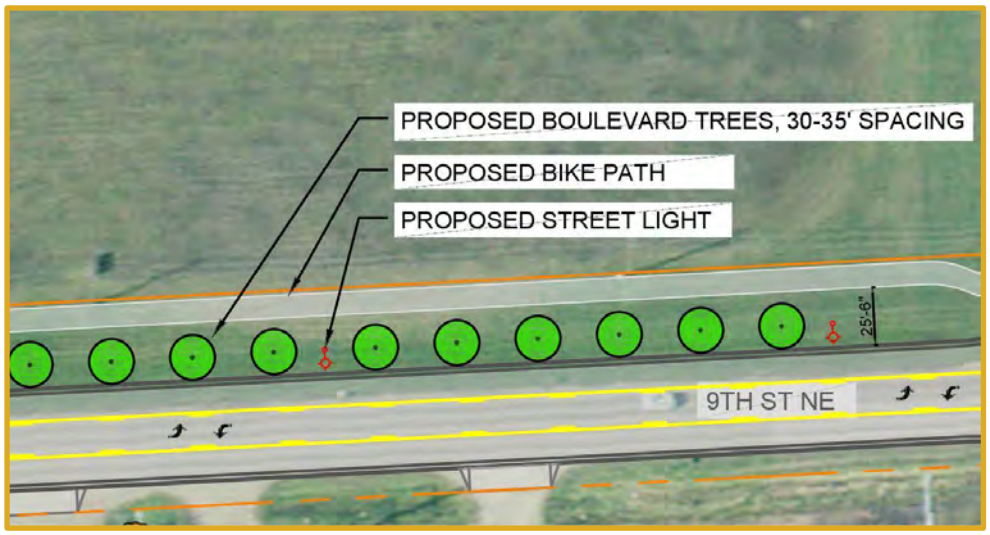


Figure 6.13: Small deciduous boulevard trees proposed where overhead power lines exist. Boulevard tree locations maintain generous visual clearances at business access and intersections.

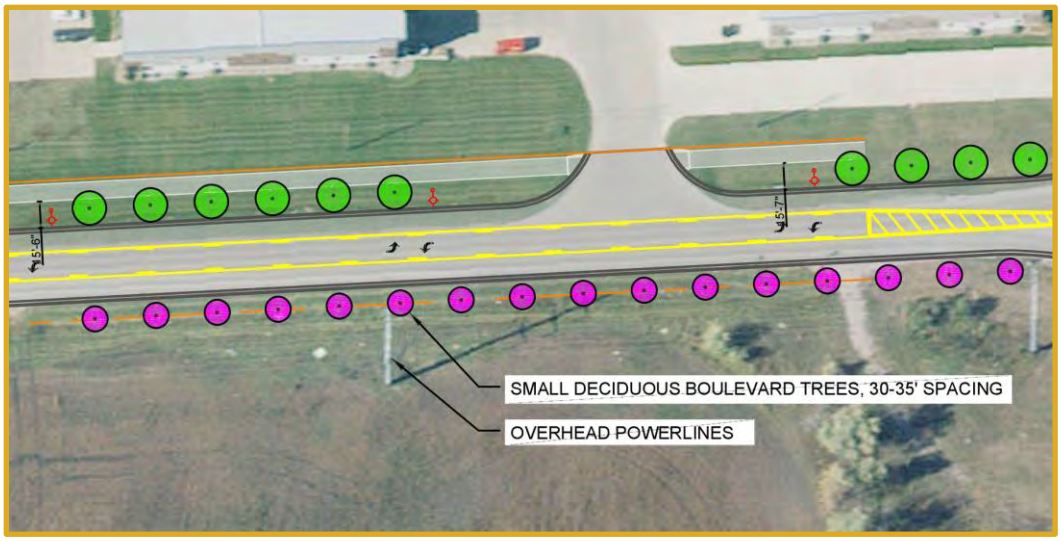
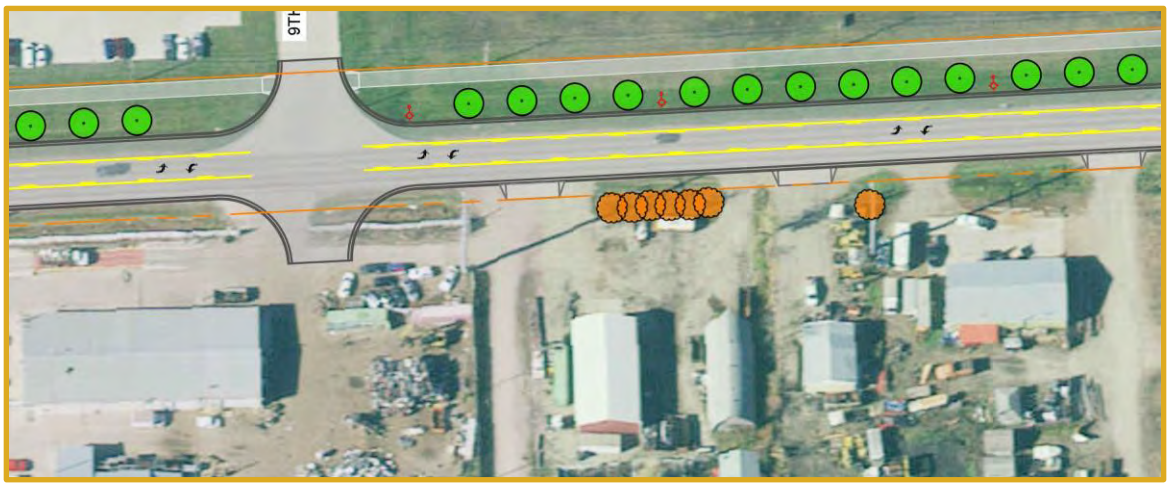
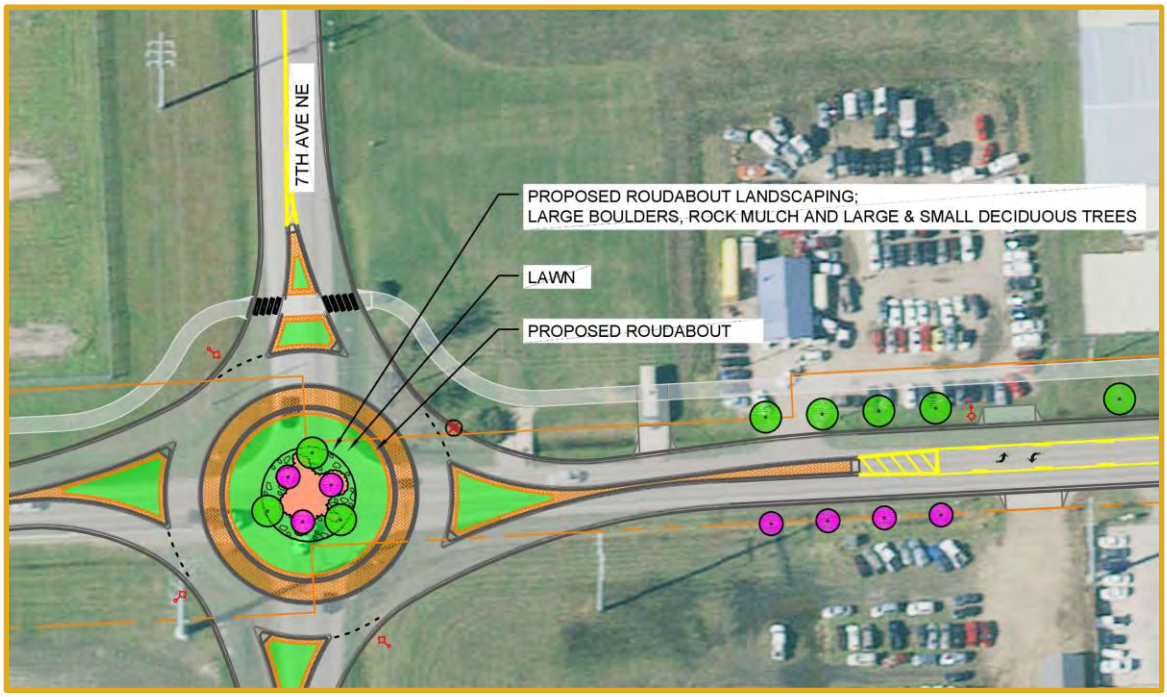


Figure 6.14: Boulevard trees are not proposed where they may conflict with established long-term existing usage of the site.



Accent plantings are proposed within the Alternative 3D roundabout at 7th Avenue Northeast. The plantings are proposed to be within a continuous shrub bed utilizing low-maintenance techniques including edging, rock mulch, chemically treated weed barrier, shrub groundcover, large deciduous trees and accent trees. Plantings are proposed at the center of the roundabout with a generous lawn perimeter to maintain good visibility through the roundabout.

Figure 6.15: Proposed roundabout at the intersection of 9th Street and 7th Avenue Northeast with proposed mix of large and small deciduous trees with a common shrub bed. Shrub bed can utilize low maintenance techniques to minimize maintenance requirements.



6.4.3 TREE PLANTING

Successful boulevard tree planting is dependent on several factors; adequate boulevard width, selection of suitable species for harsh urban conditions, installation by knowledgeable and qualified landscape installers, detailed and site-specific installation requirements, maintenance during establishment, observation of tree installation, and long-term maintenance.

Technology and practices for the installation and care of boulevard trees is constantly being improved. The following recommendations are intended to help provide additional information for improved success in the planting and long-term establishment of boulevard trees.

Additional information and references

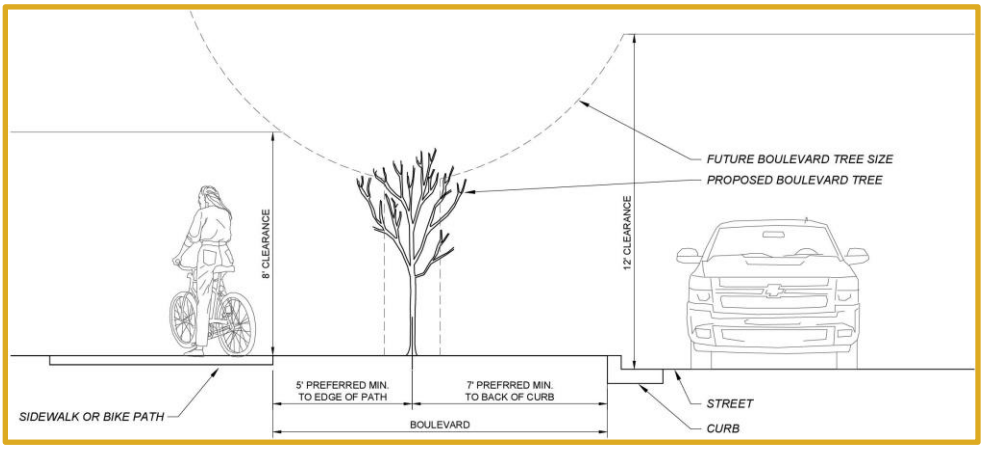
- ANSI Z60.1 Standards for Nursery Stock ANSI A300 Standards for Tree Care Tree Owners Manual- US Dept. of Ag.
- North Dakota Urban & Community Forestry Association International Society of Arboriculture
- Tree Care Industry Association
- North Dakota Forest Service -Tree Care and Health

Boulevard Widths:

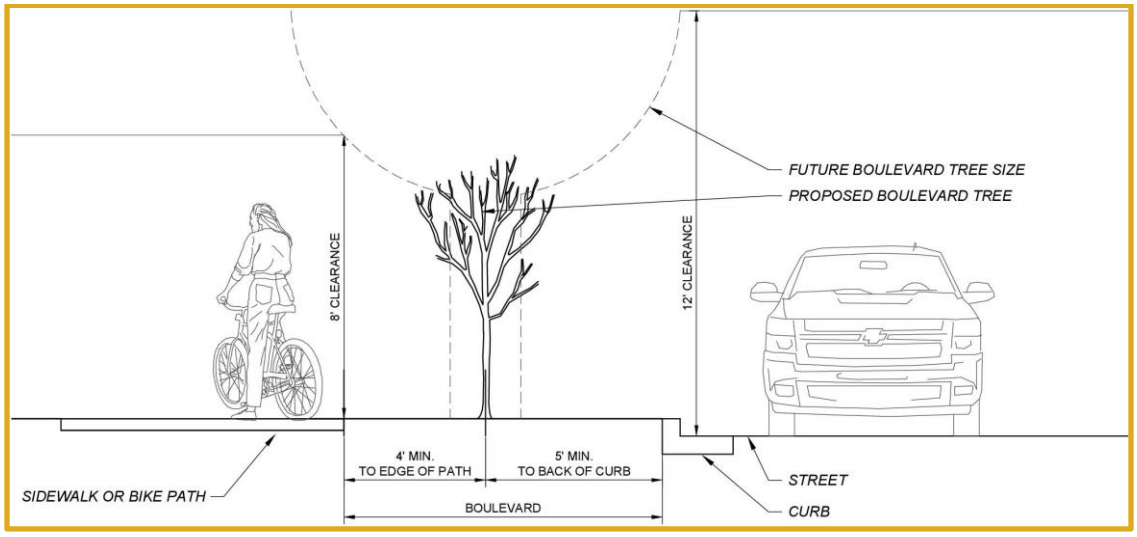
Boulevard width must be sufficiently wide to allow for the eventual growth of trees including boulevard rooting area, trunk and canopy. Trees must have room such that the canopy does not eventually interfere with pedestrians or bikers on adjacent sidewalks as well as not interfere with vehicles on the street and overhead utilities.

The preferred minimum distance of tree placement from sidewalks is 5’ and 7’ from back of curb. These distances can be reduced to 4’ from sidewalks and 5’ from back of curbs as a minimum if boulevard space is tight and trees are still desired.

The smaller boulevard widths will require additional branch pruning to keep the canopies from interfering with adjacent pedestrian walkways, bicyclists and roadways. 8’ vertical clearance should be kept clear on sidewalks and 12’ vertical clearance should be kept along streets.



Preferred minimum boulevard width allows for larger trees with less maintenance pruning to keep branching from interfering with adjacent clearances.



Recommended minimum boulevard width. Narrower boulevard widths will require selection of trees with suitable mature size and habit that will not interfere with adjacent uses. Pruning can help shape trees to keep clear of adjacent clearances.

Tree Selection:

The proposed tree plantings shown on the concept plan increases the quantity of 94 existing boulevard trees with 231 (169 large deciduous trees and 62 small deciduous trees). This quantity will vary up or down, depending on actual designed conditions that may alter boulevard widths, location of utilities, sight visibility etc.

Proposed boulevard trees should be selected from the trees listed below and with additional input from the City Forester. Planting diversity by alternating species and utilizing numerous varieties is encouraged to reduce impact of diseases and pests on boulevard trees.

The quantity of trees shown on the plans is based on the City of West Fargo standard tree spacing of 30’ to 35’ apart. Tree spacing should maintain a clear distance of 25’ from streetlights and 15’ from fire hydrants.

The current City of West Fargo rules require the adjacent property Owner be responsible for maintaining the street trees. This rule is currently under review and may shift future boulevard tree maintenance to the City. Inspection and maintenance of trees for structural safety, insect pests, and diseases is very specialized and can be very costly to the homeowner. The quantity of trees should balance the costs involved with maintaining trees and the aesthetics that they provide to the community. Too many trees without the commitment to long-term maintenance, can be a burden.

Tree species should be selected from the following and placed in a diverse arrangement. The following trees are proven durable boulevard trees for this region.

Large Deciduous Boulevard Trees

- Linden var.
- Common Hackberry
- Prairie Sentinel Hackberry (narrow var.) Northern Acclaim Honeylocust
- Street Keeper Honeylocust (narrow var.) Prairie Horizon Alder
- Elm var. (Dutch Elm Disease resistant var.)

Small Deciduous Boulevard Trees

- Ivory Silk Lilac
- Spring Snow Crab (fruitless var.)
- Amur Maple
- Hawthorn (limited use in established areas)

Trees can be specified different ways. These include 'containerized', 'balled and burlapped' (B&B), 'spading' and bareroot'. Each type has pros and cons, but for the installation by the typical qualified landscape contractor, containerized and/or B&B are usually preferred. 1 ½" caliper is probably the best balance between cost, ease of handling, establishment and resistance to vandalism.

'Containerized' trees are probably the most common tree available in the nursery industry. Containerized trees are generally ½" to 2" caliper. Containerized trees have been grown in plastic containers, under ideal nursery conditions for a minimum of 2-years.

Containerized trees usually come with container-related root ball issues that a knowledgeable installer will need to address during planting. The most common issues are roots ('pencil-sized' and larger) that have been circling within the container and trees with the 'flair root' planted too deep in the container that develop secondary adventitious roots. These issues generally result from the trees growing in too small of containers for too long. The industry is addressing these root-ball issues with new types of containers, that should become more available in the future.

Tree rootball from a containerized tree with circling roots that must be cut to eliminate the circling habit. Untreated roots will continue to circle and can inhibit the tree from thriving or premature failure.

Trees that come in containers must be individually inspected at the time of planting to have the pencil-sized circling roots cut and excess soil removed until the 'root flair' is exposed.

Flare root is exposed within containerized tree.

Tree is planted with flare root at-grade.

'Balled and Burlapped' (B&B) are trees that are grown in a field at the nursery. 'B&B' trees are commonly 1 ½" caliper to 4" caliper, with larger sizes available. Trees that are balled and burlapped for delivery to the landscape contractor, are spaded from the field into a wire basket with burlap to hold the root ball together until planting. B&B trees probably have the fewest tree root problems, but usually have an excessive amount of soil above the flare root. The experienced landscape installer must remove excess soil to expose the root flair.

Another draw-back to B&B is the size of the rootball. The rootball is large and heavy. This makes it difficult landscape contractor to maneuver the ball to the tree planting pit and remove the entire wire basket and burlap without breaking-up the rootball. Rootballs that are broken apart indicates that the root masses are excessively loose from disturbance and should be rejected.

The wire basket and the burlap must be removed from around the rootball for the roots to successfully develop beyond the original ball size.

Balled and Burlapped tree. Entire wire basked and burlap should be removed at planting.

Wire basket on this Ash tree caused sufficient stress to the tree that it eventually was removed. Note basket is still evident after 30 years. Tree was easily removed from ground with skid steer.

'Spaded' trees can be ideal trees in certain situations because they are locally grown and retain the original roots with less disturbance. Spaded trees are trees are 3" caliper to 9" dbh. Spaded trees are rarely used in boulevards because of utilities that generally exist in boulevards, the cost and the difficulty finding any quantity of desirable tree species, especially for competitive bidding.

'Bare-Root' trees are grown in the field at the nursery. While the tree is dormant, the soil is removed and the tree is stored and shipped in refrigerated storage. They are most commonly bought by nurseries and transplanted into pots and sold as containerized trees. They can be used as an economical means for boulevard tree plantings, but need special facilities, handling and a knowledgeable installer. The trees must be kept cool, moist and dormant until they are planted. At no time may the roots be allowed to dry.

Planting and warranty replacements can only be done in the spring.

Few landscape installers have the proper facilities to store the plant material until they are ready to plant or the experienced labor for proper installation. This method is not recommended, unless the contractor(s) can prove they have the facilities and knowledge. High mortality is often seen when bare root tree stock is planted by an inexperienced installer.

Bare-root tree stock is generally smaller caliper size ½" to 1 ½". The smaller tree size, if handled and installed properly can establish very well in protected sites. However, because of its smaller size, can be more of a target for vandalism or easy breakage if placed too close to roads where throwing of ice and snow by a snow plowing is an issue.

Bare-Root tree requires special handling until planting. Determining planting depth is obvious with flare root evident.

Bundles of Bare-Root stock kept moist in tubs of water before planting.

Installation by Qualified Professionals:

The proper installation of trees can be a very technical for successful tree establishment. The installation starts with an experienced landscape installer familiar with the complex issues with installing trees in urban conditions. Issues include compacted soils, underground utilities, safety procedures during installation, identification of unsuitable trees, preparation of tree rootball for planting, preparation of planting pits, staking, mulching and initial establishment maintenance.

Some municipalities have instituted a requirement that a 'Certified Arborist' be employed by the landscape installation company and that this person be the landscape supervisor and sole contact on behalf of the installer for the proper installation of each boulevard tree. This requirement helps keep the installers without the required specialized knowledge and understanding from the tree planting projects. The landscape contractor should also have a minimum of 3-years' experience installing boulevard trees.

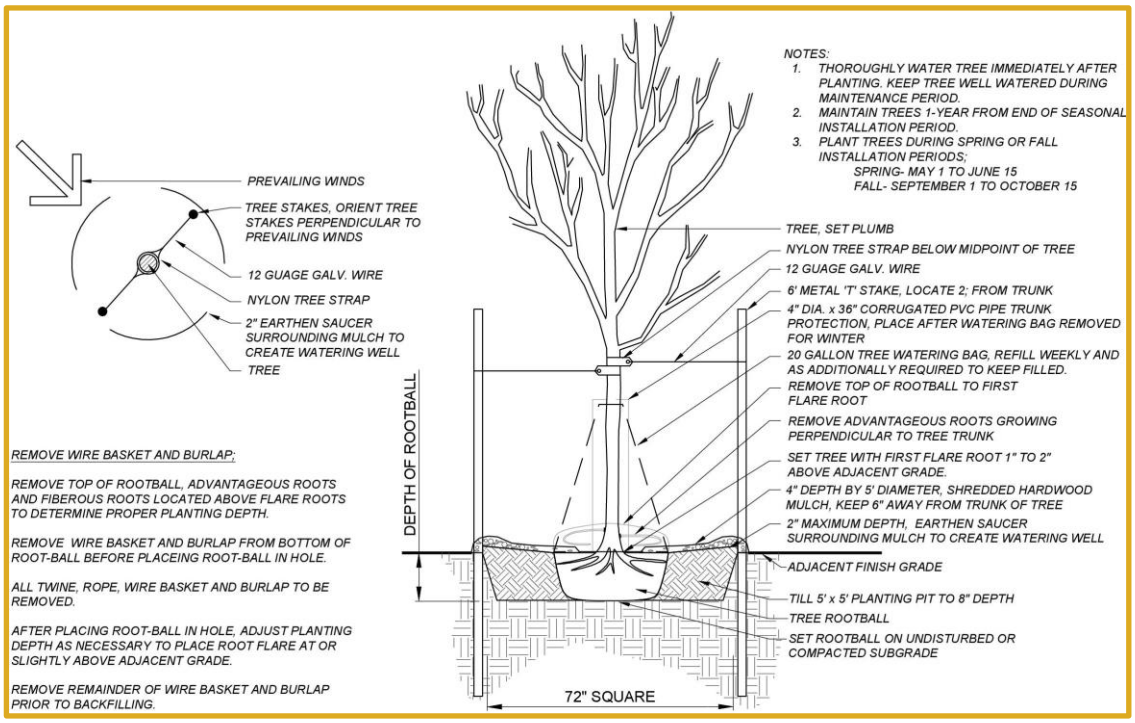
Installation Requirements:

Urban soils conditions in boulevards, especially evident in new boulevards is soil compaction and poor quantity of topsoil. 2 very important site requirements in boulevard situations for trees is the root access to air and water and the ability of the roots to penetrate into the surrounding soil. Excess water in compacted pits that do not allow water to drain away is also a consideration. These issues as well as others require the contractor to spend a considerable amount of effort preparing the planting pit to create the best possible situation for the tree to quickly adapt to it's new home and thrive.

The municipality needs to establish a standardized installation details and specifications that clearly identifies:

- Loosening compacted soils to a certain width and depth
- Placement depth of the rootball
- Treatment of the rootball prior to planting
- Backfilling
- Tree trunk protection
- Staking
- Mulching
- Maintenance requirements including watering, weeding and pruning.
- 1-year warranty

Below is a sample tree planting detail that identifies minimum requirements that can be referenced for urban boulevard tree planting. Standardizing the installation requirements help improve planting success that the installer may not normally be familiar.



Standardized tree planting detail identifies requirements for tree planting in boulevards and helps deal with local issues with tree planting.

Initial Establishment Maintenance and Warranty:

The landscape installer must be required to be responsible for the initial maintenance of the tree. The tree that has been grown under ideal nursery conditions with watering, fertilizing, weeding, pruning and protection from pests. Once the tree has been planted in the boulevard, it is critical that regular watering, weeding and minor staking adjusting be done to keep the tree as healthy as possible through this critical 1st-year transition. The tree is expected to be able to thrive on its own with little or no additional watering after a few years of establishment.

Watering bags have become a new method for reliably maintaining adequate moisture to the tree for the first few years of establishment. The watering bag is a 20 gallon, uv- resistant poly bag that wraps around the trunk of the tree. The watering bag releases water over a period of several days through very small holes in the bottom of the bag, thus maintaining consistent moisture around the base of the tree. The Contractor needs to refill the bags with water, at least weekly. Before winter, the bags must be removed and the tree trunk protection applied to help protect the tree from damage from rabbits and other pests. The previous and still current accepted method of watering is weekly hand watering. This relies on the contractor to water the trees weekly by hand-watering each tree, at one time. This relies on the contractor to apply the correct amount without causing erosion to the soil surrounding the tree bass and the muddle ring.

Trees have enough 'stored up' energy to last at least a year even if they are improperly planted and maintained. Past the one-year initial planting period, plants that are improperly planted or maintained will have a much lower likelihood of surviving, let alone thriving long-term

As an indication that a tree may be highly stressed and likely to continue to decline are trees that have less than 50% of canopy at the end of the 1-year of maintenance. These trees should be rejected under the 1-year warranty any replaced by the contractor.

To ensure the landscape installer makes good faith attempts to maintain all the trees, the tree replaced under the warranty should also require an additional 1-year of maintenance and warranty under their contract.

Observation of Boulevard Tree Installations:

Observation of boulevard tree installation is beneficial to ensure that the contractor is following the prescribed methods for the installation project. The City or their authorized experienced representative must maintain a relationship with the landscape installer with periodic inspections during the installation process, starting with a thorough pre- installation meeting to review all the methods and materials. Trees should be inspected for size, health and vigor before planting to ensure quality, healthy trees are being installed initially.

It is difficult to verify that the installer has installed the trees as detailed and specified after they have been installed, thus periodic inspections during the process is invaluable. The installer should appreciate these inspections, realizing that they will have a more successful project with fewer warranty issues.

Long Term Maintenance:

Long-term maintenance will need to be performed by the Owner. This will include watering during the first few years when conditions become very dry, treatment for pests, and periodic pruning to maintain clearances as the tree canopy grows.

The proposed tree plantings shown on the concept plan increases the quantity of 94 existing boulevard trees with 231 new boulevard trees (182 large deciduous trees and 49 small deciduous trees). Proposed boulevard trees should be selected from the trees listed below and with additional input from the City Forester. Planting of the same species in continuous monoculture is discouraged.

The quantity of trees shown on the plans is based on the City of West Fargo standard tree spacing of 30’ to 35’ apart. Tree spacing should maintain a clear distance of 25’ from streetlights and 15’ from fire hydrants.

The tree species should be selected from the following and placed in a diverse arrangement. The following trees are proven durable boulevard trees for this region.

- **Large Deciduous Boulevard Trees**
  - Linden var.
  - Common Hackberry
  - Prairie Sentinel Hackberry (narrow var.)
  - Northern Acclaim Honeylocust
  - Street Keeper Honeylocust (narrow var.)
  - Prairie Horizon Alder
  - Elm var. (Dutch Elm Disease resistant var.)

- **Small Deciduous Boulevard Trees**
  - Ivory Silk Lilac
  - Spring Snow Crab (fruitless var.)
  - Amur Maple
  - Hawthorn (limited use in established areas)

6.5 Streetscaping Improvement Costs

Below are typical streetscape improvement costs that may be used to estimate the cost of streetscape improvements implemented with a future project.

- 1 1/2" Cal. Deciduous Tree = $400/ea
- #5 Deciduous Shrub = $65/ea
- #2 Deciduous Shrub = $45/ea
- #1 Perennial = $25/ea
- Wood Mulch with Weed Barrier Fabric = $125/cy
- Rock Mulch with Weed Barrier Fabric = $175/cy
- Rock Mulch Special with Weed Barrier Fabric = $225/cy
- Precast Concrete 'Bullet' Edging = $8/lf
- Steel Bench = $1,600/ea
- Colored Concrete with Medium Broom Finish = $10/sf
- Colored with Stamped Concrete Finish = $20/sf

7.0 ENVIRONMENTAL DOCUMENTATION

7.1 Scope of Environmental Impact Analysis

This corridor study did not include an in-depth evaluation of the environmental impacts or coordination with potentially affected agencies typically involved in implementing transportation projects. The following information is presented for discussion and as a reference for identification of potential future environmental impacts.

7.2 Natural Resources

7.2.1 LAND USE AND RIGHT OF WAY

As documented in the "Existing Conditions" portions of the study, the land use throughout the corridor is a mix of retail, single family home, mobile home, heavy commercial, heavy and light industrial. It is not anticipated that any of the proposed alternatives would significantly impact the existing land use, so this aspect was not analyzed further.

The existing right of way varies throughout the corridor. The proposed improvement alternatives are generally designed to stay within the existing right of way, although alternatives that include removing and replacing the existing sidewalk with a wider shared use path, or installing a new path where one does not exist, may require temporary construction easements or purchase permanent easements of right of way. These areas include:

- East side of 9th Street from 4th Avenue East to 2nd Avenue East
- 1st Avenue East to the east intersection
- West side of 9th Street from 7th Avenue East to Hazers Auto West Driveway

The properties in these areas will need to be further evaluated if these alternatives are implemented.

7.2.2 WETLANDS AND WILDLIFE

According to the US Fish and Wildlife Wetlands Mapper Application, there is one wetland in the project area near the Railroad Crossing. The wetland is a 0.63 Acre Freshwater Emergent Wetland PEM1Cx. The nearest bodies of water include the Sheyenne River which is approximately 0.82 miles to the west of the study area. It is not anticipated that any of the proposed alternatives would significantly impact those water bodies or other potentially unknown wetlands.

7.2.3 TREES

There are numerous boulevard trees through Segments 1 and 2 of the 9th Street corridor. 90% of them are Ash or Ash hybrid trees. These trees are in generally good condition however they are susceptible to damage by the Emerald Ash Borer and are no longer recommended to be planted in this region.

Some of the improvement alternatives include removing and replacing existing sidewalks in the boulevard and wider shared-use path. These improvements to the bicycle and pedestrian facilities would have negative impacts to the existing boulevard trees either traumatizing the root structure or requiring the tree to be removed completely. Some trees may also be impacted by even a minor amount of widening needed to

install median alternatives. While this could be an opportunity to replace large overgrown trees with a more appropriately sized tree for the boulevard, removal of trees may not be publicly favored as these trees are contributing to the aesthetics and character of the corridor.

7.3 Utility Impacts

The major private utilities identified in the "Existing Conditions" analysis include overhead power lines owned by Xcel and MinnKota Power Co-Op, and several underground utilities. The exact location and ownership of the underground utilities is Xcel Energy and further analysis would be required on any alternatives chosen that would potentially impact these utilities.

The overhead power lines owned by Xcel extend from 4th Avenue E to Main Avenue E. Minnkota Power Co-op has an overhead electric transmission line on the east side of 9th Street from 7th Avenue Northeast to 12th Avenue Northeast These lines would require a significant effort to bury. The impacts of bury the overhead lines would include temporary service disruptions, localized earthwork, and traffic impacts.

7.4 Section 4(f)

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 prohibits federal transportation agencies from using land from publicly owned parks, recreation areas (including recreational trials), wildlife and waterfowl refuges, or public and private historic properties, unless there is no feasible and prudent alternative to that use and action includes all possible planning to minimize harm to the property resulting from such a use.

Potential Section 4(f) properties include:

- Parks and recreation areas
- Wildlife or waterfowl refuges and wildlife management areas
- Cultural and archeological resources and sites
- Historic sites, bridges, and highways
- Landscapes
- School playgrounds
- Fairgrounds
- Public multiple-use land holdings
- Wild and scenic rivers
- Planned facilities
- Bikeways (recreational) and trials
- Public golf course

There is one property (West Fargo High School / Veterans Memorial Arena) near the corridor that may be protected under Section 4(f) due to the publicly owned buildings, running tracks, ball fields, outdoor track facilities that also provide substantial walk-on recreational opportunities.

This study did not include an analysis of possible historical, archeological, or cultural sites.

7.5 Section 6(f)

The purpose of Section 6(f) of the Land and Waste Conservation Act (LAWCON) is to develop and provide accessibility to outdoor recreation resources. It prohibits use of any land purchased with LAWCON funds for any purpose other than recreational use unless replacement land and equal usefulness is provided.

A search of the listing of park lands purchased with LAWCON funds indicates that there are currently no Section 6(f) protected lands within the corridor study area.

7.6 Environmental Justice and Social Considerations

In accordance with Executive Order 12898 "Federal Actions to Address Environmental Justice Minority Populations and Low-Income Populations", environmental justice must be addressed to the greatest extent practicable and permitted by law in all environment, as well as provide minority and low-income populations access to public information and public participation. Future projects along the corridor could have federal funding and may be considered a federal project required to comply with this order.

A review of 2010 census data shows a high concentration of low-income and minority households along Segments 1 and 2 of the 9th Street corridor, particularly between 4th Avenue East to 1st Avenue East. It is not expected that the proposed improvements would negatively impact that particular area of the corridor more than another however there will need to be further analysis with any future project.

8.0 STUDY RECOMMENDATIONS

8.1 Summary of Recommendations

Based on input and analysis by the Study Review Committee along with public and stakeholder input, the following improvement alternatives are recommended for future implementation. It is assumed that the base alternatives 2A and 3A may be implemented within the next 5-10 years (mid-range). These projects, along with the long-range (10+ years) alternatives will require a longer project development process and/or additional funding. Further environmental documentation or study may be required depending on the funding sources used by the City for future projects.

The following is a summary of the preferred recommendations for the corridor.

8.1.1 SEGMENT 1: 13TH AVENUE EAST TO 7TH AVENUE EAST

Alternatives 1D2 and 1F should be implemented as a short-range project to install Rectangular Rapid Flashing Beacon (RRFB) systems at the pedestrian crossings at 10th Avenue East and 8th Avenue East. The existing electrical infrastructure can be used to quickly implement the improvements. This will provide an immediate safety improvement at the crossings.

The improvements completed in 2018 in this segment have addressed previous capacity issues and delayed the need for additional work. The base alternative, 1A: four lane reconstruction, should be considered for long-range implementation when warranted due to deteriorating pavement condition. Other alternatives that should be considered at that time include 1B: ¾ median at Prairie Parkway and 1D1: traffic signal at 10th Avenue East if warranted. The long-range project should also include consideration for removal of the pedestrian crossing at 8th Avenue East and enhancing the pedestrian safety features at the signalized 7th Avenue East intersection and directing pedestrians to cross at that intersection.

8.1.2 SEGMENT 2: 7TH AVENUE EAST TO MAIN AVENUE EAST

The base alternative, 2A: three lane reconstruction, should be considered for mid-range implementation when warranted due to deteriorating pavement condition. This option includes extension of the existing 10 foot shared used path from 4th Avenue East to Main Avenue East. Improvements at the 4th Avenue East intersection should consider pedestrian safety as a priority when this segment is reconstructed. Alternative 2F: 1st Avenue East reconstruction is recommended to be included as part of the long-range project.

The access control/median options in this segment are not recommended at this time as they were not highly rated in the public survey, but they should be considered in the future if there is a crash problem.

8.1.3 SEGMENT 3: MAIN AVENUE EAST TO 12TH AVENUE NORTHEAST

A short-range project should be planned to implement alternative 3B: traffic signal revisions for left turns at the Main Avenue East intersection. This alternative was rated the highest by the public responses to the online survey.

A mid-range project should be programmed to include the base 3A: three lane reconstruction with a 10 foot shared use path. This project should also include alternative 3C: quiet zone crossing to enhance the safety of the BNSF Railroad crossing.

Alternatives 3D: roundabout at 7th Avenue Northeast and 3E: realign driveways between 7th Avenue Northeast and 12th Avenue Northeast are not recommended at this time but may be considered as part of the project planning process. Land use and property ownership may be different at the time a project is implemented and may facilitate including these options for further study.

A long-range project for a grade separation at the BNSF Railroad crossing should be kept in the Metropolitan Transportation Plan. If funding for such a project becomes available sooner, this project could be advanced and possibly constructed with the mid-range three lane reconstruction.

8.2 Estimated Cost for Recommended Improvement Alternatives

The preferred options are listed below. All costs are 2020 dollars.

Table 8.1: 9th Street Alternative and Cost Summary

9th Street Recommended Alternatives			
Alternative	**Short-Range Estimated Cost**	**Mid-Range Estimated Cost**	**Long-Range Estimated Cost**
Segment 1: 13th Avenue East to 7th Avenue East – Recommended Alternatives			
1A – Four Lane Reconstruction			$3,461,000
1B – ¾ Median at Prairie Parkway			$9,500
1D1 – Traffic Signal at 10th Avenue East			$300,000
1D2 – Enhanced Ped Beacon at 10th Avenue East	$21,500		
1F – Enhanced Ped Beacon at 8th Avenue East	$21,500		
Subtotal	*$43,000*		*$3,770,500*
Segment 2: 7th Avenue East to Main Avenue East – Recommended Alternatives			
2A – Three Lane Reconstruction		$4,193,000	
2B – ¾ Median at Sommerset Drive			$33,500
2F – 1st Avenue East Reconstruction		$210,000	
Subtotal		*$4,403,000*	*$33,500*
Segment 3: Main Avenue East to 12th Avenue Northeast – Recommended Alternatives			
3A – Three Lane Reconstruction		$7,870,000	
3B – Traffic Signal Revisions at Main Avenue East	$150,000		
3C – Quiet Zone Crossing		$400,000	
BNSF Railroad Underpass			$20,000,000
Subtotal	*$150,000*	*$8,270,000*	*$20,000,000*
Totals	**$193,000**	**$12,673,000**	**$23,804,000**