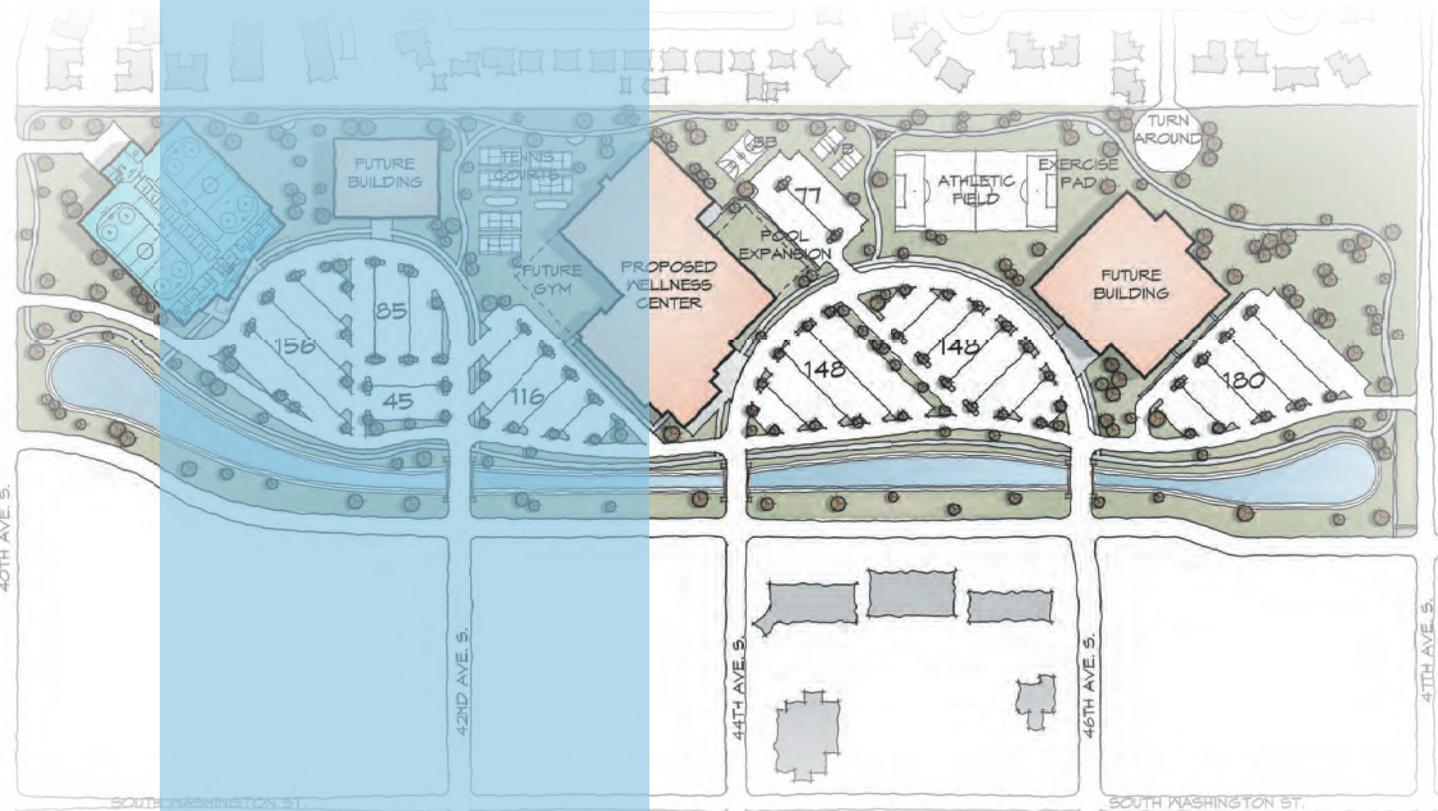




# South Washington Street Corridor Study

Prepared for:  
Grand Forks-East Grand Forks  
Metropolitan Planning Organization



Final Report  
August 31, 2011

Prepared by:  
Alliant Engineering, Inc.



## Acknowledgements

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### Executive Summary

The Parks District and wellness/fitness partners are proposing to construct a Community Wellness Center on the eastside of South Washington Street between 40<sup>th</sup> Avenue South and 47<sup>th</sup> Avenue South. The long term vision includes developing a medical and wellness style campus that will integrate the existing Aurora Medical facilities on the west side of Washington Street, with the proposed Wellness Center and future medical office and retail facilities. The change in land use designation may generate the need for additional roadway and multimodal (pedestrian, transit and bicycle) improvements to the surrounding area as traffic intensifies and travel patterns change.

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

### Study Purpose

The primary goal of the study is to provide a comprehensive look at the transportation needs (motor vehicle and multimodal) of the southern portion of South Washington Street for existing conditions and as a result of future land use changes, including the development of the Wellness Center and associated buildings. The study area included the South Washington Street corridor from 47<sup>th</sup> Avenue South to 32<sup>nd</sup> Avenue South, South 11<sup>th</sup> Street, 47<sup>th</sup> Avenue South (Washington Street to Cherry Street) and 40<sup>th</sup> Avenue South (Washington Street to Cherry Street).

A recommended transportation implementation plan will be provided to the GF-EGF MPO with a prioritized set of infrastructure, traffic operation and multi-modal improvements that coincide with short term (0-5 years), mid-term (5-15 years) and long term (greater than 15 years) needs.

### Public Involvement

The public involvement process included Study Review Committee (SRC) and Policy Advisory Committee (PAC) meetings. The committees meet four times throughout the study process. The SRC provided the technical review and guiding direction for the study. Key involvement included assisting in identification of issues, identifying potential future development, review and input on documents prepared by the project team and providing input on study recommendations. The PAC provided a forum for project review and issue discussion. The PAC played an integral in establishing a connection between the project team and the community.

In addition to the SRC and PAC meetings, two public meetings were held to gather input from the public. A website was established at the beginning of the project. The URL for the site is <http://www.theforksmppo.org/Pages/Projects.htm>. The purpose of the website is to provide another way for the general public to be informed about the project status and to disseminate information. All documents prepared for the project and public meetings have been posted to the website.

### Technical Analysis

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

To determine infrastructure improvements and the needed time frames for these improvements, two study year scenarios were identified. The following describes the scenarios:

- **2013 Conditions** – This scenario corresponds to the completion and opening of the main Wellness Center building and hockey complex on the Wellness Center site. The infrastructure improvements needed for opening day operations are identified.
- **2035 Conditions** – This scenario corresponds to the traffic forecasts in the GF-EGF MPO Long Range Transportation Plan (LRTP). It is also assumed that the remaining buildings on the Wellness Center site and surrounding parcels are developed and several other adjacent properties are developed. Mid- term and long-range infrastructure improvements are identified.

### Evaluation of Recommended Alternatives

Roadway, intersection and multimodal improvement alternatives were identified to address the deficiencies identified through the technical analysis process. Figure ES-1 illustrates the recommended roadway and intersection improvements and traffic control devices necessary to achieve acceptable traffic operations under the forecast 2013 scenario. Detailed discussion and description of each improvement measure are discussed in Section 4.1.

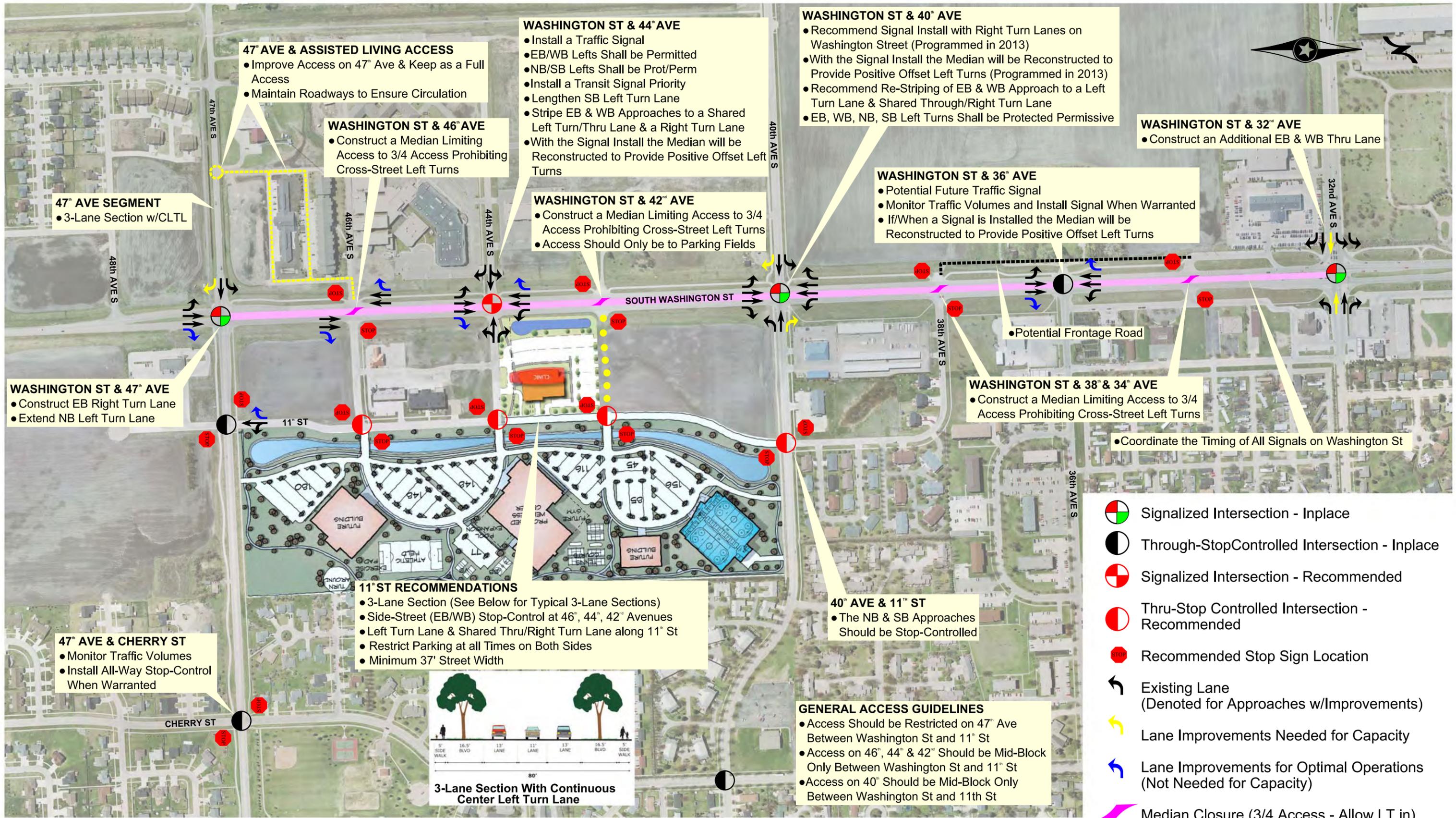
Figure ES-2 illustrates the recommended roadway and intersection improvements, access management and traffic control devices necessary to achieve acceptable traffic operations under the forecast 2035 scenario. Detailed discussion and description of each improvement measure are discussed in Section 4.2

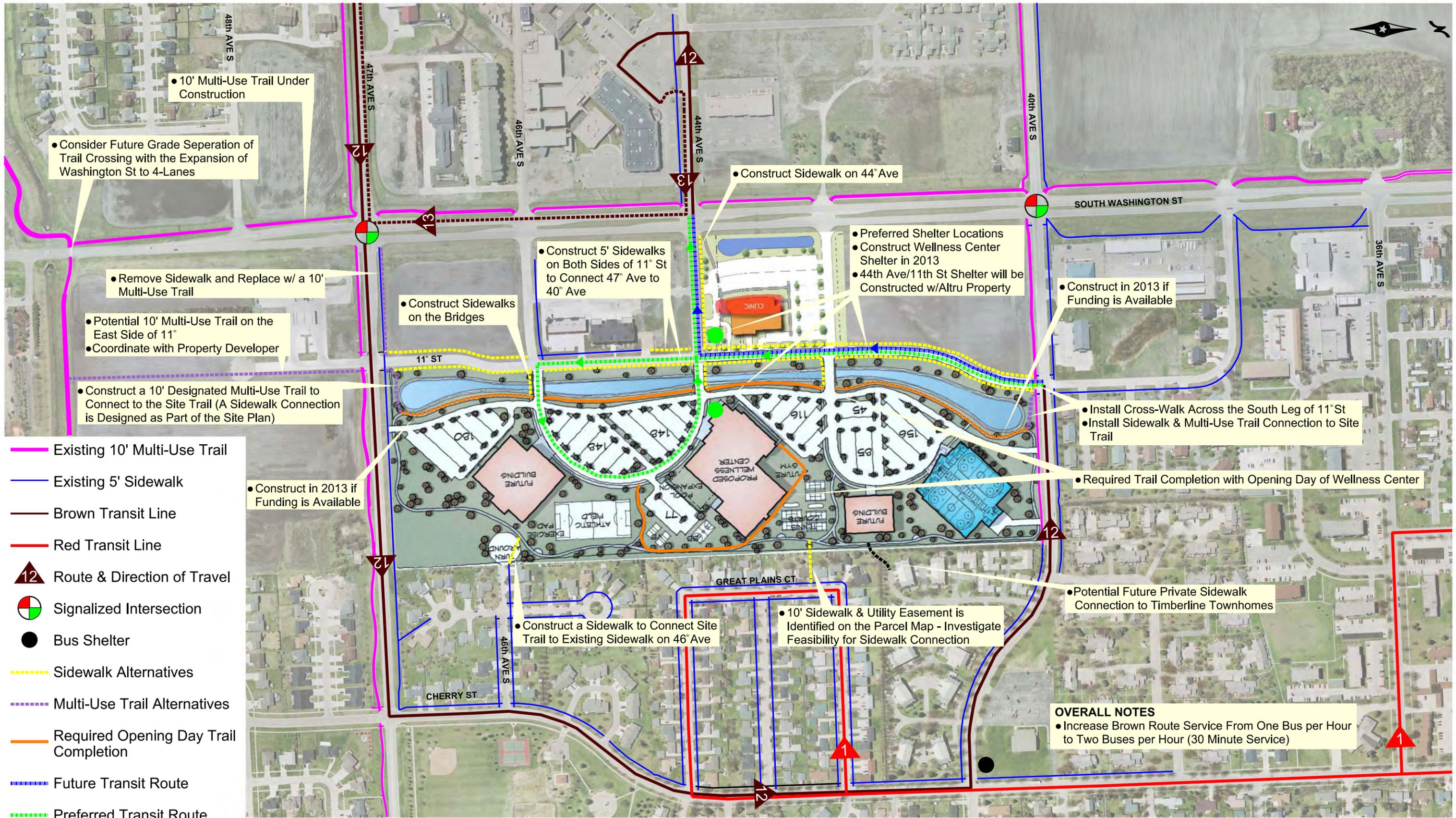
Improvements to the pedestrian, bicycle and transit network to make important connections, and provide integrated service/access with the Wellness Center site, are shown on Figure ES-3. Detailed discussion and description of each improvement measure are discussed in Section 4.3.

### Recommended Implementation Plan

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







The implementation plan provides the GF-EGF MPO with guidance and serves as a planning tool to develop a prioritization for future roadway and multimodal transportation improvements. Although it should be noted, the implementation plan could be subject to change based on actual development plans, market conditions or other unforeseen traffic changes that may occur in the future.

Preliminary costs were developed for the major components of the recommendations that are not already included in previously programmed projects and for those items the GF-EGF MPO are responsible for. The costs of these improvements are high level planning estimates, and should be applied/utilized in that regard. The improvement costs are based on estimated year 2010 construction costs and include surface level features only. The estimated construction costs were then increased by 30% to account for preliminary and final engineering design fees, minor utility impacts, construction administration and/or contingencies. Basic unit cost assumptions are as follows:

- Sidewalk and multiuse trail costs can range widely depending on quantities and whether constructed independently or with concurrent grading/site work. Estimates assume \$50 per linear foot and \$65 per linear foot for sidewalk and multiuse trail, respectively.
- Right turn lanes are estimated at approximately \$40,000 per 200 foot long lane and include the assumed relocation of one catch basin per turn lane.
- $\frac{3}{4}$  access median closures assume concrete center island construction, removal of existing median and addition of bituminous pavement at an estimated \$80,000 per closure. Two catch basin relocations per closure are assumed.
- Construction of positive offset left turn lanes at signalized intersections assume median reconstruction and pavement addition at an estimated \$65,000 per intersection. Separation of the left turn and adjacent through lane is provided via pavement markings. Two catch basin relocations per intersection are assumed.
- The construction of a typical city street (proposed frontage road) is estimated using \$400 per linear foot of road.

Right of way (if applicable), drainage considerations beyond the assumptions listed above, and grading are not included. Once preliminary design plans have been developed for these alternatives, a more refined cost estimate for each improvement measure can and should be established.

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

### Potential Funding Sources

To support the implementation of the recommended infrastructure and multimodal improvement measures, the GF-EGF MPO may seek support from available funding sources and/or integrate the implementation of select items with the redevelopment of property parcels. Key funding sources may include:

- Highway Safety Improvement Program (HSIP)
- Urban Roads Program
- Transportation Enhancement (TE) Dollars

- Recreational Trails
- Special Assessment
- JARC (Job Access Reverse Commute) federal transit funds

The MPO has submitted an application to receive a Federal Transit Administration Capital Investment Grant for the construction of multimodal improvements. The Grand Forks Livability Loop project is a scalable multi-year, multi-phase project to enhance accessibility, multimodal integration and options for users at key destinations throughout the community. Included within the grant application are five infrastructure improvements identified as part of the Wellness Center project. These items and their estimated construction costs include:

- 11<sup>th</sup> Street Extension: \$858,000 (includes roadway extension from 44<sup>th</sup> Avenue to 40<sup>th</sup> Avenue, sidewalks along both sides of 11<sup>th</sup> Street from 47<sup>th</sup> Avenue to 40<sup>th</sup> Avenue and sidewalk along the north side of 44<sup>th</sup> Avenue between Washington Street and 11<sup>th</sup> Street).
- Washington Street/44<sup>th</sup> Avenue Traffic Signal and Intersection Improvements: \$650,000 (includes traffic signal system, median reconstruction, and northbound/southbound right turn lanes)
- Wellness Center Trail Loop: \$1,029,600 (includes all shared use trails on the Wellness Center property between 47<sup>th</sup> Avenue and 40<sup>th</sup> Avenue).
- 11<sup>th</sup> Street/44<sup>th</sup> Avenue Bus Shelter: \$20,000
- Pedestrian Access to Bus Shelter: \$8,600

Items specific to the Livability Loop grant are denoted on Table ES-1.

Table ES-1 Implementation Plan and Cost Estimates

Transportation Mode	Location	Improvement Measure Description	Suggested Priority	Implementation Trigger	Lead Agency	Preliminary Cost Estimate (1)	Notes
Vehicle Mobility / Safety	Washington Street / 32nd Avenue	1. Re-stripe the existing WB right turn lane at Washington Street/32nd Avenue to a shared through/right turn lane. Reconstruct pork chop island on northeast corner to allow two WB through lanes	2013	Currently warranted	NDDOT	\$13,000	No Signal Improvements
		2. Conduct detailed intersection study to determine long term intersection improvements	2013	Incorporate into 2012 LRTP Update	GF-EGF MPO / NDDOT	\$50,000	
		3. Reconstruct intersection to widen 32nd Avenue to add an additional EB/WB through lane. The EB approach would consist of 2-left turn lanes, 2-through lanes and 1-right turn lane. The WB approach would consist of 1-left turn lane, 2-through lanes and 1-right turn lane.	Long-term	Based on implementation schedule determined through recommended intersection study	NDDOT	Requires Further Study (Item 2 above)	
	Washington Street / 36th Avenue	1. Install traffic signal system	Long-term	Closure of 34th Avenue and 38th Avenue medians, construction of the frontage road, redevelopment, road extension and/or Engineering Study determines it to be warranted	GF Engineering	\$625,000	
		2. Reconstruct center median to provide positive offset left turn lanes 3. Construct exclusive NB/SB right turn lanes	Long-term Long-term	Construct with traffic signal installation Construct with traffic signal installation	GF Engineering GF Engineering		
	Washington Street / 40th Avenue	1. Install traffic signal system (All approaches protected/permissive left turn operation)	2013	Required with Wellness Center	GF Engineering	2014 Programmed Project #23 (2012-2015 TIP)	Recommend switching construction year with Programmed Project #17 (2012-2015 TIP)
		2. Reconstruct center median to provide positive offset left turn lanes	2013	Construct with traffic signal installation	GF Engineering		
		3. Re-stripe EB/WB Approaches to provide an exclusive left turn lane and shared through/right turn lane	2013	Required with Wellness Center, if EB/WB right turn lanes are not constructed	GF Engineering		
		4. Construct exclusive NB/SB right turn lanes	2013	Construct with traffic signal installation	GF Engineering		
		5. Construct exclusive EB/WB right turn lanes at Washington Street/40th Avenue	2013	Construct with traffic signal installation	GF Engineering		
	Washington Street / 44th Avenue	1. Install traffic signal system (NB/SB protected/permissive left turn operation, EB/WB permissive only)	Long-term (2)	3/4 access median reconstruction at 42nd Avenue and 46th Avenue and Engineering Study determines it to be warranted	GF Engineering	\$650,000	
		2. Reconstruct center median to provide positive offset left turn lanes	Long-term (2)	Construct with traffic signal installation	GF Engineering		
		3. Re-stripe EB/WB Approaches to provide an exclusive right turn lane and shared left turn/through lane	2013	Required with Wellness Center	GF Engineering		
		4. Lengthen SB left turn lane	Long-term (2)	3/4 access median reconstruction at 42nd Avenue and 46th Avenue	GF Engineering		
		5. Construct exclusive NB/SB right turn lanes	Long-term (2)	Construct with traffic signal installation	GF Engineering		
Washington Street / 47th Avenue	1. Construct an exclusive EB right turn lane	Mid-term	Coordinate with 47th Avenue roadway improvements	GF Engineering	\$52,000		
	2. Extend NB left turn lane	Long-term	Construct with future 4-lane divided roadway extension of Washington Street	GF Engineering	\$26,000		
	3. Construct exclusive NB right turn lane	Long-term	Construct with future 4-lane divided roadway extension of Washington Street	GF Engineering	\$52,000		
47th Avenue / Cherry Street	1. Install all-way stop control	Long-term	Monitor traffic volumes, install when warranted	GF Engineering	\$650		
Washington Street Corridor	1. Install traffic signal coordination timing plans between 32nd Avenue and 47th Avenue	2013	Required with Wellness Center	GF Engineering	\$12,000		
	2. Construct 3/4 access median closure at Washington Street/38th Avenue and Washington Street 34th Avenue	Long-term	When determined needed	GF Engineering	\$208,000 (\$104,000 ea.)		
	3. Potential Frontage Road between 34th Avenue and 38th Avenue (west side of Washington Street). Contingent upon development plans and/or future 36th Street roadway alignment to the west	Long-term	Closure of 34th Avenue and 38th Avenue medians or warranted by development	GF Engineering	\$625,000		
	4. Construct 3/4 access median closure at Washington Street/46th Avenue and Washington Street/42nd Avenue	Long-term	When determined needed	GF Engineering	\$208,000 (\$104,000 ea.)		
	5. Improve access at 47th Avenue/Assisted Living Property (full access) and maintain internal circulation	Mid-term	Coordinate with 47th Avenue roadway improvements or closure of the Washington Street/46th Avenue median	GF Engineering	\$26,000		
	6. Optional -- Construct exclusive NB/SB right turn lanes at Washington Street/46th Avenue	Long-term	When determined needed	GF Engineering	\$104,000		
11th Street Corridor	1. Construct 3-lane section along 11th Street between 44th Avenue and 40th Avenue (40 foot streetwidth minimum)	2013 (2)	Required with Wellness Center	GF Engineering	\$858,000		
	2. Install thru-stop control at 11th Street/42nd Avenue, 44th Avenue and 46th Avenue	2013 (2)	Required with Wellness Center	GF Engineering			

Mid-term = Expected necessary within 5-15 years

Long term = expected necessary within 15-25 years

Note: (1) Preliminary cost estimates are based on 2010 average construction costs, which have been increased by 30% to account for preliminary and final engineering design service fees, utilities and contingency.

(2) Included in the FTA Livability Loop Grant Application. Construction costs provided by Grand Forks Engineering Department.

(3) Included in the FTA Livability Loop Grant (11th Street Extension). The sidewalk along 11th Street (east side) is estimated at \$140,000 and the west side is estimated at \$115,000. The sidewalk along 44th Avenue (north side) is estimated at \$32,500.

Table ES-1 Implementation Plan and Cost Estimates Continued

Transportation Mode	Location	Improvement Measure Description	Suggested Priority	Implementation Trigger	Lead Agency	Preliminary Cost Estimate	Notes
Bicycle / Pedestrian	47th Avenue	1. Remove existing sidewalk and Replace with a 10 foot multi-use trail between Washington Street and 11th Street 2. Construct 10 foot multi-use trail, east of 11th Street to connect into Wellness Center site trail system	Mid-term Mid-term	Construct concurrent with future trail extension on Washington Street (south of 47th Avenue) or development of adjoining parcel Construct with completion of Wellness Center trail loop.	GF Engineering Park District	\$49,400 (4)	
	11th Street	1. Construct sidewalk on east side of 11th Street between 47th Avenue and 40th Avenue 2. Construct sidewalk on west side of 11th Street between 47th Avenue and 40th Avenue	2013 Mid-term	Required with Wellness Center Construct with development of each parcel	Park District Property Owners	(3) (3)	Include in Development Site Plan
	44th Avenue	1. Construct sidewalk on north side of street between Washington Street and 11th Street	Mid-term	Required with Altru Clinic development	Altru Clinic	(3)	Include in Development Site Plan
	11th Street/40th Avenue	1. Construct 10 foot multi-use trail connection between existing trail on 40th Avenue and Wellness Center internal trail loop.	Mid-term	Construct with completion of Wellness Center trail loop.	Park District	(4)	
	Washington Street / At-Grade Trail Crossing	1. Conduct Feasibility Study to Grade separate (tunnel)	Long-term	Construct with future 4-lane divided roadway extension of Washington Street	GF-EGF MPO	\$156,000	Construct with Future 4-Lane Expansion Project
	Wellness Center Access Bridges (42nd, 44th and 46th Avenues)	1. Construct sidewalk on one side of the bridge connecting 11th Street into on site sidewalk system	2013	Required with Wellness Center	Park District	Included in Bridge Contract (Project Let 2011)	
	Wellness Center Trail Loop	1. Construct on-site internal trail loop (west side of property) 2. Construct segments of the trail loop (east side/south side of Wellness Center) to connect facility with Great Plains Court. 3. Construct remaining on-site internal trail loop (east side of property)	TBD (2) TBD (2) TBD (2)	Required with Wellness Center As funding becomes available or adjoining parcels are developed As funding becomes available or adjoining parcels are developed	Park District Park District Park District	 \$1,029,600 	
	11th Street (47th Avenue to South)	1. Potential 10 foot multi-use trail connection to South	Mid-term	Construct with development of parcel	Property Owners	\$117,000	Include in Development Site Plan
	Neighborhood Connection	1. Construct sidewalk connection between 46th Avenue and the east side of the Wellness Center property 2. Construct sidewalk on existing 10 foot Easement between Great Plains Court and east side of Wellness Center Property 3. Construct sidewalk between the Timberline Townhome Development and east side of Wellness Center Property	Mid-term Mid-term Mid-term	Construct concurrent with implementation of internal trail system on east side of Wellness Center property Investigate feasibility and construct when or if possible. Private Sidewalk as Determined Necessary by Timberline Townhome Association	GF Engineering / Park District GF Engineering / Park District GF Engineering / Park District	\$6,500 \$15,600 \$15,600	
	Transit	Brown Route	1. Re-route onto 11th Street and 44th Avenue (Circulate through Wellness Center site)	2013	Required with Wellness Center	Cities Area Transit	NA
3. Increase Brown Route service frequency from 1 bus per hour to every 30 minutes			Mid-term	Required with Wellness Center	Cities Area Transit	\$252,760 / year	
4. Consider adding evening and Sunday service (based on actual user demand)			Long-term	Grand Forks city wide Night CAT and Sunday service consideration.	Cities Area Transit	NA	
Transit Shelter		1. Install bus shelter and bench on northwest corner of 11th Street/44th Avenue intersection. 2. Incorporate bus shelter and bench into main entrance way of the Wellness Center building. Consider secondary shelter at 11th Street/44th Avenue intersection.	Mid-term (2) 2013	Construct with Altru Clinic property Required with Wellness Center	Cities Area Transit Cities Area Transit	\$20,000 Included in Building Contract	
Transit Signal Priority	1. Install traffic signal priority equipment at the Washington Street/44th Avenue intersection	Long-term	Install with traffic signal system	Cities Area Transit / GF Engineering	\$13,000		

Mid-term = Expected necessary within 5-15 years  
Long term = expected necessary within 15-25 years

Note: (1) Preliminary cost estimates are based on 2010 average construction costs, which have been increased by 30% to account for preliminary and final engineering design service fees, utilities and contingency.  
(2) Included in the FTA Livability Loop Grant Application. Construction costs provided by Grand Forks Engineering Department.  
(3) Included in the FTA Livability Loop Grant (11th Street Extension). The sidewalk along 11th Street (east side) is estimated at \$140,000 and the west side is estimated at \$115,000. The sidewalk along 44th Avenue (north side) is estimated at \$32,500.  
(4) Included in the FTA Livability Loop Grant (Wellness Center Trail Loop). The trail connection stubs between Wellness Trail Loop and existing roadway trail (both at 47th Avenue and at 40th Avenue) are estimated at \$12,600 each.

### 1.0 Introduction

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South Washington Street is a vital north/south link traversing the extents of the Grand Forks City limits and providing regional connectivity to communities to the north and south. Along its length, Washington Street serves a mix of land uses including commercial retail, institutional and residential properties. The corridor is heavily used by daily commuters accessing downtown Grand Forks, motorists traveling between Grand Forks and East Grand Forks and thoroughfare traffic not traveling on the interstate.

Currently, the segment of Washington Street south of 32<sup>nd</sup> Avenue is largely undeveloped; however, serves the needs of adjoining residential neighborhoods, a few small retail establishments and the Aurora Medical Clinic. The Parks District and wellness/fitness partners are proposing to construct a Community Wellness Center on the eastside of South Washington Street between 40<sup>th</sup> Avenue South and 47<sup>th</sup> Avenue South. The long term vision includes developing a medical and wellness style campus that will integrate the existing Aurora Medical facilities on the west side of Washington Street, with the proposed Wellness Center and future medical office and retail facilities. The change in land use designation may generate the need for additional roadway and multimodal (pedestrian, transit and bicycle) improvements to the surrounding area as traffic intensifies and travel patterns change.

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

#### 1.1 Project Location

The area included in this study is South Washington Street corridor from 47<sup>th</sup> Avenue South to 32<sup>nd</sup> Avenue South, South 11<sup>th</sup> Street, 47<sup>th</sup> Avenue South (Washington Street to Cherry Street) and 40<sup>th</sup> Avenue South (Washington Street to Cherry Street). In addition, the following ten existing intersections were evaluated:

- South Washington Street & 32<sup>nd</sup> Avenue South
- South Washington Street & 36<sup>th</sup> Avenue South
- South Washington Street & 38<sup>th</sup> Avenue South
- South Washington Street & 40<sup>th</sup> Avenue South
- South Washington Street & 44<sup>th</sup> Avenue South
- South Washington Street & 46<sup>th</sup> Avenue South
- South Washington Street & 47<sup>th</sup> Avenue South
- 47<sup>th</sup> Avenue South & South 11<sup>th</sup> Street
- 47<sup>th</sup> Avenue South & Cherry Street
- 40<sup>th</sup> Avenue South & Cherry Street

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

### 1.2 Study Purpose

The primary goal of the study is to provide a comprehensive look at the transportation needs of the southern portion of South Washington Street for existing conditions and as a result of future land use changes, including the development of the Wellness Center and associated buildings. A recommended transportation implementation plan will be provided to the GF-EGF MPO with a prioritized set of infrastructure, traffic operation and multi-modal improvements that coincide with short term (0-5 years), mid-term (5-15 years) and long term (greater than 15 years) needs.

### 1.3 Stakeholder and Public Involvement

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

- Study Review Committee (SRC)
- Policy Advisory Committee (PAC)
- Public Meetings
- Project Website

#### 1.3.1 Study Review Committee

The SRC consisted of members of the Parks District, Grand Forks Engineering, Public Works – Streets, Planning and the MPO. The SRC was at the center of the public involvement and provided the technical review and guiding direction for the study. The South Washington Street Corridor Study was completed under the direction of the following SRC members:

- Nancy Ellis, GF-EGF MPO Senior Planner
- Jane Williams, Grand Forks Engineering Department
- Mark Aubol, Grand Forks Public Works Street Department
- Brad Gengler, Grand Forks Planning Department
- Bill Palmiscno, Park District Department
- Dale Bergman, Cities Area Transit

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

#### 1.3.2 Policy Review Committee

The PAC included representation from the City Council, Planning and Zoning Commission, the Park Board, Aurora Medical Park and the surrounding neighborhood. The PAC provided a forum for project review and issue discussion. The PAC plays an integral in establishing a connection between the project team and the community. Participants included:

- Jim Bollman, Park Board
- Tim Tosh, Aurora Medical Park
- Doug Christensen, Grand Forks City Council

- Laura Jelinek, Grand Forks Planning Commission
- Ken Vein, Altru Clinics
- Mark Dusenbury, Neighborhood Resident
- Kerwin Kjelstrom, Neighborhood Resident

The PAC met three times over the course of the study. Minutes for the PAC meetings are included in Appendix B.

### 1.3.3 Public Meetings

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

- Be actively engaged in the planning process
- Provide comment and express ideas
- Distribute and present information
- Serve as listening sessions for the project team

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

- **1<sup>st</sup> Public Open House** – Held on Wednesday, February 23<sup>rd</sup>, 6:30 PM at City Hall. The existing conditions of the study area were presented.
- **2<sup>nd</sup> Public Open House** – Held on Wednesday, May 18<sup>th</sup>, 6:30 PM at South Middle School. The Future Conditions and Recommendations of the study were presented.

Attendance information, questions and comments from the Public Meetings are included in Appendix C.

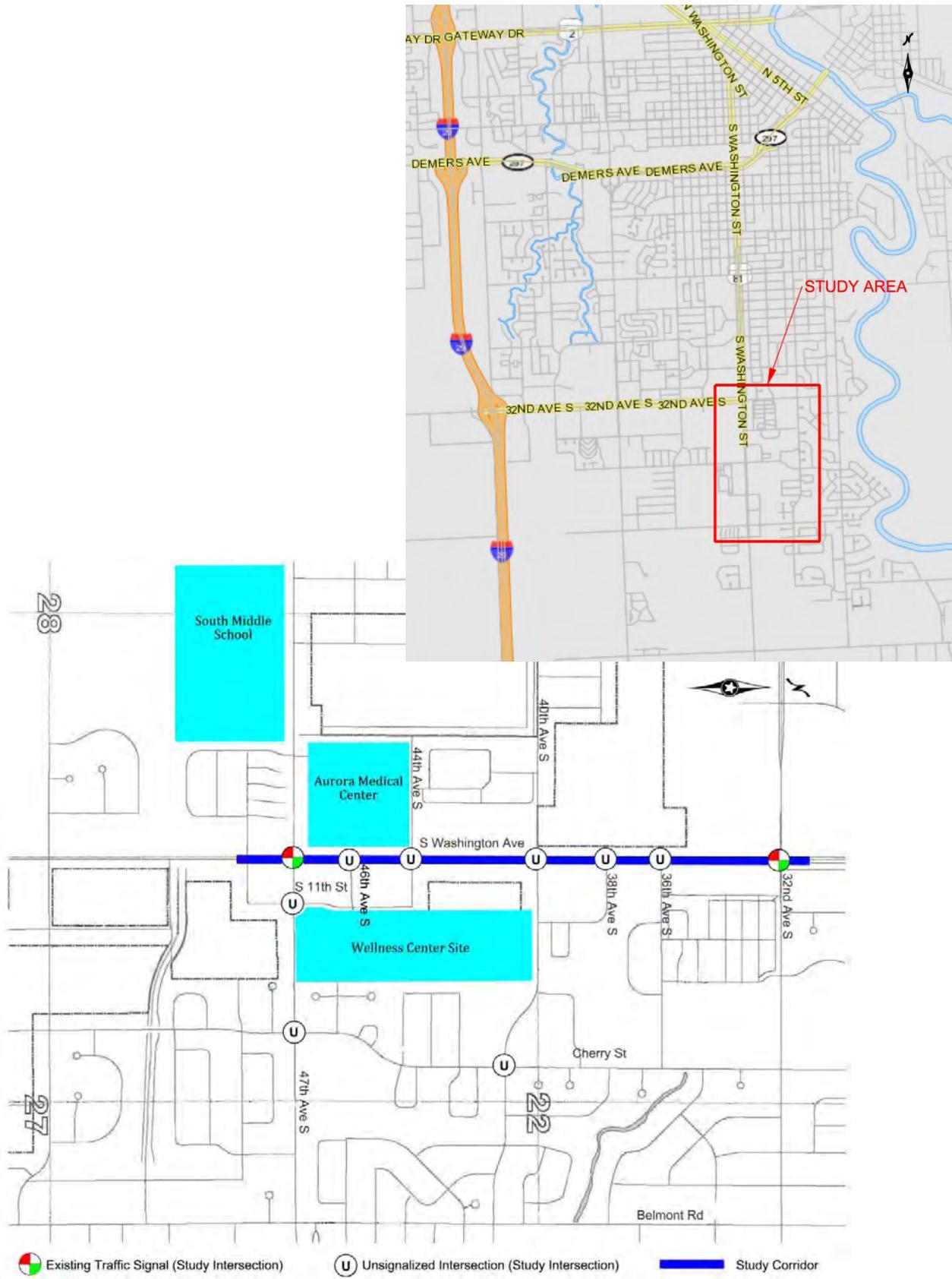
### 1.3.4 Project Website

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

## 1.4 47<sup>th</sup> Avenue Corridor Study Coordination

A study for the 47<sup>th</sup> Avenue Corridor is being concurrently completed by another consulting firm. The technical analysis for the South Washington Street Corridor Study has been completed in coordination with the 47<sup>th</sup> Avenue Corridor study. The recommended transportation plan will be compatible with the recommendations of 47<sup>th</sup> Avenue Corridor Study.

# South Washington Street Corridor Study



**Figure 1.1. Project Location and Study Area**

## 2.0 Existing Conditions

Key components of the existing conditions for the South Washington Street Corridor Study include land use, corridor characteristics, mobility (traffic operations) and roadway safety. Existing or baseline land use and transportation network conditions are defined in the following sections.

### 2.1 Land Use

South Washington Street is unique as it connects agricultural areas on the south to the downtown area of Grand Forks to the north. In the study area, bordering the east side of South Washington Street are many retail/office parcels that have recently been constructed or are currently under development. Further to the east of these retail/office land uses, mainly residential land uses exist bounded by the Red River. The west side of South Washington Street is vacant and residential lands uses with Aurora Medical Park and memory care facilities spanning from 44<sup>th</sup> Avenue South to 47<sup>th</sup> Avenue South. Figure 2.1 shows the existing land use map from 2010 as detailed in the Grand Forks-East Grand Forks 2040 Land Use Plan<sup>1</sup>.

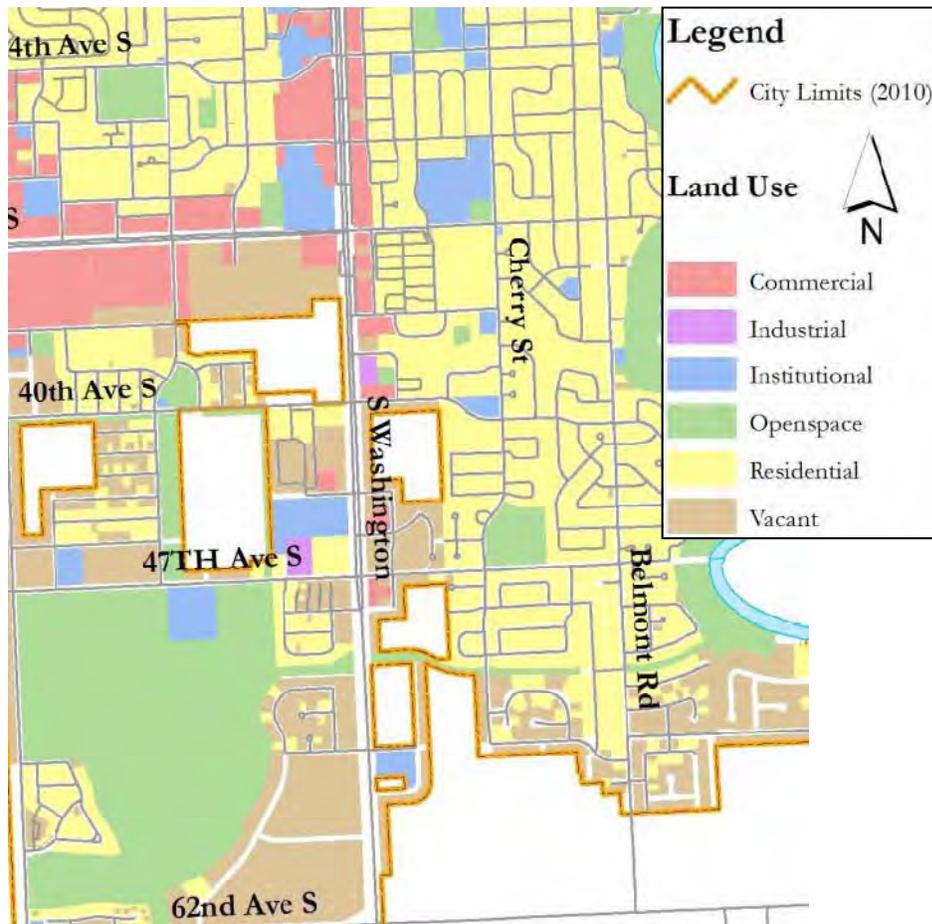


Figure 2.1. Existing Land Use Map

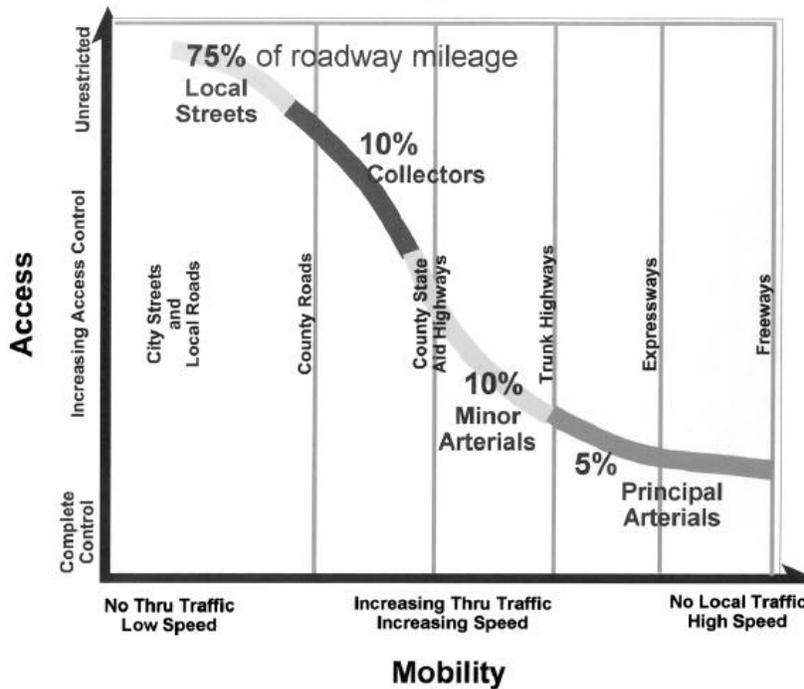
<sup>1</sup> Grand Fork – East Grand Forks Land Use Plan Update Draft, [www.grandforksgov.com/gfgov/home.nsf/Pages/Land+Use](http://www.grandforksgov.com/gfgov/home.nsf/Pages/Land+Use)

## 2.2 Corridor Characteristics

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

### 2.2.1 Functional Class

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



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

Figure 2.2 Access/Mobility Relationship to Functional Classification

The South Washington Street corridor is defined as a Principle Arterial and categorized as a Level 4 roadway for access control where mobility is emphasized and access is limited. The GF-EGF LRTP<sup>2</sup> states that principle arterials carry some of the highest traffic loads and the backbone of the transportation system. Figure 2.3 shows the transportation system functional classification of the surrounding roadway network as defined in the GF-EGF LRTP. 47<sup>th</sup> Avenue is defined as a Minor Arterial and is important for both access and mobility. 40<sup>th</sup> Avenue is defined as a Collector with limited mobility and high access.

<sup>2</sup> Grand Forks-East Grand Forks Long Range Transportation Plan Update, Street & Highway Element, January 2008

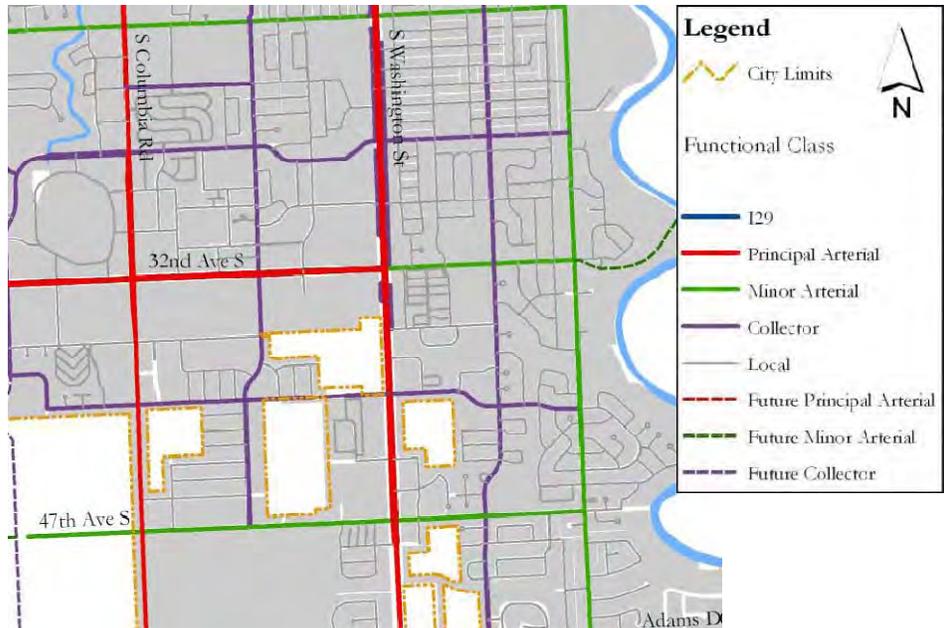


Figure 2.3 Transportation System Functional Classification

**2.2.2 Access Spacing**

One of the key factors affecting the quality of mobility (traffic operations) and the safety characteristics is roadway access. The City of Grand Forks has developed Access Management Guidelines for each level of roadway to help guide development and prioritize roadway improvements. Table 2.1 details the City’s access spacing guidelines. Figure 2.4 shows the existing intersection spacing along South Washington Street.

**Table 2.1 City of Grand Forks Access Control<sup>3</sup>**

Roadway Category	Full Access Spacing Requirements
Level 6	As Needed
Level 5	300' (No private residential accesses allowed. Access allowed to uses with over 150' of frontage. Uses with smaller frontage are allowed shared common drives.)
Level 4	660'
Level 3	1,320' Intersection (Private access at 660')
Level 2	2,640' Intersection (Private access at 1,320')
Level 1	FHWA and NDDOT Approval

1. City of Grand Forks Land Use Development Code Article 9 Subdivision Regulations.

**2.2.3 Geometrics and Traffic Control**

To determine the existing quality of traffic capacity and resulting operations, the roadway and intersection geometries and traffic control were documented. Figure 2.4 illustrates the existing geometrics and traffic control, as well as the existing access spacing previously discussed.

<sup>3</sup> City of Grand Forks Land Use Development Code, Article 9, Subdivision Regulations.

**2.2.4 Multimodal Facilities**

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

**Bicycle/Pedestrian**

Grand Forks/East Grand Forks currently has 46 miles of paved bicycle/pedestrian trails that traverse the City and Greenway areas. An additional 18 miles are currently planned. In the study area, a 10-foot paved bicycle/pedestrian trail exists on the west side of South Washington Street from 47<sup>th</sup> Avenue South to 15<sup>th</sup> Avenue South. Paved trails also exist on the south sides 47<sup>th</sup> Avenue South and 40<sup>th</sup> Avenue. Just south of 47<sup>th</sup> Avenue South, there is a marked trail crossing on South Washington Street at approximately 52<sup>nd</sup> Avenue. The crossing is zebra striped with pedestrian pushbutton activated flashers.

**Sidewalks**

Five-foot concrete sidewalks exist on many of the local neighborhood streets near the site. Sidewalks are also constructed on the north side of 47<sup>th</sup> Avenue and on a portion of the north and south sides of 40<sup>th</sup> Avenue. Partial sidewalks have been constructed on South 11<sup>th</sup> Street and 46<sup>th</sup> Avenue South.

**Transit**

Cities Area Transit (CAT) is the public transportation system serving Grand Forks and East Grand Forks. Table 2.2 highlights the Brown Route and the Red Route, which currently service the Wellness Center area. The Brown Route travels from the Alerus Center, Columbia Mall and Aurora Medical Park. The current Brown Route currently services the Wellness Center area between 6:00 AM and 5:30 PM weekdays on a one bus per hour frequency. The Red Route travels from Cherry Street, Tufto Manor and Great Plain Court between the hours of 7:00 AM and 6:00 PM. The Red Route provides one bus per hour service. Saturday service is currently offered for both the Brown and Red route beginning at 8:00 AM.

**Table 2.2 Existing Transit Service**

Route	Red Route	Brown Route
Stop Location	Great Plains	Aurora Medical
<b>Time</b>	--	6:13 AM
	7:10 AM	7:13 AM
	8:10 AM	8:13 AM
	9:10 AM	9:13 AM
	10:10 AM	10:13 AM
	11:10 AM	11:13 AM
	12:10 PM	12:13 PM
	1:10 PM	1:13 PM
	2:10 PM	2:13 PM
	3:13 PM	3:16 PM
	4:13 PM	4:16 PM
	5:13 PM	5:16 PM
	6:10 PM	--



2-LANE UNDIVIDED

4-LANE DIVIDED

LANE GEOMETRICS

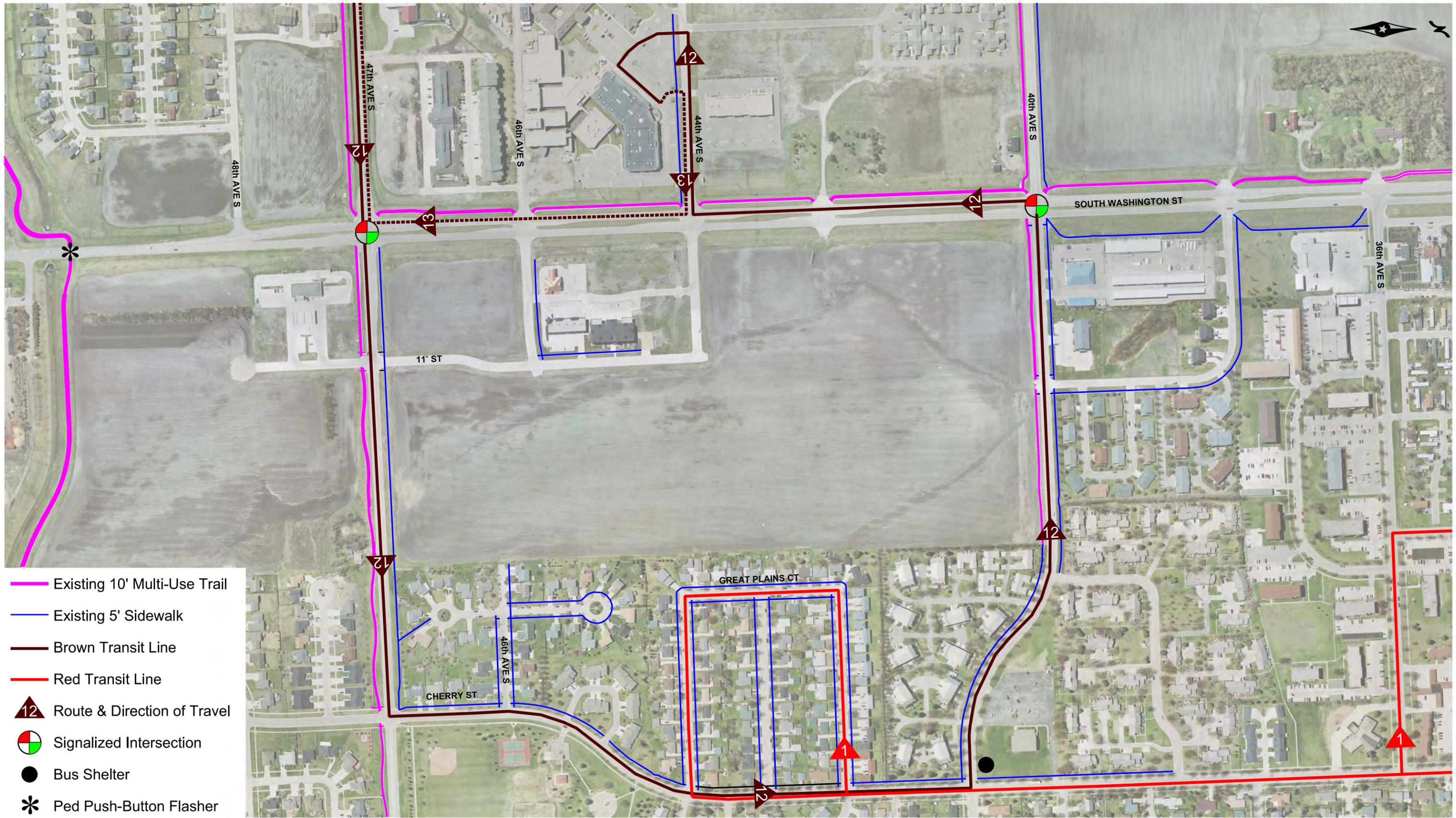
STOP CONTROLLED APPROACH

SIGNALIZED INTERSECTION

SOUTH WASHINGTON STREET CORRIDOR STUDY



**FIGURE 2.4**  
**EXISTING GEOMETRICS, TRAFFIC CONTROL**  
**AND ACCESS SPACING**



SOUTH WASHINGTON STREET CORRIDOR STUDY

FIGURE 2.5  
EXISTING MULTIMODAL FACILITIES

### 2.3 Mobility

An assessment of the existing quality of mobility (traffic operations) for the corridor and the ten existing intersections was completed. The following sections document the existing traffic operations characteristics.

#### 2.3.1 Intersection Volumes and ADT

To determine the existing quality of traffic operations in the study area, a traffic operations analysis was conducted for the ten existing study area intersections and roadway segments. To complete the traffic analysis, existing vehicular traffic volumes were documented. The GF-EGF MPO provided year 2010 turning movement counts for a 12-hour period for the study area intersections. From the 12-hour counts, AM and PM peak hour turning movements were calculated. The AM and PM peak hours were found to be 7:30 to 8:30 AM and 4:45 to 5:45 PM. Additionally, the Average Daily Traffic (ADT) volumes were estimated based on the 12-hour counts. Figure 2.6 shows the existing 2010 AM and PM peak hour turning movement counts and the estimated 2010 ADT.

#### 2.3.2 Traffic Operations Analysis

The quality of traffic flow and mobility was measured using Level of Service (LOS) methodology. LOS calculations were performed for the South Washington Street corridor as well as the 10 key intersections. A discussion of the capacity including LOS is included in the following sections.

##### Definition of Level of Service

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

The study area intersections and the South Washington Street corridor were analyzed to determine the operating LOS, a quantitative analysis that compares the vehicle flow of traffic on a roadway or through an intersection with the vehicle flow capacity of that particular roadway. The results are then categorized on an LOS A to LOS F scale. LOS A represents high quality traffic operations where motorists experience little or no delay (i.e. free flow conditions). Conversely, LOS F corresponds to low quality operations with high delays and congestion. This study used the LOS C/D boundary, as directed by the GF-EGF MPO, as the lowest accepted level of service.

Although the measure of effectiveness used in determining LOS for each facility (i.e., arterial street vs. rural highway vs. signalized intersection) may differ, the concept of the LOS grade is

the same. The general relationship between capacity and LOS are graphically displayed in Table 2.3.

**Table 2.3 Level of Service Description**

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

**Intersection Level of Service**

The LOS grade for an intersection as a whole is based on a weighted average delay of each movement. The delays can vary greatly based on traffic volume, lane geometry and intersection traffic control (traffic signal, through-stop and all-way-stop). Grades are different at unsignalized and signalized intersections; due to the fact the drivers anticipate longer delays at signalized intersections. Table 2.4 details the ranges for each letter grade for both types of intersection, in seconds of average delay per vehicle. This is based on the 2000 Highway Capacity Manual (HCM), published by the Transportation Research Board.

**Table 2.4 Level of Service vs. Average Delay – Signalized and Unsignalized Intersections<sup>4</sup>**

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

The AM and PM peak hour LOS was calculated at each of the key intersections identified previously. It is important to note that the LOS presented for unsignalized through-stop

<sup>4</sup> 2000 Highway Capacity Manual (HCM), Published by the Transportation Research Board.

intersections represents the movement with the highest level of wait time (almost always the minor street left turn). This is a variation from signalized intersections in which the LOS presented represents an average for all movements through the intersection. It is quite common at thru-stop controlled intersections on higher volume roadways for minor streets approaches to experience higher wait times, when the actual overall delay would correspond to LOS A.

The intersection traffic operations analysis was completed for the existing conditions for both the AM and PM peak hours using the Synchro/SimTraffic7 software package. The software model was calibrated using the existing signal timing provided by the City of Grand Forks. The LOS was calculated from the averaged delay per vehicle from five SimTraffic runs. For signalized intersections, the overall intersection LOS is shown. For unsignalized intersections, the critical stop-controlled movement and overall intersection LOS is shown. Table 2.5 summarizes the existing LOS for the study area intersections. The existing intersection LOS is also detailed on Figure 2.5 (Existing 2010 Turning Movement Counts, ADT and LOS) previously presented.

**Table 2.5 Existing Intersection LOS**

Intersection	Traffic Control	AM Peak Intersection LOS <sup>1</sup>	PM Peak Intersection LOS <sup>1</sup>
Washington St @ 32nd Ave	Traffic Signal	C	D
Washington St @ 36th Ave	Thru-Stop	A / B	A / C
Washington St @ 38th Ave	Thru-Stop	A / B	A / A
Washington St @ 40th Ave	Thru-Stop	A / C	A / C
Washington St @ 44th Ave	Thru-Stop	A / A	A / A
Washington St @ 46th Ave	Thru-Stop	A / B	A / C
Washington St @ 47th Ave	Traffic Signal	B	B
47th Ave @ 11th St	Thru-Stop	A / B	A / A
40th Ave @ Cherry St	Thru-Stop	A / A	A / A
47th Ave @ Cherry St	Thru-Stop	A / A	A / A

<sup>1</sup> LOS shown is overall intersection for signals. For Thru-Stop control, X / X is report for overall intersection and critical stop control movement, respectively.

Source: Alliant Engineering, Inc using Synchro/SimTraffic 7.0 and 2010 traffic volume data.

As shown, nearly all intersections within the study area are currently operating at an acceptable LOS C or better during both the AM and PM peak periods. It is noted that the South Washington Street/32<sup>nd</sup> Avenue signalized intersection is approaching capacity (LOS D/E boundary).

**Arterial Level of Service**

Arterial roadway LOS is based upon the 2000 HCM. Based on the existing operations, roadway characteristics, traffic volume characteristics and the surrounding land uses, South Washington Street is classified as an Urban Street. Urban Streets are roadways that primarily serve longer through trips; however, they also provide access and traffic circulation within residential, commercial and industrial industries. Urban Streets are typically characterized by an urban design and the presence of a series of traffic signal systems.

The general parameters used in the urban street segment analysis is intersection geometry, traffic volume characteristics, signal timing parameters, progression quality, segment length and signal spacing and posted speed limit. The key measure of effectiveness (MOE) in determining LOS is average operating speed.

The urban street analysis was conducted using the Synchro/SimTraffic 7 software package. Synchro/Simtraffic 7 follows the methodologies and procedures of the HCM 2000 in computing segment average speed and determining LOS. The LOS was determined for the existing conditions on South Washington Street for the northbound and southbound travel directions from the averaged speed from five SimTraffic runs. Table 2.6 summarizes the existing arterial LOS of South Washington Street.

**Table 2.6 Existing Arterial LOS – South Washington Street**

**Northbound S Washington Street**

Cross-Street Intersection	Distance	Urban Street Class <sup>1</sup>	AM Peak Hour		PM Peak Hour	
			Average Travel Speed (mph) <sup>2</sup>	LOS	Average Travel Speed (mph) <sup>2</sup>	LOS
48th Ave to 40th Ave	4,196	II	34.5	B	34.9	B
40th Ave to 32nd Ave	2,636	II	30.0	B	23.7	C
<b>Corridor Total</b>	<b>6,832</b>	<b>II</b>	<b>32.6</b>	<b>B</b>	<b>33.8</b>	<b>B</b>

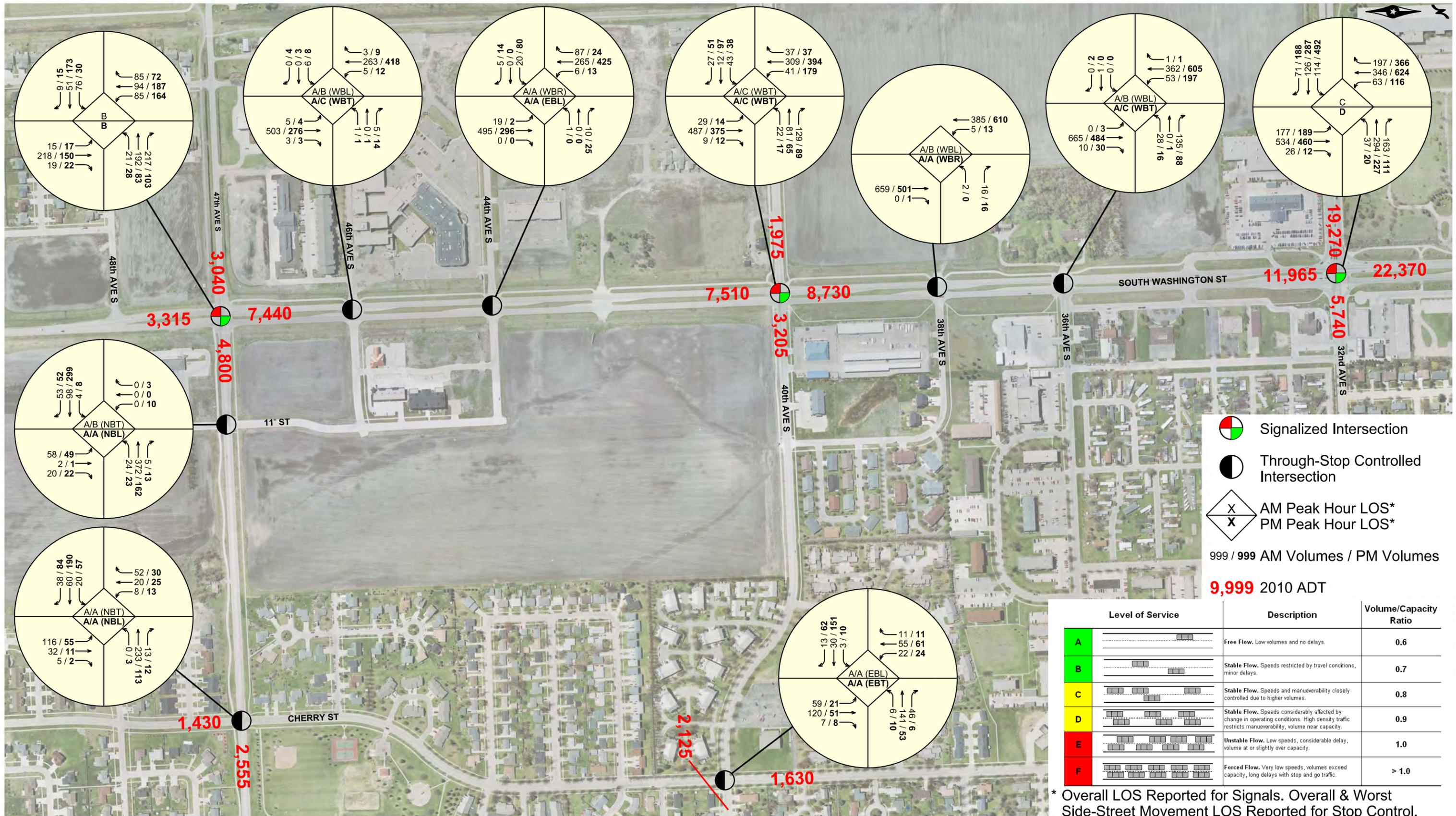
**Southbound S Washington Street**

Cross-Street Intersection	Distance	Urban Street Class <sup>1</sup>	AM Peak Hour		PM Peak Hour	
			Average Travel Speed (mph) <sup>2</sup>	LOS	Average Travel Speed (mph) <sup>2</sup>	LOS
32nd Ave to 40th Ave	3,963	II	29.4	B	26.0	C
40th Ave to 48th Ave	3,166	II	40.9	A	41.8	A
<b>Corridor Total</b>	<b>7,129</b>	<b>II</b>	<b>33.6</b>	<b>B</b>	<b>31.2</b>	<b>B</b>

<sup>1</sup> Roadway classification as defined by the Highway Capacity Manual 2000 used in determining the LOS.

<sup>2</sup> SimTraffic model output for AM and PM peak hours.

For the existing conditions, the South Washington Street Corridor operates acceptably at a LOS C or better.



### 2.4 Roadway Safety

A review of the corridor crash records was conducted to evaluate the safety characteristics of the roadway. Historical crash data from 2007 to mid 2009 was provided by the City of Grand Forks.

#### 2.4.1 Key Factors in Safety Analysis

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

##### Crash Rate

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

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

##### Critical Crash Rate

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

##### Crash Severity

The third key factor in establishing safety deficiencies is crash severity. Crash severity quantifies how severe the crashes are at a particular location. In the crash information provided by the City of Grand Forks, crashes are categorized into three major categories of severity:

- Property Damage – no injuries occurred
- Injury Crashes – injury occurred
- Fatal Crashes – at least one fatality occurred in the crash

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

**Distribution of Crash Type**

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

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

The Grand Forks citywide average for each of these types was calculated. By identifying particular locations having a crash distribution that varies from the expected distribution, safety deficiencies that were not highlighted by the other factors can be documented.

**2.4.2 Crash Summary**

The total number of crashes in the study area, documented by severity, is illustrated in Table 2.7.

**Table 2.7 Summary of Total Crashes by Severity**

Fatal	Injury	Property Damage	Total
0	9	25	34

Table 2.8 summarizes the crash rate and critical crash rate for each of the study area intersections.

The distribution of crash type in the study area was compared to the distribution of the entire City of Grand Forks. Table 2.9 depicts a graphical representation of the crash type distribution.

**Table 2.8 Summary of Crash Rate and Critical Crash Rate**

Intersection	Traffic Control	Total Crashes	Crash Rate	Critical Crash Rate <sup>1,2</sup>
Washington St @ 32nd Ave	Signal	18	0.81	1.31
Washington St @ 36th Ave	Thru-Stop	0	0.00	0.76
Washington St @ 38th Ave	Thru-Stop	1	0.12	0.85
Washington St @ 40th Ave	Thru-Stop	4	0.34	0.75
Washington St @ 44th Ave	Thru-Stop	0	0.00	0.91
Washington St @ 46th Ave	Thru-Stop	0	0.00	0.89
Washington St @ 47th Ave	Signal <sup>3</sup>	6	0.63	1.45
47th Ave @ 11th St	Thru-Stop	0	0.00	1.04
40th Ave @ Cherry St	Thru-Stop	3	0.72	1.11
47th Ave @ Cherry St	Thru-Stop	2	0.41	1.04
Study Area Total		34		

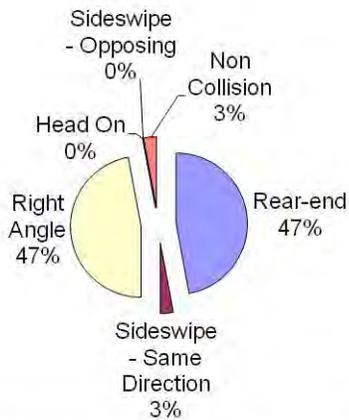
<sup>1</sup> The critical crash rate is a statistically adjusted crash rate to account for random nature of crashes.

<sup>2</sup> A 99.5% confidence level was assumed. An average crash rate of 0.8 was assumed for signal control and 0.3 for thru-stop control.

<sup>3</sup> Crashes occurred prior to signal install.

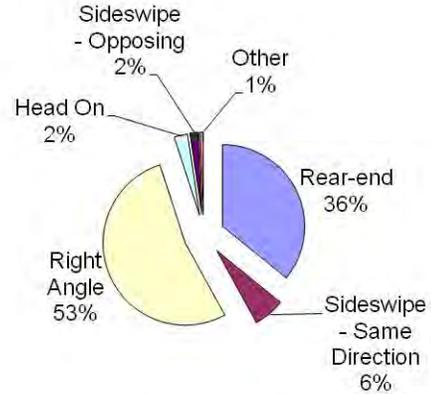
**Table 2.9 Crash Type Distribution**

**Study Area<sup>1</sup>**



<sup>1</sup>Source: City of Grand Forks, data dated years 2007-mid 2009.

**Grand Forks Citywide Average<sup>1</sup>**



<sup>1</sup>Source: City of Grand Forks, data dated years 2007-mid 2009.

The intersections of South Washington Street/32<sup>nd</sup> Avenue and South Washington Street/47<sup>th</sup> Avenue have critical crash rates that exceed the crash rate and have been identified as Hot Spot locations for crashes.

Investigations of the crash type distribution showed a high number of rear-end crashes at the South Washington Street/32<sup>nd</sup> Avenue intersection. In many cases, increased rear-end crashes are attributable to congested traffic signals that have deficient timing and coordination plans with adjacent signals. It is noted that the timing and coordination of this traffic signal has recently

been updated in the Fall of 2010. Crash data is not currently available for a long enough period of time to determine an improvement, but it is anticipated the crash potential has decreased with the retiming.

A traffic signal was recently installed at the South Washington Street/47<sup>th</sup> Avenue intersection. The crash data provided for this intersection was previously from stop-controlled operations. Review of the crash type distribution at this intersection indicates a higher number of right-angle crashes. It is anticipated that the new signal will help reduce this type of crash as the side-street vehicles will have a protected movement.

It is suggested that these two crash hot spot locations be monitored in the future to determine if the updated signal timing and coordination or the recently installed traffic signal at 47<sup>th</sup> Avenue has improved the intersection safety. Roadway safety hazards at the remaining intersection were not identified.

### **2.5 Identification on Deficiencies**

Review of the existing conditions indicates that there is no major roadway or multimodal deficiencies in the existing roadway network. However, several gaps in sidewalk connectivity do exist along 11<sup>th</sup> Street. Existing intersection and arterial LOS is acceptable and no roadway safety hazards were identified. As traffic volumes increase and land uses change and develop on the South Washington Street Corridor, access configuration and spacing may need to be addresses to emphasize mobility and safety.

## 3.0 Future Transportation Needs

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

### 3.1 Study Scenarios

To determine accurate infrastructure improvements and the needed time frames for these improvements, two study year scenarios were identified. The following describes the scenarios:

- **2013 Conditions** – This scenario corresponds to the completion and opening of the main Wellness Center building and hockey complex on the Wellness Center site. The infrastructure improvements needed for opening day operations will be determined.
- **2035 Conditions** – This scenario corresponds to the traffic forecasts in the GF-EGF MPO Long Range Transportation Plan (LRTP). It is also assumed that the remaining buildings on the Wellness Center site and surrounding parcels are developed and several other adjacent properties are developed. Mid- term and long-range infrastructure improvements will be determined.

### 3.2 Long Range Transportation Plan

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

#### 3.2.1 Land Use Plan, Housing Growth and Employment Growth

To gauge how the study area is going to develop in the future and to understand the TAZ data that is inputted into the ATAC traffic model, the following three future indicators from the GF-EGF LRTP were investigated:

- **2035 Land Use Plan – Figure 3.1.** The areas surrounding South Washington Street, south of Merrifield Road are assumed to remain agricultural land uses. North of Merrifield Road, residential and commercial land uses are shown bordering South Washington Street. Many of these areas are currently undeveloped.
- **Growth in Housing from 2005 to 2035 – Figure 3.2.** TAZ growth of more than 500 houses in some zones bordering South Washington Street is anticipated. In general,

there is high residential growth predicted on the south portion of South Washington Street.

- **Growth in Employment from 2005 to 2035 – Figure 3.3.** There is high employment growth predicted in the TAZs surround South Washington Street between 32<sup>nd</sup> Avenue and 47<sup>th</sup> Avenue.

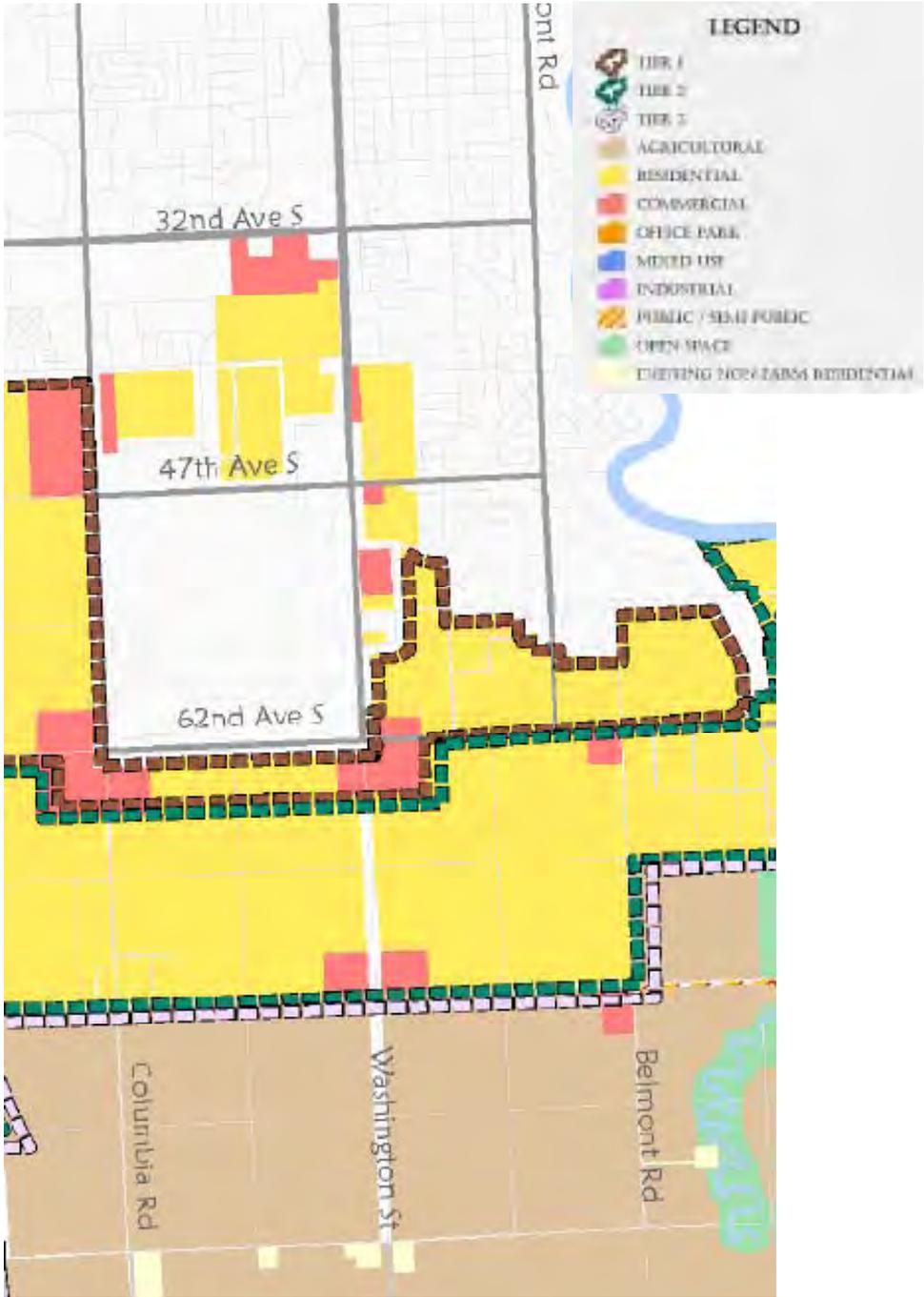


Figure 3.1 2035 Land Use Plan

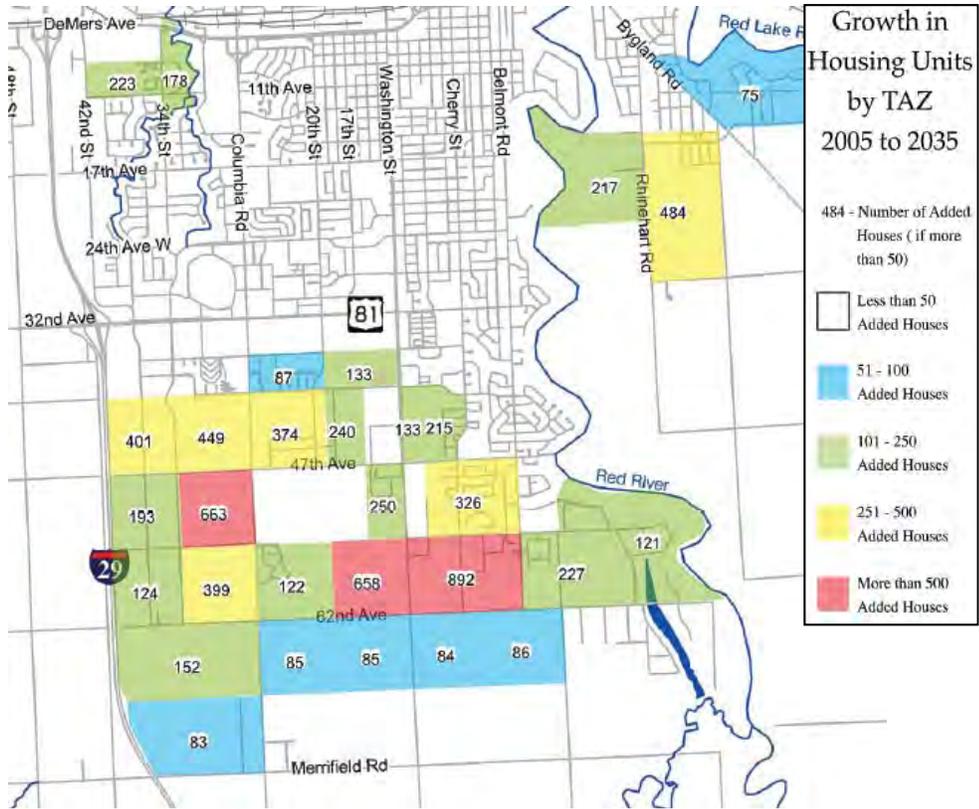


Figure 3.2 Growth in Housing Units by TAZ (2005 to 2035)

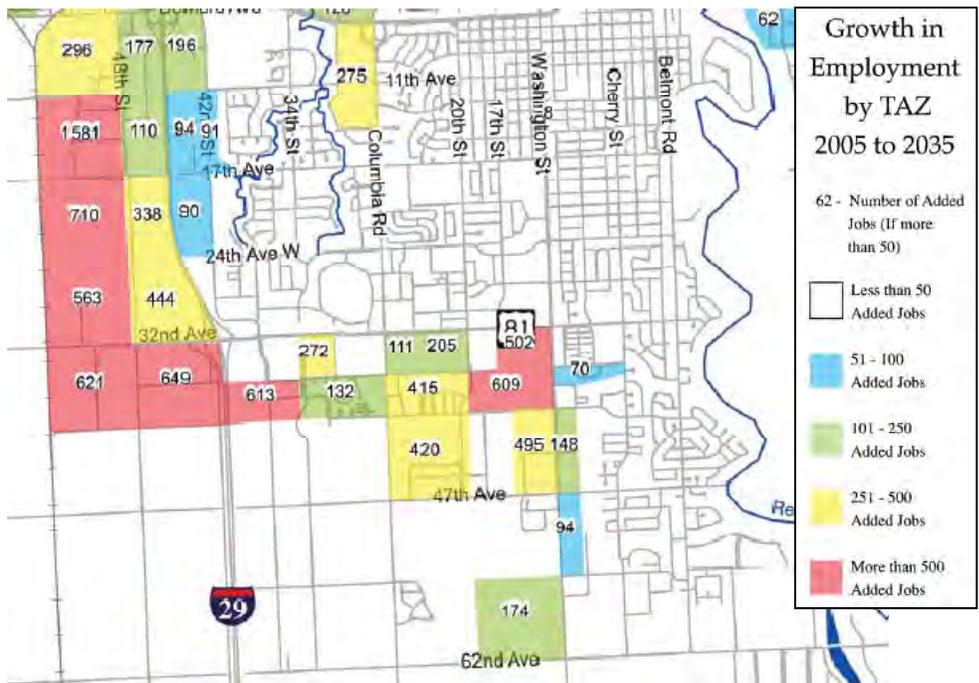


Figure 3.3 Growth in Employment by TAZ (2005 to 2035)

With the construction of the proposed Wellness Center site, TAZ data for Zones 244 and 544 has changed slightly since the publication of the GF-EGF LRTP. Previously, residential land uses were assumed with low employment growth. With the Wellness Center site fully developed, employment growth will be high and residential growth is low. The GF-EGF MPO sent updated information to ATAC and the traffic model was updated to produce revised year 2035 traffic volume forecasts.

### 3.2.2 LRTP Infrastructure Improvements

The ATAC traffic model update for the Wellness Center development is not assumed to change any of the infrastructure improvements that are highlighted in the GF-EGF LRTP. Based on the GF-EGF LRTP, one long-term major infrastructure improvement is recommended in the study area; the widening of South Washington Street from a two-lane roadway to a four-lane roadway on the segment from 48<sup>th</sup> Avenue to 57<sup>th</sup> Avenue. This recommendation is assumed for the 2035 scenario (long-term) of this study.

### 3.3 Programmed Roadway Improvements

There are currently two programmed infrastructure improvements by the City of Grand Forks planned in the study area network. The first is a traffic signal installation at the South Washington Street/ 40<sup>th</sup> Avenue intersection. The signal is currently programmed to be installed in 2014 (the implementation plan will recommend the 2012-2015 Transportation Improvement Plan be updated to install the traffic signal in year 2013 to coincide with the Wellness Center). Included in the signal installation is the construction of dedicated northbound and southbound right turn lanes on South Washington Street and modification of the center median to provide for positive offset left turn lanes.

The second infrastructure improvement is the extension of 11<sup>th</sup> Street to the north to 40<sup>th</sup> Avenue. With the Wellness Center site construction the City of Grand Forks will extend 11<sup>th</sup> Street from the current stub at 44<sup>th</sup> Street north to 40<sup>th</sup> Avenue. All necessary utilities will be constructed with this improvement.

Both of these infrastructure improvements are assumed for the 2013 conditions scenario of this study.

### 3.4 Planned Developments

Planned developments in the study area were investigated to better estimate the traffic conditions for the 2013 and 2035 scenarios. The development areas and land uses were determined through review of the 2035 Land Use Plan and the SRC and PAC meetings. Table 3.1 provides a description of each of the areas and assumed completion year. Figure 3.4 illustrates the location of the planned developments and the assumed development year. Figure 3.5 depicts the proposed Wellness Center site plan concept.

**Table 3.1 Development Area Description**

Development #	Land Use Description	Evaluation Year
1	<ul style="list-style-type: none"> <li>● Wellness Center Build</li> <li>● Hockey Complex</li> </ul>	2013
2	<ul style="list-style-type: none"> <li>● ALTRU Medical Offices</li> </ul>	2013
3	<ul style="list-style-type: none"> <li>● Single Family Houses</li> <li>● Townhouses</li> </ul>	2013
4	<ul style="list-style-type: none"> <li>● Single Family Houses</li> <li>● Apartments</li> </ul>	2035
5	<ul style="list-style-type: none"> <li>● Retail (Strip Mall)</li> </ul>	2035
6	<ul style="list-style-type: none"> <li>● ALTRU Medical Offices</li> </ul>	2035
7	<ul style="list-style-type: none"> <li>● ALTRU Medical Offices</li> </ul>	2035
8	<ul style="list-style-type: none"> <li>● Retail (Strip Mall)</li> </ul>	2035
9	<ul style="list-style-type: none"> <li>● Townhouses</li> <li>● Retail (Strip Mall)</li> </ul>	2035
10	<ul style="list-style-type: none"> <li>● Public Safety (Police/Firestation)</li> </ul>	2035

### 3.5 Trip Generation

Trip generation, for the development areas described above was estimated using the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 8<sup>th</sup> Edition*. The estimated volume of site-generated trips for the development areas are summarized in Table 3.2 on the following page.

### 3.6 Directional Distribution

The distribution of the development area trips to the surrounding roadway network was based on the expected origins and destinations of motorists traveling to and from the proposed developments. Inbound and outbound trips for each development were distributed based upon a regional distribution per existing travel patterns and more detailed distribution was based on the location of the access points. Figure 3.6 shows the overall trip distribution percentages.

Table 3.2 Trip Generation Estimates

Interim (2013) Development Trip Generation

Development	Land Use Description	ITE Land Use Code	Size (SF) / Units	AM Peak Hour Trip Generation						PM Peak Hour Trip Generation					
				Rate	Entering %	Exiting %	Enter Trips	Exit Trips	Total Trips	Rate	Entering %	Exiting %	Enter Trips	Exit Trips	Total Trips
1	Wellness Center Buildings	See Note 1	155,000	2.66	57%	43%	235	177	413	4.79	65%	35%	483	260	743
	Hockey Rink	465	64,000	--	--	--	--	--	--	2.36	45%	55%	68	83	151
	<b>Development Total Trips</b>								<b>413</b>						<b>894</b>
2	ALTRU Medical Offices	720	45,000	2.3	79%	21%	82	22	104	3.46	27%	73%	42	114	156
	<b>Development Total Trips</b>								<b>104</b>						<b>156</b>
3	Single Family Home - Detached <sup>2</sup>	210	14	0.75	25%	75%	3	8	11	1.01	63%	37%	9	5	14
	Townhouse <sup>2</sup>	230	56	0.44	17%	83%	4	20	25	0.52	67%	33%	20	10	29
	<b>Development Total Trips</b>								<b>35</b>						<b>43</b>
<b>Total Interim Trips</b>							<b>324</b>	<b>227</b>	<b>551</b>				<b>621</b>	<b>471</b>	<b>1093</b>

<sup>1</sup> Trip Generation Rates are based on the existing Wellness Center data and population usage estimates of 8% at the existing site to 22% at the proposed site.

<sup>2</sup> Currently platted developments.

Full Build (2035) Development Trip Generation

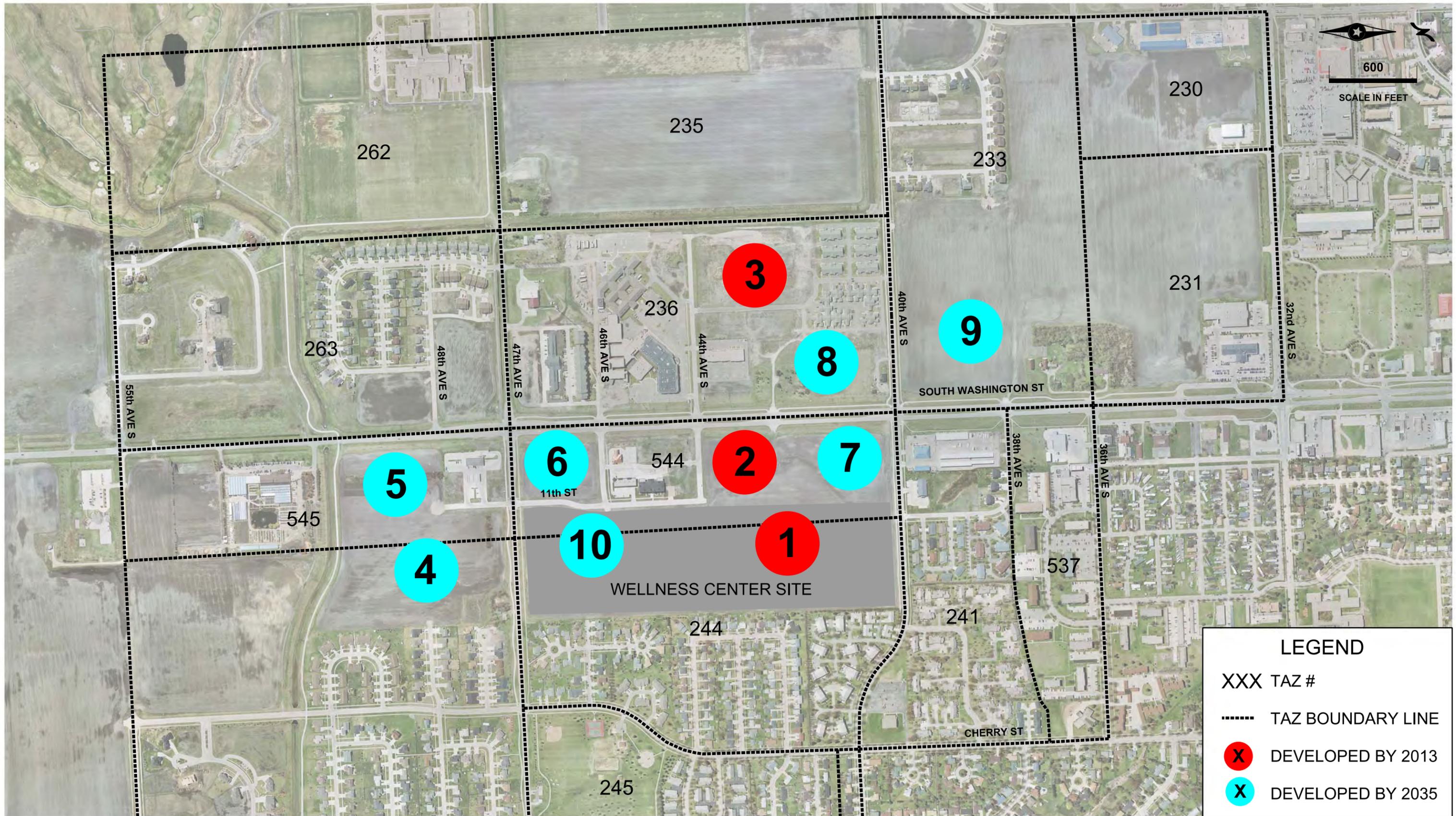
Development	Land Use Description	ITE Land Use Code	Size (SF) / Units	AM Peak Hour Trip Generation						PM Peak Hour Trip Generation					
				Rate	Entering %	Exiting %	Enter Trips	Exit Trips	Total Trips	Rate	Entering %	Exiting %	Enter Trips	Exit Trips	Total Trips
4	Apartments <sup>1</sup>	220	195	0.51	20%	80%	20	80	99	0.62	65%	35%	79	42	121
	Single Family Home - Detached <sup>2</sup>	210	54	0.75	25%	75%	10	30	41	1.01	63%	37%	34	20	55
	<b>Development Total Trips</b>								<b>140</b>						<b>175</b>
5	Specialty Retail	814	20,000	--	--	--	--	--	--	2.71	44%	56%	24	30	54
	<b>Development Total Trips</b>								<b>0</b>						<b>54</b>
6	ALTRU Medical Offices	720	30,000	2.3	79%	21%	55	14	69	3.46	27%	73%	28	76	104
	<b>Development Total Trips</b>								<b>69</b>						<b>104</b>
7	ALTRU Medical Offices	720	45,000	2.3	79%	21%	82	22	104	3.46	27%	73%	42	114	156
	<b>Development Total Trips</b>								<b>104</b>						<b>156</b>
8	Specialty Retail	814	20,000	--	--	--	--	--	--	2.71	44%	56%	24	30	54
	<b>Development Total Trips</b>								<b>0</b>						<b>54</b>
9	Specialty Retail	814	20,000	--	--	--	--	--	--	2.71	44%	56%	24	30	54
	Townhouse <sup>3</sup>	230	200	0.44	17%	83%	15	73	88	0.52	67%	33%	70	34	104
	<b>Development Total Trips</b>								<b>88</b>						<b>158</b>
10	Public Safety Building <sup>4</sup>	730	20	1.02	84%	16%	17	3	20	1.91	74%	26%	28	10	38
	<b>Development Total Trips</b>								<b>20</b>						<b>38</b>
<b>Total Full Build Trips</b>							<b>198</b>	<b>222</b>	<b>421</b>				<b>353</b>	<b>387</b>	<b>740</b>
<b>Gross Total (Interim and Full Build Combined)</b>							<b>522</b>	<b>450</b>	<b>972</b>				<b>974</b>	<b>859</b>	<b>1832</b>

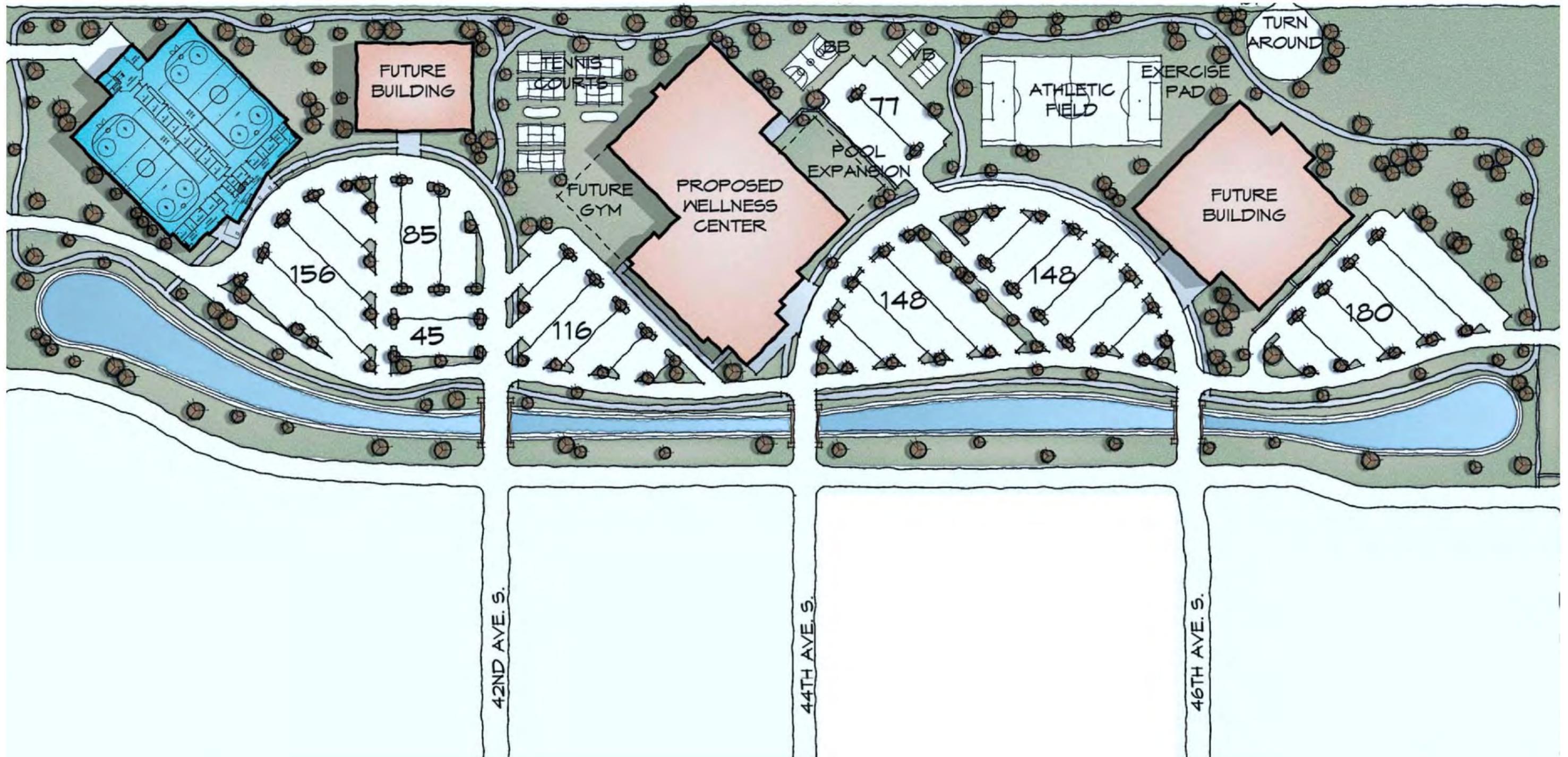
<sup>1</sup> Based on max allowable units

<sup>2</sup> Assumed 3 units per acre.

<sup>3</sup> Assumed 10 units per acre.

<sup>4</sup> 20 Employees were assumed at the Public Safety Building







### 3.7 2013 and 2035 Forecast Volumes

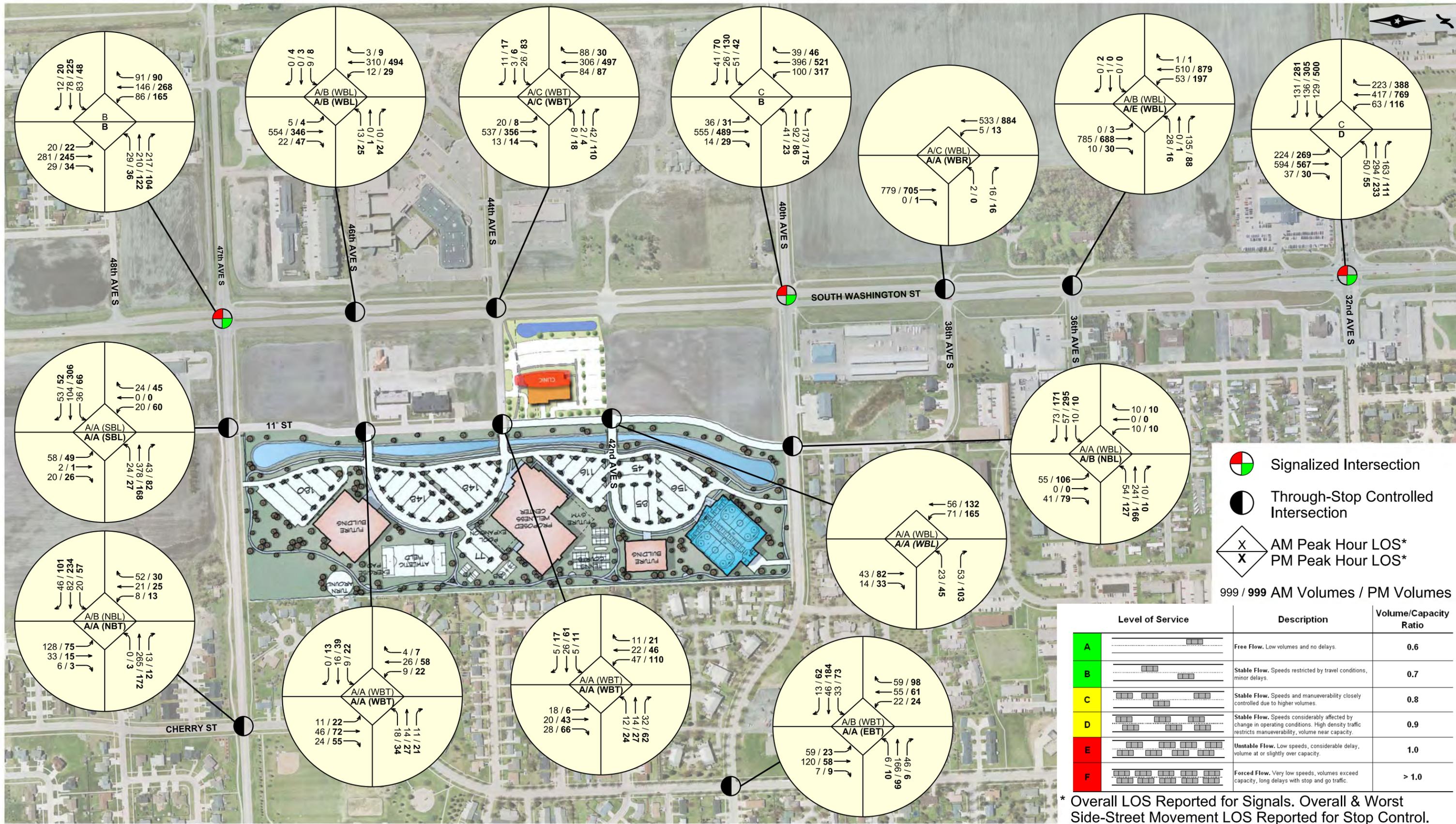
The estimation of the 2013 and 2035 forecast traffic volumes was based on three pieces of information, the 2010 traffic volumes, development area trip generation and the 2035 forecast ADT provided by ATAC. The follow describes the steps taken to estimate the forecast intersection turning movement volumes:

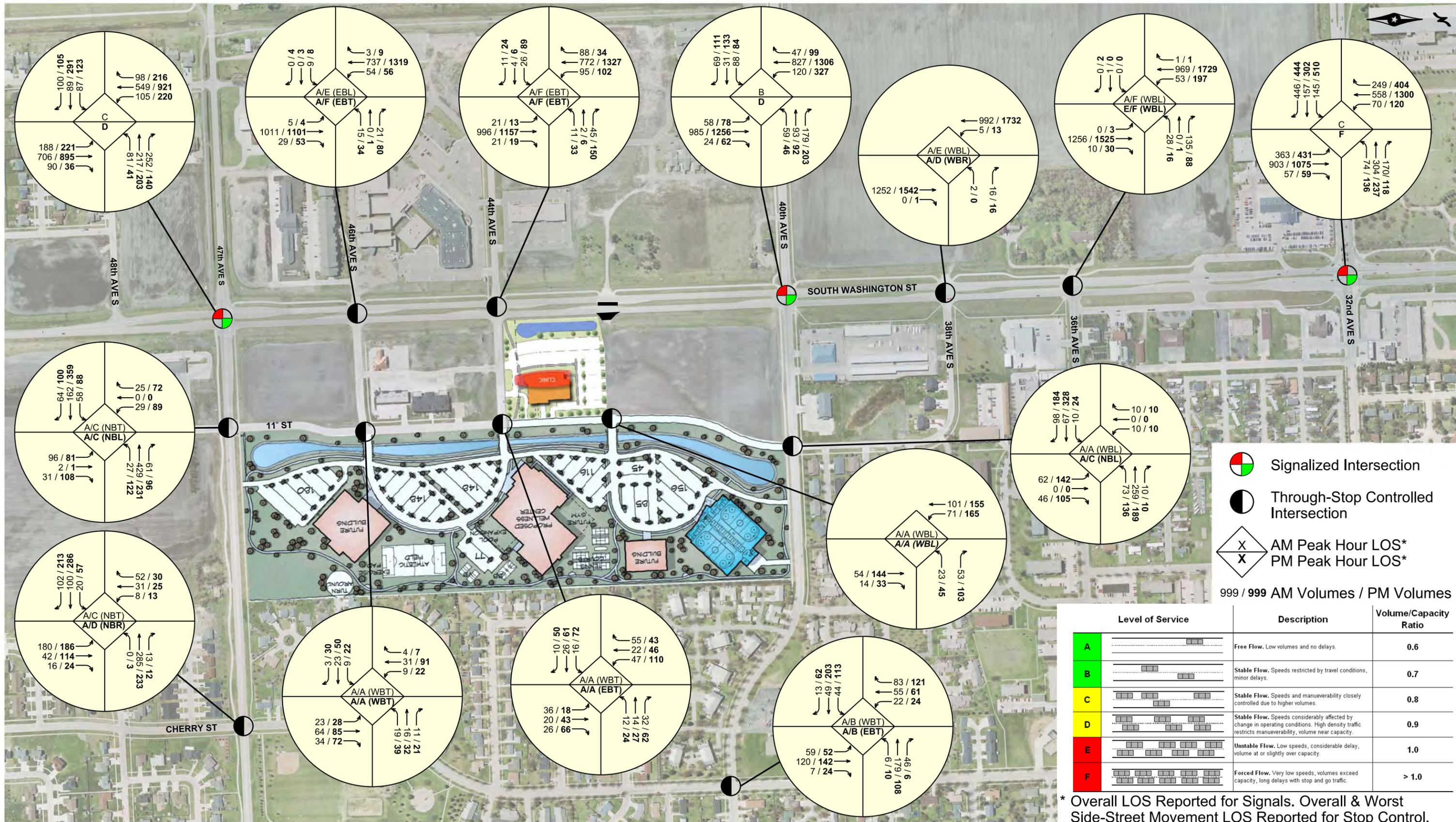
- The 2035 forecast traffic volumes and peak hour turning movement volumes were developed first. The 2035 forecast ADT provided by ATAC was assumed to be accurate for 2035 conditions. Figure 3.7 illustrates the 2035 forecast ADT provided by ATAC.
- The 2010 traffic volumes and development area trip generation (all 2013 and 2035 trips) were combined. The PM peak hour volumes were assume to be approximately 10 percent of the ADT for each intersection approach.
- To arrive at the forecast 2035 ADT volumes, an annual growth rate was applied to the turning movement volumes on these segments to account for background growth from traffic and developments, in addition to the specific planned development parcel and Wellness Center vehicle trips.
- The 2013 forecast traffic volumes were developed by combining the 2010 traffic volumes, the development area trip generation for 2013 and the select segment annual growth rate. Figure 3.8 shows the 2013 AM and PM peak hour forecast traffic volumes for the base conditions.
- The 2035 forecast traffic volumes were developed by combining the 2010 traffic volumes, the development area trip generation for both 2013 and 2035 and the select segment annual growth rate. Figure 3.9 depicts the 2035 AM and PM peak hour forecast traffic volumes for the base conditions.

The 2035 ADT forecasts provided by ATAC for the updated model were compared against the 2035 LRTP traffic forecasts. In general, the forecasts were comparable, with the refined ATAC model producing slightly higher values. This result is expected with more detailed trip generation estimates and intense land uses expected with the planned development parcels, then may have been previously assumed. A large 2035 ADT volume discrepancy was discovered on 32<sup>nd</sup> Avenue (west of Washington Street). The revised ATAC model was estimating a much higher 2035 forecast ADT than shown in the LRTP. After further review, the 2035 LRTP value was determined most appropriate and used in this study. However, it should be noted, whether the LRTP value or the higher refined model ATAC forecast value were used, the conclusions and recommendations for the Washington Street/32<sup>nd</sup> Avenue intersection remain the same.



X,XXX 2035 FORECAST ADT (PROVIDED BY ATAC)





### 3.8 Traffic Operations Analysis – Base Conditions

A traffic operation analysis was conducted for the year 2013 and 2035 base conditions. The base conditions assume only programmed infrastructure improvements and applicable planned developments are in place (see Section 3.3 and Section 3.4). The purpose of the analysis is to assist in identifying additional future transportation system needs.

#### 3.8.1 2013 Intersection and Arterial Analysis

An intersection traffic operations analysis was completed for the 2013 base conditions for both the AM and PM peak hours using the Synchro/SimTraffic7 software package. Table 3.3 summarizes the 2013 base conditions LOS for the study area intersections. The 2013 base conditions intersection LOS is also detailed on the previously highlighted Figure 3.8 (2013 Turning Movement Counts, ADT and LOS – Base Conditions).

**Table 3.3 2013 Base Conditions Intersection LOS**

Intersection	Traffic Control	AM Peak Intersection LOS <sup>1</sup>	PM Peak Intersection LOS <sup>1</sup>
Washington St @ 32nd Ave	Traffic Signal	C	D
Washington St @ 36th Ave	Thru-Stop	A / B	A / E
Washington St @ 38th Ave	Thru-Stop	A / C	A / A
Washington St @ 40th Ave	Traffic Signal	C	B
Washington St @ 44th Ave	Thru-Stop	A / C	A / C
Washington St @ 46th Ave	Thru-Stop	A / B	A / B
Washington St @ 47th Ave	Traffic Signal	B	B
47th Ave @ 11th St	Thru-Stop	A / A	A / A
40th Ave @ Cherry St	Thru-Stop	A / B	A / A
47th Ave @ Cherry St	Thru-Stop	A / B	A / A
40th Ave @ 11th St	Thru-Stop	A / A	A / B
11th St @ 42nd Ave	Thru-Stop	A / A	A / A
11th St @ 44th Ave	Thru-Stop	A / A	A / A
11th St @ 46th Ave	Thru-Stop	A / A	A / A

<sup>1</sup> LOS shown is overall intersection for signals. For Thru-Stop control, X / X is report fo roverall intersection and critical stop control movement, respectively.

Source: Alliant Engineering, Inc using Synchro/SimTraffic 7.0 and 2013 traffic volume data.

As shown, all intersections within the study area are currently operating at an acceptable LOS C or better during both the AM and PM peak periods, with exception to the Washington Street/32<sup>nd</sup> Avenue intersection. No access to the ALTRU medial office is assume at 42<sup>nd</sup> Avenue on the east side of South Washington Street.

An urban street analysis was conducted using the Synchro/SimTraffic 7 software package for the 2013 base conditions. Table 3.4 summarizes the 2013 base conditions arterial LOS of South Washington Street.

**Table 3.4 2013 Base Conditions Arterial LOS – South Washington Street**

**Northbound Washington Street**

Cross-Street Intersection	Distance	Urban Street Class <sup>1</sup>	AM Peak Hour		PM Peak Hour	
			Average Travel Speed (mph) <sup>2</sup>	LOS	Average Travel Speed (mph) <sup>2</sup>	LOS
48th Ave to 40th Ave	4,196	II	29.0	B	26.1	C
40th Ave to 32nd Ave	2,636	II	27.3	C	21.6	D
<b>Corridor Total</b>	<b>6,832</b>	<b>II</b>	<b>28.3</b>	<b>B</b>	<b>24.1</b>	<b>C</b>

**Southbound Washington Street**

Cross-Street Intersection	Distance	Urban Street Class <sup>1</sup>	AM Peak Hour		PM Peak Hour	
			Average Travel Speed (mph) <sup>2</sup>	LOS	Average Travel Speed (mph) <sup>2</sup>	LOS
32nd Ave to 40th Ave	3,963	II	31.9	B	27.2	C
40th Ave to 48th Ave	3,166	II	23.0	C	22.8	C
<b>Corridor Total</b>	<b>7,129</b>	<b>II</b>	<b>27.2</b>	<b>C</b>	<b>25.1</b>	<b>C</b>

<sup>1</sup> Roadway classification as defined by the Highway Capacity Manual 2000 used in determining the LOS.

<sup>2</sup> SimTraffic model output for AM and PM peak hours.

For the 2013 base conditions, the South Washington Street Corridor operates acceptably at an overall corridor LOS C or better for both the AM and PM peak hours.

**3.8.2 2035 Intersection and Arterial Analysis**

An intersection traffic operations analysis was completed for the 2035 base conditions for both the AM and PM peak hours using the Synchro/SimTraffic7 software package. The programmed infrastructure improvements that were assume for 2013 conditions (traffic signal at South Washington Street/40<sup>th</sup> Avenue and the extension of 11<sup>th</sup> Street) are still assumed, as well as a four lane section on South Washington Street south of 48<sup>th</sup> Avenue. All planned developments identified previously in Section 3.4 are included. Table 3.5 summarizes the 2035 base conditions LOS for the study area intersections. The 2035 base conditions intersection LOS is also detailed on previously mention Figure 3.9 (2035 Turning Movement Counts, ADT and LOS – Base Conditions).

**Table 3.5 2035 Base Conditions Intersection LOS**

Intersection	Traffic Control	AM Peak Intersection LOS <sup>1</sup>	PM Peak Intersection LOS <sup>1</sup>
Washington St @ 32nd Ave	Traffic Signal	C	F
Washington St @ 36th Ave	Thru-Stop	A / F	E / F
Washington St @ 38th Ave	Thru-Stop	A / E	A / D
Washington St @ 40th Ave	Traffic Signal	B	D
Washington St @ 44th Ave	Thru-Stop	A / F	A / F
Washington St @ 46th Ave	Thru-Stop	A / E	A / F
Washington St @ 47th Ave	Traffic Signal	C	D
47th Ave @ 11th St	Thru-Stop	A / C	A / C
40th Ave @ Cherry St	Thru-Stop	A / B	A / B
47th Ave @ Cherry St	Thru-Stop	A / C	A / D
40th Ave @ 11th St	Thru-Stop	A / A	A / C
11th St @ 42nd Ave	Thru-Stop	A / A	A / A
11th St @ 44th Ave	Thru-Stop	A / A	A / A
11th St @ 46th Ave	Thru-Stop	A / A	A / A

<sup>1</sup> LOS shown is overall intersection for signals. For Thru-Stop control, X / X is report for overall intersection and critical stop control movement, respectively.

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

For the 2035 base conditions analysis, the signalized intersection of South Washington Street/32<sup>nd</sup> Avenue operates at an unacceptable LOS F. Additionally, the South Washington Street/36<sup>th</sup> Avenue intersection operates at a poor overall LOS E. The side-street movements at the South Washington Street/44<sup>th</sup> Avenue intersection and the South Washington Street/46<sup>th</sup> Avenue intersection experience long delays and could result in a future safety concern.

An urban street analysis was conducted using the Synchro/SimTraffic7 software package for the 2035 base conditions. Table 3.6 summarizes the 2035 base conditions arterial LOS of South Washington Street.

**Table 3.6 2013 Base Conditions Arterial LOS – South Washington Street**

**Northbound Washington Street**

Cross-Street Intersection	Distance	Urban Street Class <sup>1</sup>	AM Peak Hour		PM Peak Hour	
			Average Travel Speed (mph) <sup>2</sup>	LOS	Average Travel Speed (mph) <sup>2</sup>	LOS
48th Ave to 40th Ave	4,196	II	25.4	C	13.4	E
40th Ave to 32nd Ave	2,636	II	27.3	C	14.0	E
<b>Corridor Total</b>	<b>6,832</b>	<b>II</b>	<b>25.8</b>	<b>C</b>	<b>16.5</b>	<b>E</b>

**Southbound Washington Street**

Cross-Street Intersection	Distance	Urban Street Class <sup>1</sup>	AM Peak Hour		PM Peak Hour	
			Average Travel Speed (mph) <sup>2</sup>	LOS	Average Travel Speed (mph) <sup>2</sup>	LOS
32nd Ave to 40th Ave	3,963	II	25.1	C	9.8	F
40th Ave to 48th Ave	3,166	II	31.9	B	18.8	D
<b>Corridor Total</b>	<b>7,129</b>	<b>II</b>	<b>27.7</b>	<b>C</b>	<b>12.5</b>	<b>F</b>

<sup>1</sup> Roadway classification as defined by the Highway Capacity Manual 2000 used in determining the LOS.

<sup>2</sup> SimTraffic model output for AM and PM peak hours.

For the 2035 base conditions, the South Washington Street Corridor operates unacceptably for the PM peak hour.

### 3.9 Identification of Deficiencies

The roadway and multimodal deficiencies of the base conditions are defined the following sections.

#### 3.9.1 2013 Traffic Operations Deficiencies

The 2013 traffic operations of the roadway are acceptable base on a LOS measurement. The following details the potential areas of concern, while Figure 3.10 provides a graphical representation of the 2013 traffic operations deficiencies:

- The South Washington Street/32<sup>nd</sup> Avenue intersection operates at LOS D during the PM peak hour and the eastbound and westbound approaches are nearing capacity. This intersection could have unacceptable operates shortly after the 2013 analysis year.
- The existing constructed portion of 11<sup>th</sup> Street from 47<sup>th</sup> Avenue to 44<sup>th</sup> Avenue is 36 feet wide. This width is too narrow to have designated turn lanes. This could be an issue in the future when 11<sup>th</sup> is extend to the north to 40<sup>th</sup> Avenue and through and turning traffic increases on this segment.

### 3.9.2 2035 Traffic Operations Deficiencies

The 2035 traffic operations of the roadway are unacceptable for a couple individual intersections and the South Washington Street corridor based on a LOS measurement. The following details the deficiency areas, while Figure 3.11 provides a graphical representation of the 2035 traffic operations deficiencies:

- The South Washington Street/32<sup>nd</sup> Avenue intersection has deficient capacity for the eastbound and westbound approaches. The operation of 32<sup>nd</sup> Avenue degrades the capacity for the entire intersection.
- The South Washington Street/36<sup>th</sup> Avenue intersection experiences long westbound delays, which could result in safety concerns.
- The South Washington Street/38<sup>th</sup> Avenue intersection experiences long westbound delays, which could result in safety concerns.
- The signalized intersection of South Washington Street/40<sup>th</sup> Avenue is nearing the LOS D/E capacity threshold with the 2013 geometry. The eastbound and westbound approaches are nearing capacity.
- 44<sup>th</sup> Avenue, on the west of South Washington Street, is the existing ambulance access roadway to the Aurora Medical Center. With increased traffic traveling through and turning at the South Washington Street/44<sup>th</sup> Avenue intersection, future ambulance access could be a concern.
- The South Washington Street/46<sup>th</sup> Avenue intersection experiences long eastbound and westbound delays, which could result in safety concerns.
- At the South Washington Street/47<sup>th</sup> Avenue intersection, the eastbound approach is at capacity and the northbound left turn lane is too short to accommodate predicted queues.
- The 47<sup>th</sup> Avenue and Cherry Street intersection experiences a long northbound delay.
- The existing constructed portion of 11<sup>th</sup> Street from 47<sup>th</sup> Avenue to 44<sup>th</sup> Avenue is 36 feet wide. This width is too narrow to have designated turn lanes. This could be an issue in the future when 11<sup>th</sup> is extend through to 40<sup>th</sup> Avenue as through and turning traffic increases. (This was defined as one the 2013 deficiencies.)

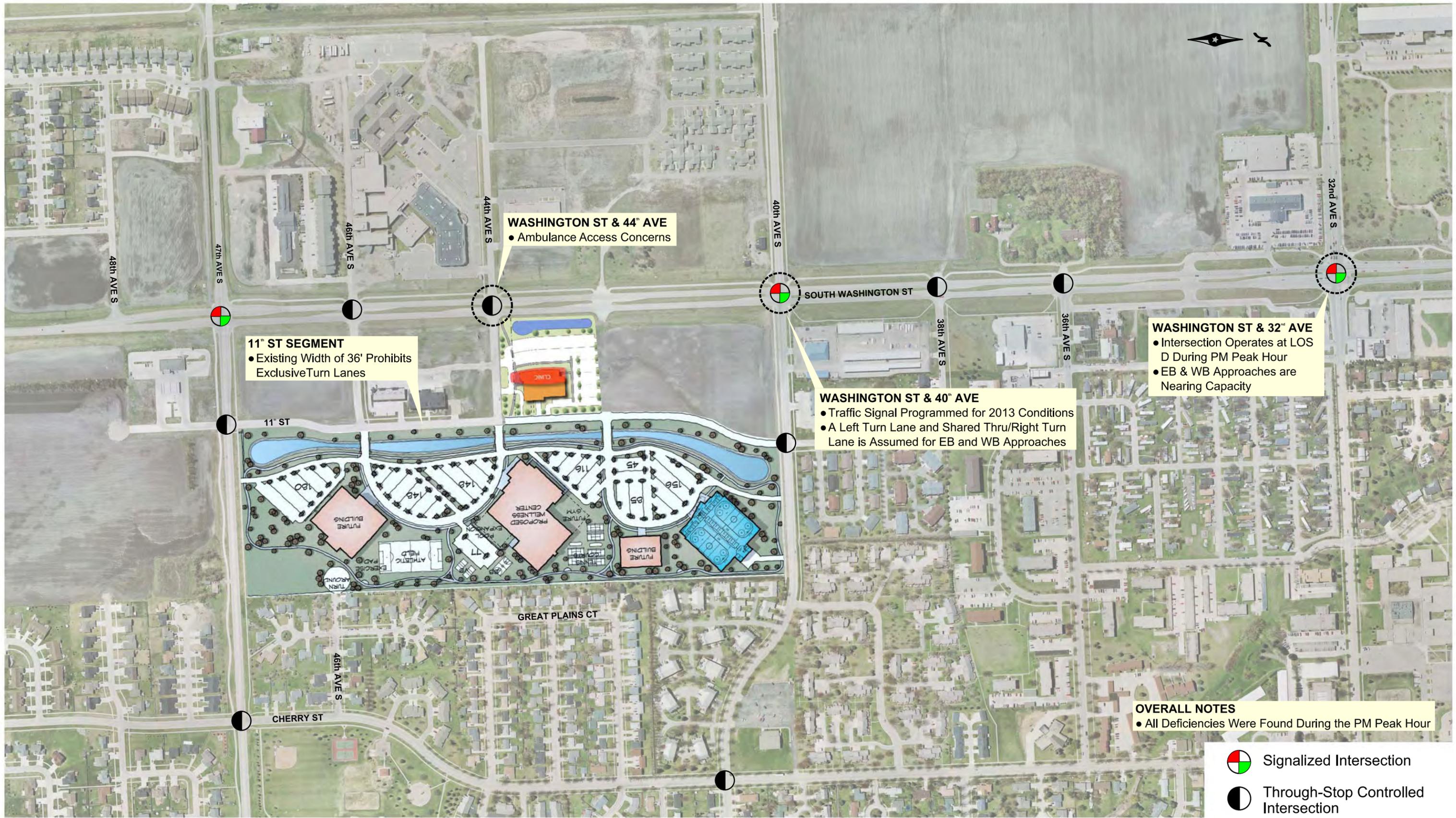
### 3.9.3 Multimodal Deficiencies

The pedestrian, bicycle and transit operations of the study area network were reviewed as they relate to serving/accessing the Wellness Center site. Deficiencies in service, gaps in connectivity and connection to the Wellness Center site are detail below and on Figure 3.12.

- The transit routes that currently serve the area are the Red Route and the Brown Route. Discussions with CAT indicate that the Red Route does not have the flexibility to add

additional stops (or distance to the route) and still be able maintain its existing service frequency. Therefore, no service changes can occur. However could be accessed by the Wellness Center if a neighborhood sidewalk connection to the east were provided.

- The Brown Route does not currently access the site and a service rate of one per hour may not be practical to adequately serve the needs of the Wellness Center. It does travel through and stop at the Aurora Medical Center campus via South Washington Street and 44<sup>th</sup> Avenue. The only bus shelter location in the study area is on the northwest corner of the 40<sup>th</sup> Avenue/Cherry Street intersection.
- Existing 10-foot multi-use trails exist on the west side of South Washington Street, south side of 40<sup>th</sup> Avenue and the south side of 47<sup>th</sup> Avenue, but these trails provide no connection to the Wellness Center site.
- Existing 5-foot sidewalks are located on the north side of 40<sup>th</sup> Avenue, north side of 47<sup>th</sup> Avenue, west side of Cherry Street, within the residential neighborhood to the east of the Wellness Center site and on a portion of 46<sup>th</sup> Avenue and 11<sup>th</sup> Street. To provide adequate pedestrian facilities, sidewalks will need to extend the entire length of 11<sup>th</sup> Street, 44<sup>th</sup> Avenue and be provided on the bridge crossings into the Wellness Center site.
- Sidewalk connections should be provided at multiple locations from the neighborhood on the east into the site trail network.



**11° ST SEGMENT**  
 • Existing Width of 36' Prohibits Exclusive Turn Lanes

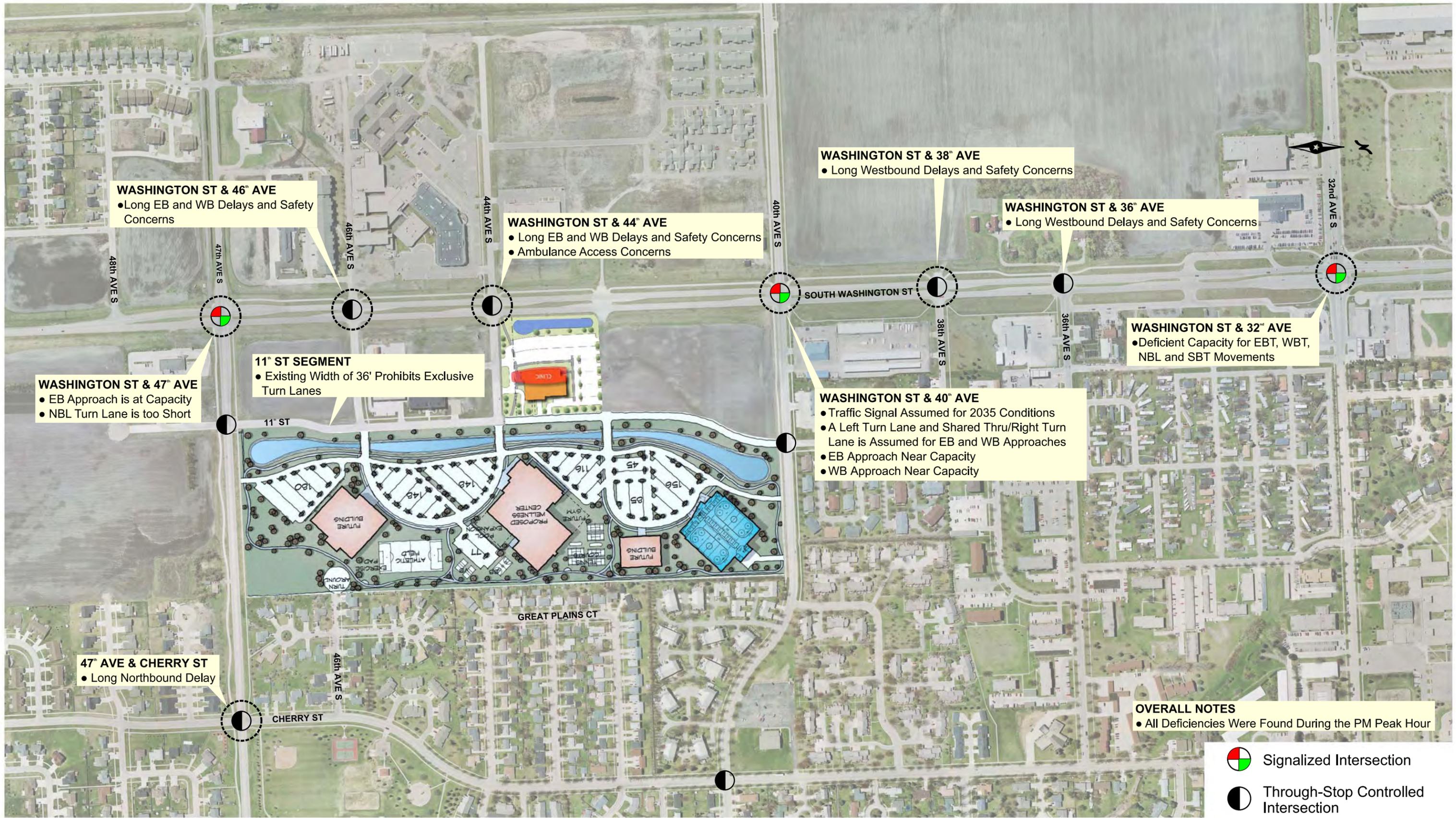
**WASHINGTON ST & 44° AVE**  
 • Ambulance Access Concerns

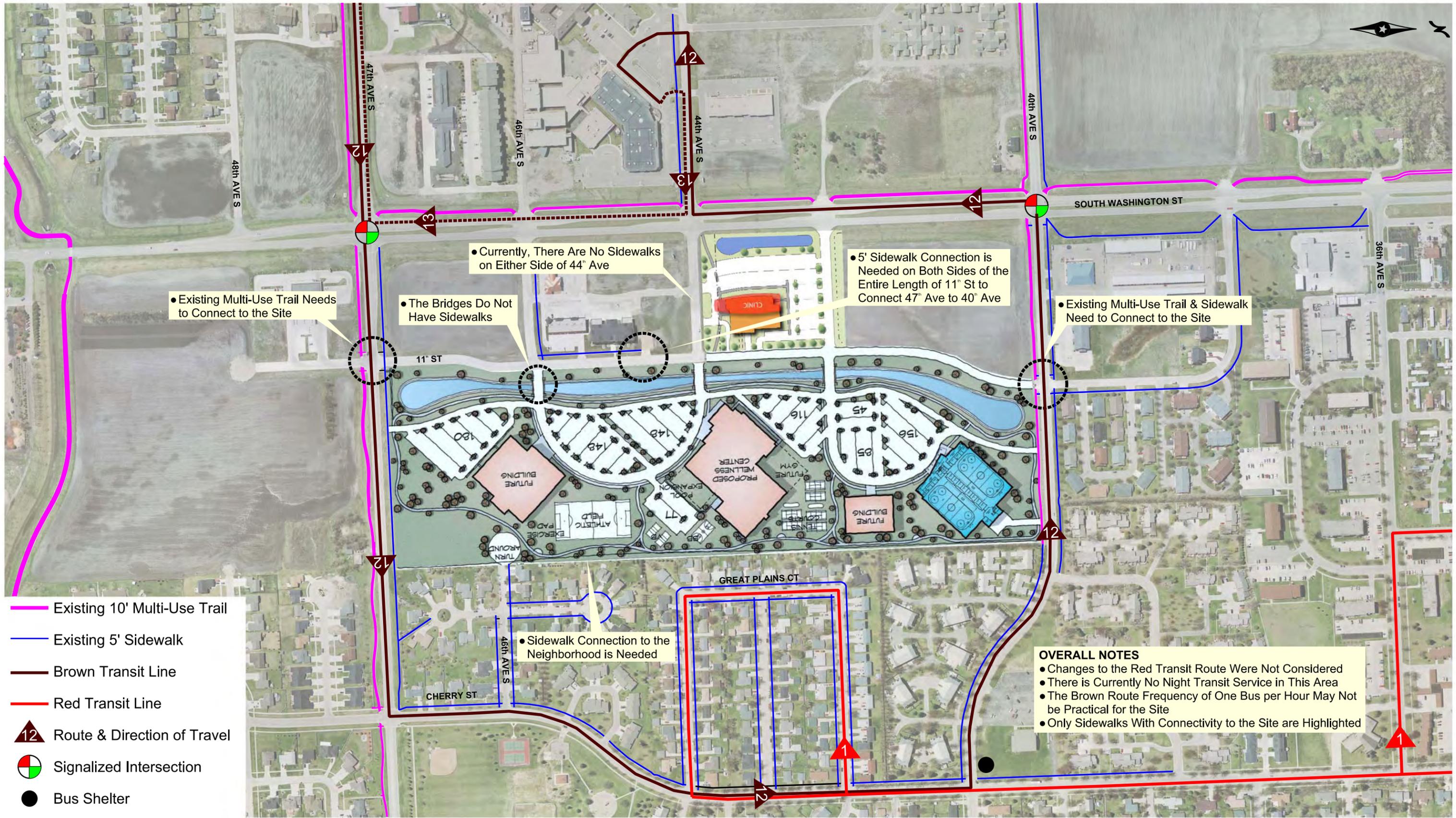
**WASHINGTON ST & 40° AVE**  
 • Traffic Signal Programmed for 2013 Conditions  
 • A Left Turn Lane and Shared Thru/Right Turn Lane is Assumed for EB and WB Approaches

**WASHINGTON ST & 32° AVE**  
 • Intersection Operates at LOS D During PM Peak Hour  
 • EB & WB Approaches are Nearing Capacity

**OVERALL NOTES**  
 • All Deficiencies Were Found During the PM Peak Hour

-  Signalized Intersection
-  Through-Stop Controlled Intersection





## 4.0 Evaluation of Recommended Alternatives

Roadway, intersection and multimodal improvement alternatives were identified to address the previously presented deficiencies. The following sections discuss the recommended improvement measures as it relates to roadway/intersection geometrics, traffic control devices, access management and multimodal accommodations.

### 4.1 2013 Roadway and Intersection Improvements

Roadway and intersection recommended improvements have been detailed for the 2013 scenario and are illustrated in Figure 4.1. The 2013 traffic recommendation for geometrics, traffic control, 11<sup>th</sup> Street and access management are detailed in the following sections.

#### 4.1.1 Roadway and Intersection Geometrics

The following geometric changes are recommended:

- South Washington Street/32<sup>nd</sup> Avenue Intersection** – Re-stripe the existing westbound right turn lane to a shared through/right turn lane. The westbound right turn lane pork chop will require modification; however, the location of the existing signal pole foundation is not expected to be impacted. This interim solution will result in overall intersection LOS C. In 2035 an additional eastbound and westbound through lane is needed. A detailed intersection study will be reviewed concurrent to or as part of the 2012 Long Range Transportation Plan (LRTP) update.
- South Washington Street/40<sup>th</sup> Avenue Intersection** – Modify the existing median to provide a positive offset for the left turn lanes on South Washington Street. The median modification and the construction of exclusive northbound and southbound right turn lanes is programmed for by the City of Grand Forks for 2014. In addition, the eastbound and westbound approaches should be restriped to provide a left turn lane and a shared through/right turn



*Washington Street/32<sup>nd</sup> Avenue Interim Improvements*



*Example of Positive Offset Left Turn Lane at Signalized Intersection Location*

lane. The construction of right turn lanes on the eastbound and westbound approaches is suggested for optimal operations, but is not required for capacity under 2013 forecast volumes.

- **South Washington Street/42<sup>nd</sup> Avenue Intersection** – This intersection is dependent on the development plans for the ALTRU medical office building. It is recommended that there be no vehicular through connectivity between South Washington Street and 11<sup>th</sup> Street. Individual parking field access to South Washington Street and/or 11<sup>th</sup> Street could be provided.

### 4.1.2 Traffic Control Devices

The following traffic control devices are recommended:

- **South Washington Street/40<sup>th</sup> Avenue Intersection** – The installation of the traffic signal is recommended by 2013. It is recommended that the left turn signal phasing be protected/permmissive for all approaches. A traffic signal install is programmed by the City of Grand Forks for 2014. This traffic signal installation timeline should be accelerated to be installed in 2013, coinciding with the Wellness Center opening.
- **11<sup>th</sup> Street/40<sup>th</sup> Avenue Intersection** – It is recommended that this intersection be two-way stop-controlled with 11<sup>th</sup> Street stopped and 40<sup>th</sup> Avenue free-flowing.
- **11<sup>th</sup> Street/42<sup>nd</sup> Avenue Intersection** – It is recommended that this intersection be two-way stop-controlled with 42<sup>nd</sup> Avenue stopped and 11<sup>th</sup> Street free-flowing.
- **11<sup>th</sup> Street/44<sup>th</sup> Avenue Intersection** – It is recommended that this intersection be two-way stop-controlled with 44<sup>th</sup> Avenue stopped and 11<sup>th</sup> Street free-flowing.
- **11<sup>th</sup> Street/46<sup>th</sup> Avenue Intersection** – It is recommended that this intersection be two-way stop-controlled with 46<sup>th</sup> Avenue stopped and 11<sup>th</sup> Street free-flowing.
- Optimized traffic signal coordination should be implemented for the traffic signals on South Washington Street between 32<sup>nd</sup> Avenue and 47<sup>th</sup> Avenue. Fiber optic interconnect cable currently exists along Washington Street. The traffic signal coordination will provide improved progression for motorists and will also provide mobility benefit to heavy trucks, particularly during the harvest season.

### 4.1.3 11<sup>th</sup> Street

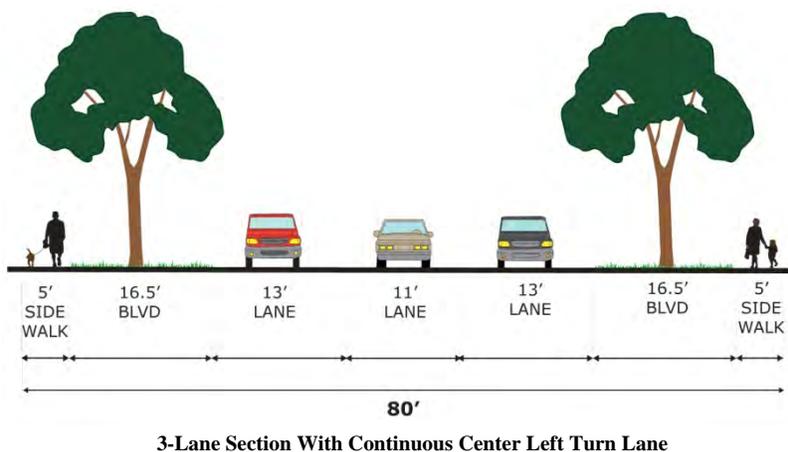
The 11<sup>th</sup> Street recommendations are as follows:

- The existing width of the portion of 11<sup>th</sup> Street that is constructed (from 47<sup>th</sup> Avenue to 44<sup>th</sup> Avenue) is 37 feet. It is recommended that the width of 11<sup>th</sup> Street from 44<sup>th</sup> Street to 40<sup>th</sup> Street be constructed at a minimum of 37 feet to allow for exclusive left turn lanes

(continuous center left turn lane). Parking should be restricted on both sides of the roadway at all times.

- A three-lane section is recommended on 11<sup>th</sup> Street. Designated left turn lanes and shared through/right turn lanes are recommended at intersections. The preferred option is a three lane section, one lane in each direction with a continuous left turn lane down the center. Table 4.1 shows the recommended typical section.

**Table 4.1 11<sup>th</sup> Street Design Typical Section**



### 4.1.4 Access Management

The following general access guidelines are recommended for the 2013 roadway network:

- Access should be restricted on 47<sup>th</sup> Avenue between Washington Street and 11<sup>th</sup> Street.
- Future access along 40<sup>th</sup> Avenue (between Washington Street and 11<sup>th</sup> Street) should be located mid-block (1 access point on the south side of street).
- Access on 46<sup>th</sup> Avenue, 44<sup>th</sup> Avenue, 42<sup>nd</sup> Avenue and should be midblock between South Washington Street and 11<sup>th</sup> Street.
- Access through the assisted living land use in the northwest quadrant of South Washington Street and 47<sup>th</sup> Avenue should be improved and enhanced to look, feel and serve as the primary property access. Portions of the site roadways and the site access on 47<sup>th</sup> Avenue are gravel. These roadways should be paved and full access should be maintained on 47<sup>th</sup> Avenue. (This recommendation should also be highlighted in the 47<sup>th</sup> Avenue Corridor Study). Improving this existing site access point will allow for future access restriction at Washington Street/46<sup>th</sup> Avenue, with negligible impact to the property.
- Full access at the existing intersections of Washington Street/34<sup>th</sup> Avenue, 36<sup>th</sup> Avenue, 38<sup>th</sup> Avenue, 42<sup>nd</sup> Avenue, 44<sup>th</sup> Avenue and 46<sup>th</sup> Avenue can be maintained at this time.



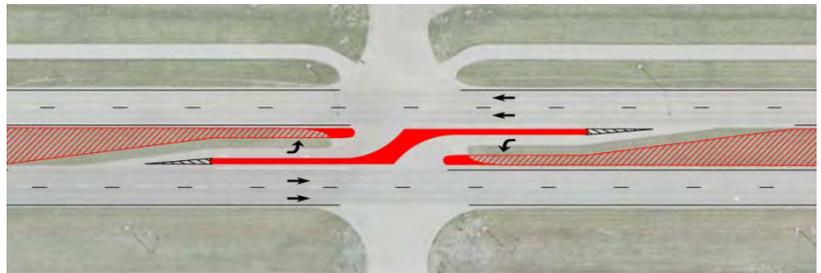
## 4.2 2035 Roadway and Intersection Improvements

Roadway and intersection recommended improvements have been detailed for the 2035 scenario and are illustrated in Figure 4.2. The 2035 traffic recommendation for geometrics, traffic control, 11<sup>th</sup> Street and access management are detailed in the following sections.

### 4.2.1 Roadway and Intersection Geometrics

The following geometric changes are recommended:

- South Washington Street/32<sup>nd</sup> Avenue Intersection** – It is recommended that an additional eastbound and westbound through lane be constructed. A detailed intersection study will be reviewed concurrent or as part of the 2012 Long Range Transportation Plan (LRTP) update.
- South Washington Street/34<sup>th</sup> Avenue Intersection** – Construct a median that limits access to  $\frac{3}{4}$  access where cross-street through and left turn movements are prohibited. All other movements will be allowed.
- South Washington Street/36<sup>th</sup> Avenue Intersection** – This is expected to be a potential future traffic signal location if warranted by traffic volumes. If a traffic signal is installed the median on South Washington Street will need to be reconstructed to provide positive offset left turn lanes allowing for the provision of protected/permissive left turn operation. Northbound and southbound right turn lanes are suggested to provide optimal operations, but are not needed for capacity.
- South Washington Street/38<sup>th</sup> Avenue Intersection** – Construct a median that limits accesses to  $\frac{3}{4}$  access where cross-street through and left turn movements are prohibited. All other movements will be allowed.
- Potential Frontage Road** – A potential frontage road could be constructed on the west side of South Washington Street from 34<sup>th</sup> Avenue to 38<sup>th</sup> Avenue. This would be advantageous if the vacant parcels on the west side were to develop and the existing residential home at 36<sup>th</sup> Avenue is maintained. The frontage road also allows for the recommended access restrictions at 38<sup>th</sup> Avenue and 34<sup>th</sup> Avenue, with negligible impact to the adjoining properties. However, if the existing residential home is purchased, the need for frontage road concept may not be necessary and is contingent upon how the land parcels develop and the alignment of the future 36<sup>th</sup> Avenue extension to the west.



*Example of  $\frac{3}{4}$  Access Control with Positive Offset Left Turn Lane Design (Solid Red is Concrete Island)*

- **South Washington Street/40<sup>th</sup> Avenue Intersection** – Construct exclusive eastbound and westbound right turn lanes.
- **South Washington Street/42<sup>nd</sup> Avenue Intersection** – Construct a median that limits accesses to  $\frac{3}{4}$  access where cross-street through and left turn movements are prohibited. All other movements will be allowed. As described in the 2013 recommendations, there should be no vehicular through connectivity between South Washington Street and 11<sup>th</sup> Street. Individual parking field access to South Washington Street and/or 11<sup>th</sup> Street could be provided.
- **South Washington Street/44<sup>th</sup> Avenue Intersection** – Modify the median to provide positive offset left turns. The eastbound and westbound approach should be striped to provide a shared left turn/through lane and a right turn lane and the southbound left turn lane should be lengthened.
- **South Washington Street/46<sup>th</sup> Avenue Intersection** – Construct a median that limits accesses to  $\frac{3}{4}$  access where cross-street through and left turn movements are prohibited. All other movements will be allowed.
- **South Washington Street/47<sup>th</sup> Ave Intersection** – Construct an exclusive eastbound right turn lane. In addition, the northbound left turn lane should be extended. A northbound right turn lane is recommended for optimal operations, but is not needed for capacity.
- **47<sup>th</sup> Avenue Segment** – it is recommend that the 47<sup>th</sup> Avenue segment west of South Washington Street be a three-lane section with a center left turn lane. However, the final recommendations for the roadway cross-section along 47<sup>th</sup> Avenue will be determined as part of the 47<sup>th</sup> Avenue Corridor Study.

### 4.2.2 Traffic Control Devices

The following traffic control devices for 2035 conditions are recommended:

- **South Washington Street/36<sup>th</sup> Avenue** – A future traffic signal may be needed at this location. It is suggested that traffic volumes be monitored and the signal be installed when warranted. The installation of a traffic signal is predicated upon the recommended access restrictions at 34<sup>th</sup> Avenue and 38<sup>th</sup> Avenue, the future development west of Washington Street, and/or the potential extension of 36<sup>th</sup> Avenue to the west.
- **South Washington Street/44<sup>th</sup> Avenue Intersection** – A traffic signal is recommended. Left turn signal phasing should be protected/permissive for northbound and southbound approaches and permitted only for the eastbound and westbound approaches. Additionally, transit signal priority (TSP) should be provided. A traffic signal is expected necessary in the future based on the following considerations:

- Washington Street/44<sup>th</sup> Avenue will be the primary intersection for CAT bus service and crossing access between Aurora Clinics, Altru Clinics and the Wellness Center. A traffic signal provides a benefit to transit vehicles.
- Access from Aurora Clinic to 40<sup>th</sup> Avenue on the west side of Washington Street is circuitous and would require frontage or site reconstruction to make possible. 44<sup>th</sup> Avenue is the appropriate full access location.
- Aurora Clinics is expecting to begin providing ambulance service in the future. A traffic signal equipped with Emergency Vehicle Preemption (EVP) provides the greatest level of service.
- The operation analysis indicates the existing two-way stop control will provide unacceptable motorist delays into the future. This could lead to safety concerns as motorists may begin to choose smaller traffic gaps. A traffic signal is expected to provide improved traffic operation and motorist safety.
- 44<sup>th</sup> Avenue will also serve as a primary pedestrian crossing between clinics, the bicycle path and the Wellness Center. A traffic signal provides an improved level of control for pedestrian crossings.

It should be noted with the potential construction of a fire station on the south end of the Wellness Center property, coordination between the ambulances and the fire trucks will be necessary. To best operate EVP, and to eliminate the potential for conflicting ambulance and fire truck EVP requests at the traffic signal, it is recommended the fire trucks (destined northbound) access Washington Street using 44<sup>th</sup> Avenue.

- **11<sup>th</sup> Street/44<sup>th</sup> Avenue Intersection** – It is recommended that this intersection be two-way stop-controlled with 44<sup>th</sup> Avenue stopped and 11<sup>th</sup> Street free-flowing. It is suggested that traffic volumes be monitored and all-way stop-control be installed if/when warranted.
- **11<sup>th</sup> Street/46<sup>th</sup> Avenue Intersection** – It is recommended that this intersection be two-way stop-controlled with 46<sup>th</sup> Avenue stopped and 11<sup>th</sup> Street free-flowing.
- **47<sup>th</sup> Avenue/Cherry Street** – For the 2035 conditions, this side-street stop-controlled intersection (Cherry Street is stopped) experiences long northbound delays. It is recommended that this intersection be monitored and an all-way stop be installed when warranted.
- Optimized traffic signal coordination should be implemented for the traffic signals on South Washington Street between 32<sup>nd</sup> Avenue and 47<sup>th</sup> Avenue. Fiber optic interconnect cable currently exists along Washington Street. The traffic signal coordination will provide improved progression for motorists and will also provide mobility benefit to heavy trucks, particularly during the harvest season.

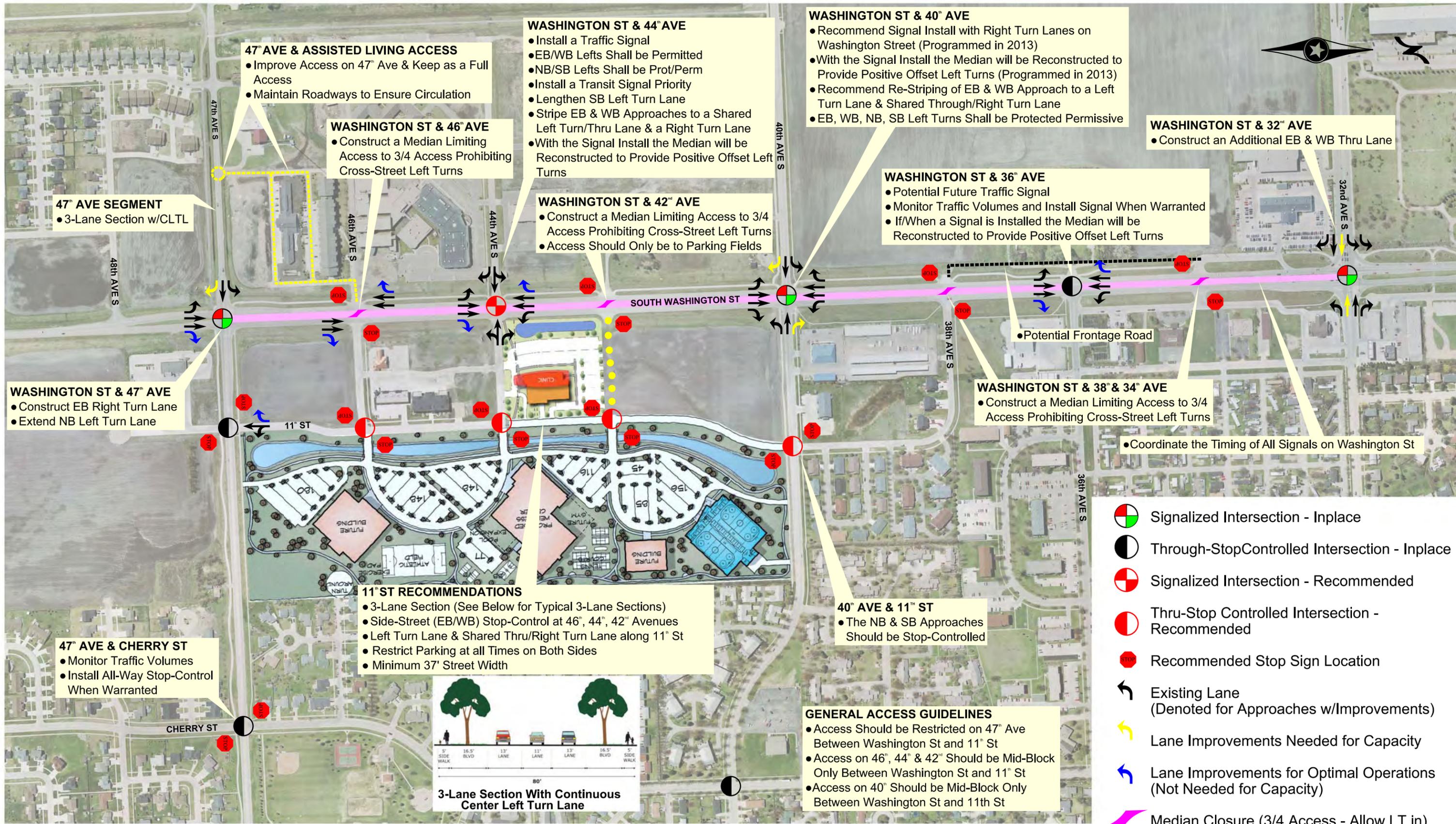
### 4.2.3 11<sup>th</sup> Street

The 11<sup>th</sup> Street recommendations for 2035 conditions are the same as the 2013 conditions.

### 4.2.4 2035 Access Management

The following general access guidelines for the 2035 conditions are the same as those recommended for the 2013 conditions.

- Access should be restricted on 47<sup>th</sup> Avenue between Washington Street and 11<sup>th</sup> Street.
- Future access along 40<sup>th</sup> Avenue (between Washington Street and 11<sup>th</sup> Street) should be located mid-block (1 access point on the south side of street).
- Access on 46<sup>th</sup> Avenue, 44<sup>th</sup> Avenue, 42<sup>nd</sup> Avenue and should be midblock between South Washington Street and 11<sup>th</sup> Street.
- Access through the assisted living land use in the northwest quadrant of South Washington Street and 47<sup>th</sup> Avenue should be improved and enhanced to look, feel and serve as the primary property access. Portions of the site roadways and the site access on 47<sup>th</sup> Avenue are gravel. These roadways should be paved and full access should be maintained on 47<sup>th</sup> Avenue. (This recommendation should also be highlighted in the 47<sup>th</sup> Avenue Corridor Study). Improving this existing site access point will allow for the recommended access restriction at Washington Street/46<sup>th</sup> Avenue intersection, with negligible impact to the property.
- The existing intersections of Washington Street/34<sup>th</sup> Avenue, 36<sup>th</sup> Avenue, 38<sup>th</sup> Avenue, 42<sup>nd</sup> Avenue and 46<sup>th</sup> Avenue should be restricted to  $\frac{3}{4}$  access where cross-street through and left turn movements are prohibited. All other movements will be allowed.



### 4.3 Multimodal Improvements

Improvements to the pedestrian, bicycle and transit operations of the study area, as they relate to serving/accessing the Wellness Center site, are shown on Figure 4.3.

#### 4.3.1 Pedestrian Improvements

The following details the recommended pedestrian improvements:

- 5-foot sidewalk connections to the neighborhood on the east should be considered in two locations, one via 46<sup>th</sup> Avenue through the proposed cul-de-sac and one off of Great Plains Court in the location of an existing sidewalk and utility easement. The Great Plains Court sidewalk easement exists and Grand Forks Engineering should further investigate feasibility of using this easement in the future. The Timberline Townhome Association should consider the potential for constructing a private sidewalk (secured gate at neighborhood entrance) to allow for more direct pedestrian access to their community. In addition to these connections providing pedestrian access between the neighborhood and the Wellness Center, they also provide a convenient access for patrons wishing to catch the Red Route (transit) via Great Plains Court.
- Construct 5-foot sidewalks on both sides on 11<sup>th</sup> Street to connect 40<sup>th</sup> Avenue to 47<sup>th</sup> Avenue.
- Construct 5-foot sidewalks on the three bridges over the water feature. The sidewalk on the 42<sup>nd</sup> Avenue bridge should be on the south side, the sidewalk on the 44<sup>th</sup> Avenue bridge should be on the north side and the sidewalk on the 46<sup>th</sup> Avenue bridge should be on the south side.
- All sidewalks adjacent to the parking lots and along the building fronts should be installed with construction of the site.
- Construct a 5-foot sidewalk in the north side of 44<sup>th</sup> Avenue between Washington Street and 11<sup>th</sup> Street.

#### 4.3.2 Bicycle Improvements

The following details the recommended bicycle/multi-use trail improvements:

- At the 11<sup>th</sup> Street/40<sup>th</sup> Avenue intersection construct a 10-foot multi-use trail connection between the existing trail along 40<sup>th</sup> Avenue and the multi-use trail loop on the Wellness Center property.
- At the 11<sup>th</sup> Street/47<sup>th</sup> Avenue intersection construct a 10-foot multi-use trail connection between the existing trail along 47<sup>th</sup> Avenue and the multi-use trail loop on the Wellness Center property.
- On the north side of 47<sup>th</sup> Avenue, from South Washington Street to 11<sup>th</sup> Street, remove the existing 5-foot sidewalk and replace it with a 10-foot multi-use trail. By enhancing this one-block segment, any bicyclist arriving/departing to/from the west or south, would be able to access the Wellness Center property by crossing the roadways at the signalized

Washington Street/47<sup>th</sup> Avenue intersection and avoiding the need to cross 47<sup>th</sup> Avenue at an unsignalized location.

- The property owner of the vacant parcels on the east side of South Washington Avenue (and south of 47<sup>th</sup> Avenue), have expressed interest in constructing a north/south multi-use trail connecting the existing east/west multi-use trail (south of 47<sup>th</sup> Avenue) to 47<sup>th</sup> Avenue. If constructed, the trail should be located on the east side 11<sup>th</sup> Street providing a more direct access to the Wellness Center trails and providing less conflict with motor vehicles.
- A future grade separated trail crossing should be considered on South Washington Avenue when it is widened from a 2-lane roadway to a 4-lane roadway.
- As shown on Figure 4.3, the Wellness Center proposes to construct a multi-use trail that makes a loop around the property. The segment of loop between 47<sup>th</sup> Avenue and 40<sup>th</sup> Avenue, on the west side of the property, should be constructed upon opening of the facility. In addition, a short segment of the trail on the east side and south side of the building should also be constructed. These trail segments will allow for the immediate connection to the existing bicycle network surrounding the property.

### 4.3.3 Transit Improvements

The following bullet points detail the recommended transit improvements. It is noted that the Red Route does not have the flexibility to add additional stops (or distance to the route) and still be able maintain its existing service frequency. Therefore changes to the Red Route are not considered at this time.

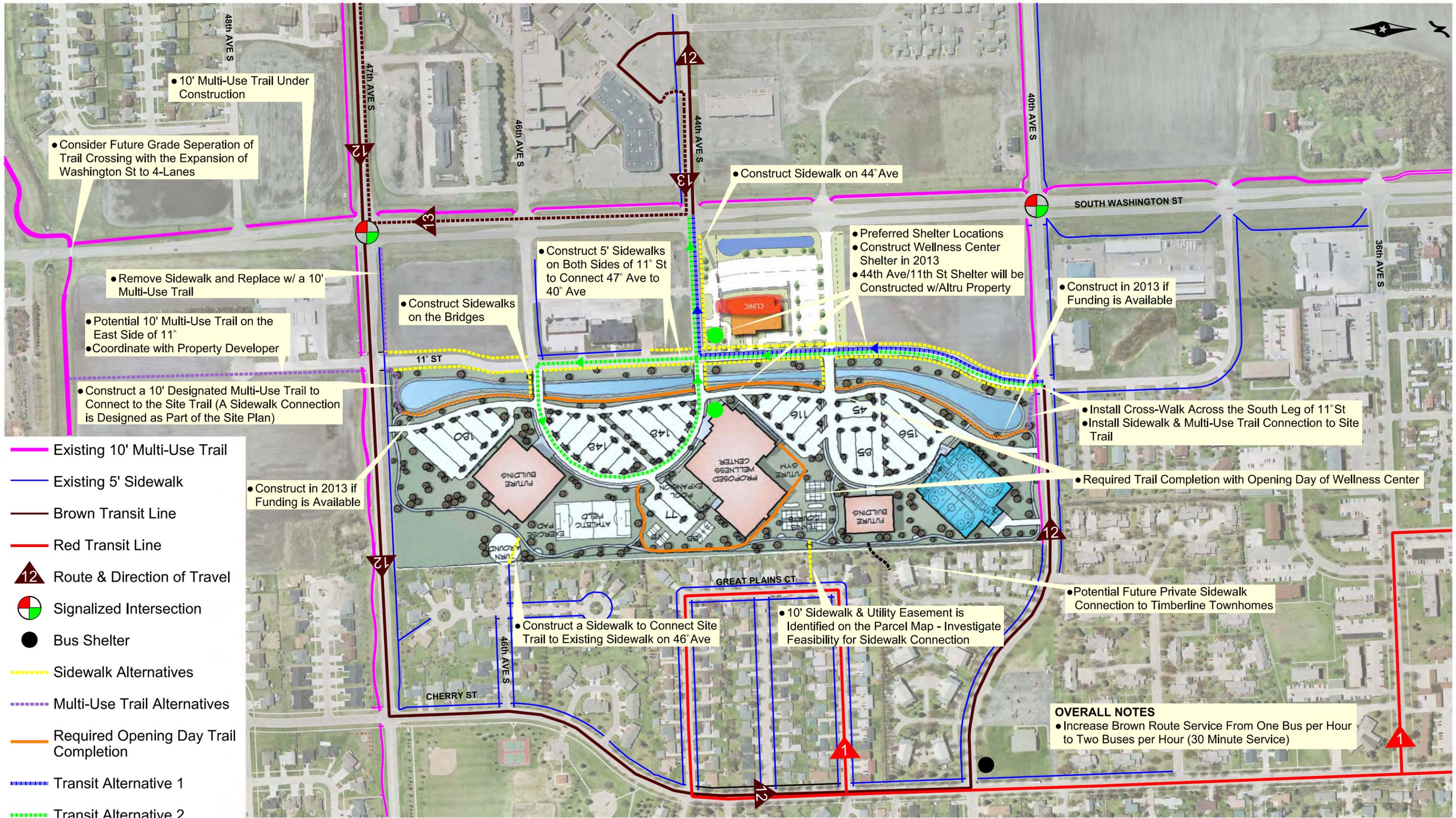
- The preferred transit alternative will provide direct connection to the Wellness Center lobby, circulate through the 11<sup>th</sup> Street/44<sup>th</sup> Avenue intersection and provide connectivity to the Aurora Medical Campus. In discussion with CAT, it is recommended the Brown Route add an additional bus to the line, providing for 30 minute headway service. The two buses per hour will allow transit to be a more practical and convenient option for users of the Wellness Center and surrounding land uses. The addition of the weekday bus will carry increased yearly operational costs.
- A bus shelter is being incorporated into the Wellness Center lobby and will provide convenient access for transit riders. A second bus shelter is recommended at the 11<sup>th</sup> Street/44<sup>th</sup> Avenue intersection (Altru Clinic property) to provide better service to riders accessing other properties within the area.
- CAT may consider evening (Night CAT) and or Sunday service. However, it is recommended that CAT and the Wellness Center work closely upon opening of the facility to understand the actual user demand to determine the need for evening or Sunday transit service to the site. It is recognized the addition of Night CAT or Sunday Service will also be dependent on the greater demand for transit service throughout Grand Forks. Currently one bus is used to service Grand Forks during the Night CAT. In discussion with CAT, the Night CAT/Sunday service would be accomplished through the addition of another bus to the system. The second bus would allow for expanded bus service

coverage area. Both buses would service the greater Grand Forks area and would not be specific to the Brown Route.

### 4.4 Wellness Center On-Site Traffic Circulation

A review of the proposed Wellness Center conceptual site plan (illustrated in Figure 3.5) was completed. The following provides guidelines regarding the on-site traffic circulation:

- The concept plan shows the Wellness Center and Hockey Arena parking lots gaining direct access to 47<sup>th</sup> Avenue on the south and 40<sup>th</sup> Avenue on the north. It is recommended these access points not be provided. Access to the Wellness Center and associated buildings should occur via 11<sup>th</sup> Street.
- As shown, the parking lots should be interconnected on-site to allow patrons the ability to circulate between Wellness Center, the Hockey Arena and other future buildings without having to re-enter 11<sup>th</sup> Street. This parking lot connection roadway should be provided and should minimize the amount of vehicle circulation that occurs adjacent to the building front doors.
- The parking lot connection roadway should be two-way stop controlled at its intersection with 46<sup>th</sup> Avenue, 44<sup>th</sup> Avenue and 42<sup>nd</sup> Avenue. These crossing entering/exiting accesses should have right of way. Particular attention should be given to the bridge profile, to ensure adequate sight distance for the stop controlled motorists.



**4.5 Traffic Operations Analysis – Recommended Alternatives**

A traffic operation analysis was conducted for the year 2013 and 2035 recommended improvement alternatives.

**4.5.1 2013 Intersection and Arterial Analysis**

An intersection traffic operations analysis was completed for the 2013 recommended alternatives for both the AM and PM peak hours using the Synchro/SimTraffic7 software package. Table 4.2 summarizes the 2013 recommended conditions LOS for the study area intersections. The 2013 recommended conditions intersection LOS is also detailed on Figure 4.4

**Table 4.2 2013 Recommended Conditions Intersection LOS**

Intersection	Traffic Control	AM Peak Intersection LOS <sup>1</sup>	PM Peak Intersection LOS <sup>1</sup>
Washington St @ 32nd Ave	Traffic Signal	C	C
Washington St @ 36th Ave	Thru-Stop	A / D	A / E
Washington St @ 38th Ave	Thru-Stop	A / B	A / A
Washington St @ 40th Ave	Traffic Signal	B	B
Washington St @ 44th Ave	Thru-Stop	A / D	A / C
Washington St @ 46th Ave	Thru-Stop	A / B	A / B
Washington St @ 47th Ave	Traffic Signal	B	C
47th Ave @ 11th St	Thru-Stop	A / A	A / B
40th Ave @ Cherry St	Thru-Stop	A / B	A / A
47th Ave @ Cherry St	Thru-Stop	A / A	A / B
40th Ave @ 11th St	Thru-Stop	A / A	A / B
11th St @ 42nd Ave	Thru-Stop	A / A	A / A
11th St @ 44th Ave	Thru-Stop	A / A	A / A
11th St @ 46th Ave	Thru-Stop	A / A	A / A

<sup>1</sup> LOS shown is overall intersection for signals. For Thru-Stop control, X / X is report for overall intersection and critical stop control movement, respectively.

Source: Alliant Engineering, Inc using Synchro/SimTraffic 7.0 and 2013 traffic volume data.

For the 2013 recommended conditions, all intersections within the study area are expected to operate at an acceptable LOS C or better during both the AM and PM peak periods. Of special mention the South Washington Street/32<sup>nd</sup> Avenue intersection. With recommended geometric improvements of restriping the westbound right turn lane to a shared through/right turn lane (and modification of the pork chop island) the LOS improves from D to C in the PM peak hour.

The urban street analysis was conducted using the Synchro/SimTraffic 7 software package for the 2013 recommended. Table 4.3 summarizes the 2013 recommended conditions arterial LOS of South Washington Street.

**Table 4.3 2013 Recommended Conditions Arterial LOS – South Washington Street**

**Northbound Washington Street**

Cross-Street Intersection	Distance	Urban Street Class <sup>1</sup>	AM Peak Hour		PM Peak Hour	
			Average Travel Speed (mph) <sup>2</sup>	LOS	Average Travel Speed (mph) <sup>2</sup>	LOS
48th Ave to 40th Ave	4,196	II	30.6	B	46.5	A
40th Ave to 32nd Ave	2,636	II	31.5	B	17.0	D
<b>Corridor Total</b>	<b>6,832</b>	<b>II</b>	<b>30.9</b>	<b>B</b>	<b>27.9</b>	<b>C</b>

**Southbound Washington Street**

Cross-Street Intersection	Distance	Urban Street Class <sup>1</sup>	AM Peak Hour		PM Peak Hour	
			Average Travel Speed (mph) <sup>2</sup>	LOS	Average Travel Speed (mph) <sup>2</sup>	LOS
32nd Ave to 40th Ave	3,963	II	37.0	A	30.2	B
40th Ave to 48th Ave	3,166	II	22.9	C	31.2	B
<b>Corridor Total</b>	<b>7,129</b>	<b>II</b>	<b>29.9</b>	<b>B</b>	<b>30.6</b>	<b>B</b>

<sup>1</sup> Roadway classification as defined by the Highway Capacity Manual 2000 used in determining the LOS.

<sup>2</sup> SimTraffic model output for AM and PM peak hours.

For the 2013 recommended conditions, the South Washington Street Corridor operates acceptably at a LOS D or better. With the recommended interconnect and coordination of the traffic signals, the arterial operations improved over the 2013 base conditions.

**4.5.2 2035 Intersection and Arterial Analysis**

An intersection traffic operations analysis was completed for the 2035 recommended conditions for both the AM and PM peak hours using the Synchro/SimTraffic7 software package. Table 4.4 summarizes the 2035 recommended conditions LOS for the study area intersections. The 2035 recommended conditions intersection LOS is also detailed on Figure 4.5.

**Table 4.4 2035 Recommended Conditions Intersection LOS**

Intersection	Traffic Control	AM Peak Intersection LOS <sup>1</sup>	PM Peak Intersection LOS <sup>1</sup>
Washington St @ 32nd Ave	Traffic Signal	C	D
Washington St @ 36th Ave	Thru-Stop	A / F	E / F
Washington St @ 38th Ave	Thru-Stop	A / B	A / C
Washington St @ 40th Ave	Traffic Signal	B	C
Washington St @ 42nd Ave	Thru-Stop	A / A	A / B
Washington St @ 44th Ave	Traffic Signal	A	B
Washington St @ 46th Ave	Thru-Stop	A / A	A / B
Washington St @ 47th Ave	Traffic Signal	B	C
47th Ave @ 11th St	Thru-Stop	A / D	A / E
40th Ave @ Cherry St	Thru-Stop	A / B	A / B
47th Ave @ Cherry St	Thru-Stop	A / B	B / E
40th Ave @ 11th St	Thru-Stop	A / A	A / B
11th St @ 42nd Ave	Thru-Stop	A / A	A / A
11th St @ 44th Ave	Thru-Stop	A / A	A / A
11th St @ 46th Ave	Thru-Stop	A / A	A / A

<sup>1</sup> LOS shown is overall intersection for signals. For Thru-Stop control, X / X is report for overall intersection and critical stop control

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

For the 2035 recommended conditions, nearly all intersections within the study area are expected to operate at an acceptable LOS C or better during both the AM and PM peak periods. The South Washington Street/36<sup>th</sup> Avenue side-street stop controlled intersection is expected to operate at a LOS E/F. There are a couple of detailed recommendations that could improve the operations of this intersection, but they are dependent on how the adjacent western parcel develops. A traffic signal could be installed when warranted by traffic volumes, along with the construction of a frontage road on the west side of Washington Street.

At 47<sup>th</sup> Avenue/Cherry Street, an all way stop controlled intersection could be considered (monitor traffic volumes and install when warranted) and is expected to provide acceptable traffic operations. At 11<sup>th</sup> Street/47<sup>th</sup> Avenue, the existing street width of 36 feet is too narrow to stripe an exclusive southbound left or right turn lane. However, widening the west side by four feet would allow for the provision of an exclusive right turn at the intersection, which would improve the intersection operations.

The urban street analysis was conducted using the Synchro/SimTraffic 7 software package for the 2035 recommended conditions. **Table 4.5** summarizes the 2035 recommended conditions arterial LOS for South Washington Street.

**Table 4.5 2035 Recommended Conditions Arterial LOS – South Washington Street**

Cross-Street Intersection	Distance	Urban Street Class <sup>1</sup>	AM Peak Hour		PM Peak Hour	
			Average Travel Speed (mph) <sup>2</sup>	LOS	Average Travel Speed (mph) <sup>2</sup>	LOS
48th Ave to 40th Ave	4,196	II	31.4	B	29.1	B
40th Ave to 32nd Ave	2,636	II	21.6	D	17.9	D
<b>Corridor Total</b>	<b>6,832</b>	<b>II</b>	<b>26.7</b>	<b>C</b>	<b>23.4</b>	<b>C</b>

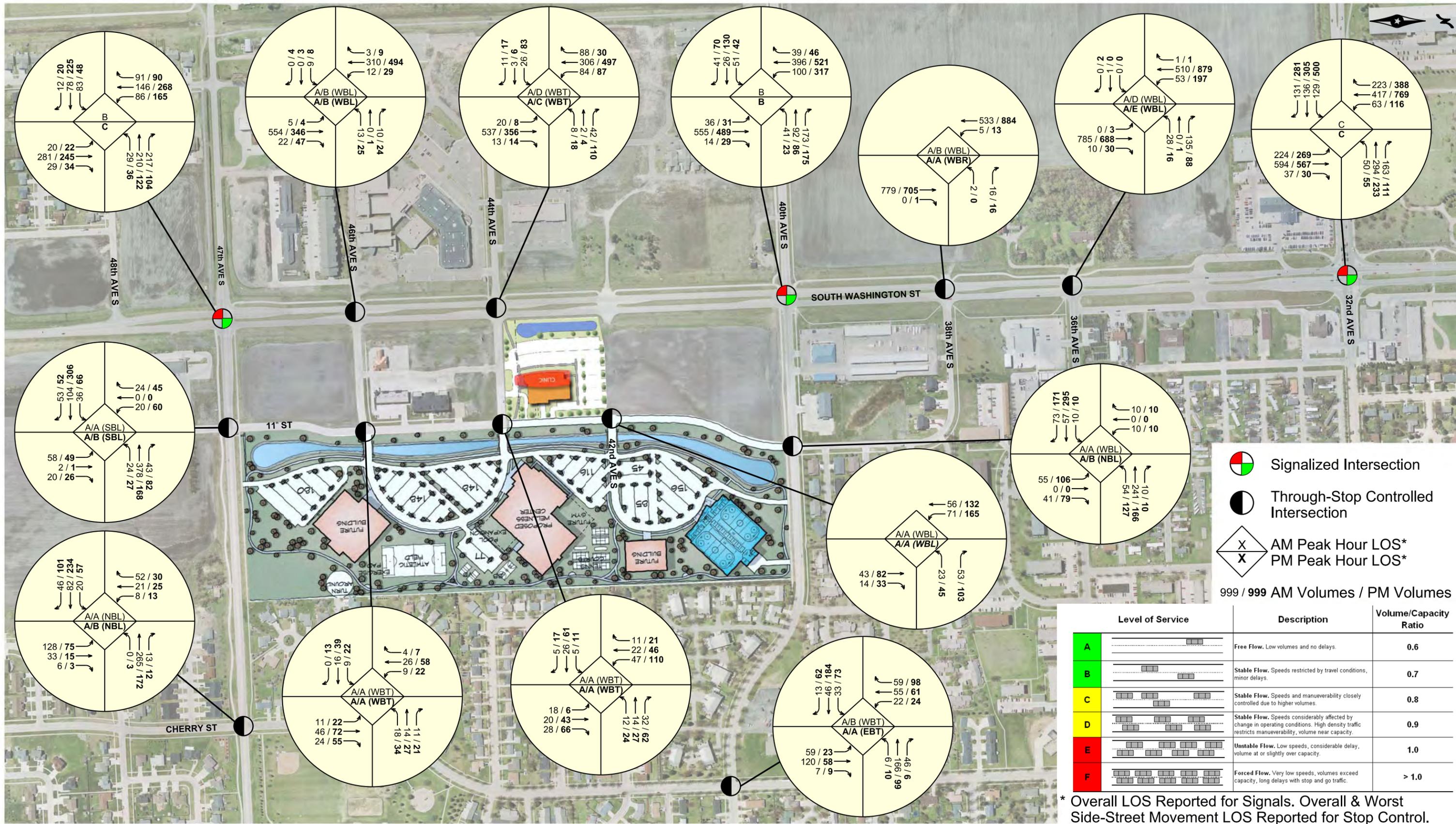
**Southbound Washington Street**

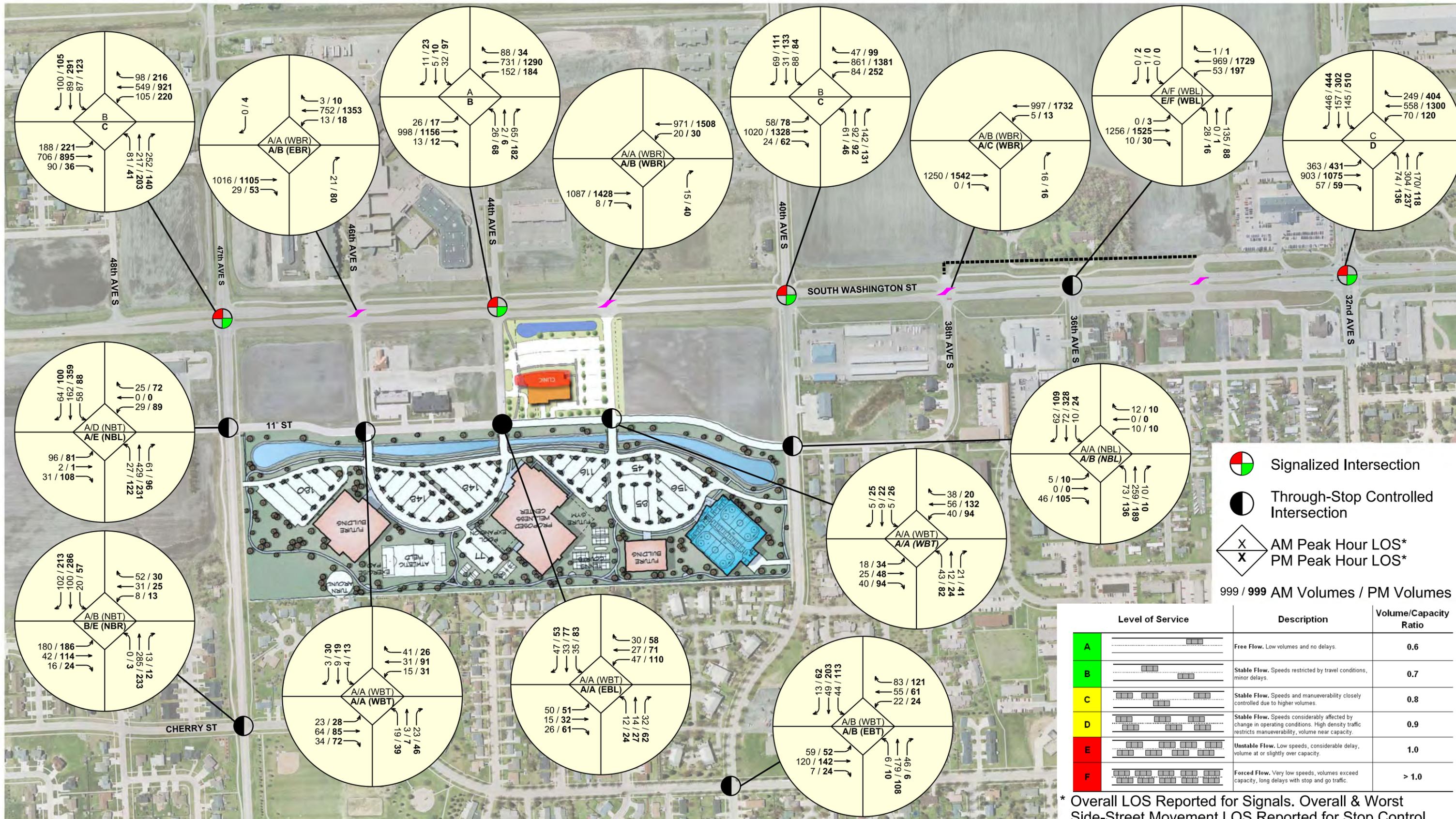
Cross-Street Intersection	Distance	Urban Street Class <sup>1</sup>	AM Peak Hour		PM Peak Hour	
			Average Travel Speed (mph) <sup>2</sup>	LOS	Average Travel Speed (mph) <sup>2</sup>	LOS
32nd Ave to 40th Ave	3,963	II	27.3	C	17.4	D
40th Ave to 48th Ave	3,166	II	24.7	C	24.5	C
<b>Corridor Total</b>	<b>7,129</b>	<b>II</b>	<b>27.9</b>	<b>C</b>	<b>20.0</b>	<b>D</b>

<sup>1</sup> Roadway classification as defined by the Highway Capacity Manual 2000 used in determining the LOS.

<sup>2</sup> SimTraffic model output for AM and PM peak hours.

For the 2035 recommended conditions, the South Washington Street Corridor operates at a LOS D or better. With the recommended 2035 improvements, the arterial operations improved over the 2035 base conditions.





## 5.0 Recommended Transportation Plan

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

### 5.1 Implementation Plan

Section 4.1, Section 4.2 and Section 4.3 detailed the recommended improvement measures as it relates to roadway/intersection geometrics, traffic control devices, access management and multimodal accommodations. The recommendations are also previously illustrated in Figure 4.1, Figure 4.2 and Figure 4.3. An implementation plan has been developed to provide a schedule of priority to the infrastructure and multimodal recommendations, to denote the anticipated timeline and associated “triggers” of when the improvements might be necessary. Table 5.1 presents the recommended implementation plan. Although it should be noted, the implementation plan could be subject to change based on actual development plans, market conditions or other unforeseen traffic changes that may occur in the future.

### 5.2 Estimated Costs and Funding Strategies

Preliminary costs were developed for the major components of the recommendations that are not already included in previously programmed projects and for those items the GF-EGF MPO are responsible for. It should be noted that the costs of these improvements are high level planning estimates, and should be applied/utilized in that regard. The improvement costs are based on estimated year 2010 construction costs and include surface level features only. The estimated construction costs were then increased by 30% to account for preliminary and final engineering design fees, minor utility impacts, construction administration and/or contingencies. Basic unit cost assumptions are as follows:

- Sidewalk and multiuse trail costs can range widely depending on quantities and whether constructed independently or with concurrent grading/site work. Estimates assume \$50 per linear foot and \$65 per linear foot for sidewalk and multiuse trail, respectively.
- Right turn lanes are estimated at approximately \$40,000 per 200 foot long lane and include the assumed relocation of one catch basin per turn lane.
- $\frac{3}{4}$  access median closures assume concrete center island construction, removal of existing median and addition of bituminous pavement at an estimated \$80,000 per closure. Two catch basin relocations per closure are assumed.
- Construction of positive offset left turn lanes at signalized intersections assume median reconstruction and pavement addition at an estimated \$65,000 per intersection. Separation of the left turn and adjacent through lane is provided via pavement markings. Two catch basin relocations per intersection are assumed.
- The construction of a typical city street (proposed frontage road) is estimated using \$400 per linear foot of road.

Right of way (if applicable), drainage considerations beyond the assumptions listed above, and grading are not included. Once preliminary design plans have been developed for these alternatives, a more refined cost estimate for each improvement measure can and should be established.

To support the implementation of the recommended infrastructure and multimodal improvement measures, the GF-EGF MPO may seek support from available funding sources and/or integrate the implementation of select items with the redevelopment of property parcels. Key funding sources may include:

- Highway Safety Improvement Program (HSIP)
- Urban Roads Program
- Transportation Enhancement (TE) Dollars
- Recreational Trails
- Special Assessment
- JARC (Job Access Reverse Commute) federal transit funds

The preliminary cost estimates are highlighted in Table 5.1.

### 5.3 Livability Loop Project

The MPO has submitted an application to receive a Federal Transit Administration Capital Investment Grant for the construction of multimodal improvements. The Grand Forks Livability Loop project is a scalable multi-year, multi-phase project to enhance accessibility, multimodal integration and options for users at key destinations throughout the community. Included within the grant application are five infrastructure improvements identified as part of the Wellness Center project. These items and their estimated construction costs include:

- 11<sup>th</sup> Street Extension: \$858,000 (includes roadway extension from 44<sup>th</sup> Avenue to 40<sup>th</sup> Avenue, sidewalks along both sides of 11<sup>th</sup> Street from 47<sup>th</sup> Avenue to 40<sup>th</sup> Avenue and sidewalk along the north side of 44<sup>th</sup> Avenue between Washington Street and 11<sup>th</sup> Street).
- Washington Street/44<sup>th</sup> Avenue Traffic Signal and Intersection Improvements: \$650,000 (includes traffic signal system, median reconstruction, and northbound/southbound right turn lanes)
- Wellness Center Trail Loop: \$1,029,600 (includes all shared use trails on the Wellness Center property between 47<sup>th</sup> Avenue and 40<sup>th</sup> Avenue).
- 11<sup>th</sup> Street/44<sup>th</sup> Avenue Bus Shelter: \$20,000
- Pedestrian Access to Bus Shelter: \$8,600

Items specific to the Livability Loop grant are denoted on Table 5.1.

Table 5.1 Implementation Plan and Cost Estimates

Transportation Mode	Location	Improvement Measure Description	Suggested Priority	Implementation Trigger	Lead Agency	Preliminary Cost Estimate (1)	Notes
Vehicle Mobility / Safety	Washington Street / 32nd Avenue	1. Re-stripe the existing WB right turn lane at Washington Street/32nd Avenue to a shared through/right turn lane. Reconstruct pork chop island on northeast corner to allow two WB through lanes	2013	Currently warranted	NDDOT	\$13,000	No Signal Improvements
		2. Conduct detailed intersection study to determine long term intersection improvements	2013	Incorporate into 2012 LRTP Update	GF-EGF MPO / NDDOT	\$50,000	
		3. Reconstruct intersection to widen 32nd Avenue to add an additional EB/WB through lane. The EB approach would consist of 2-left turn lanes, 2-through lanes and 1-right turn lane. The WB approach would consist of 1-left turn lane, 2-through lanes and 1-right turn lane.	Long-term	Based on implementation schedule determined through recommended intersection study	NDDOT	Requires Further Study (Item 2 above)	
	Washington Street / 36th Avenue	1. Install traffic signal system	Long-term	Closure of 34th Avenue and 38th Avenue medians, construction of the frontage road, redevelopment, road extension and/or Engineering Study determines it to be warranted Construct with traffic signal installation Construct with traffic signal installation	GF Engineering	\$625,000	
		2. Reconstruct center median to provide positive offset left turn lanes	Long-term				
		3. Construct exclusive NB/SB right turn lanes	Long-term				
	Washington Street / 40th Avenue	1. Install traffic signal system (All approaches protected/permissive left turn operation)	2013	Required with Wellness Center	GF Engineering	2014 Programmed Project #23 (2012-2015 TIP)	Recommend switching construction year with Programmed Project #17 (2012-2015 TIP)
		2. Reconstruct center median to provide positive offset left turn lanes	2013	Construct with traffic signal installation	GF Engineering		
		3. Re-stripe EB/WB Approaches to provide an exclusive left turn lane and shared through/right turn lane	2013	Required with Wellness Center, if EB/WB right turn lanes are not constructed	GF Engineering		
		4. Construct exclusive NB/SB right turn lanes	2013	Construct with traffic signal installation	GF Engineering		
		5. Construct exclusive EB/WB right turn lanes at Washington Street/40th Avenue	2013	Construct with traffic signal installation	GF Engineering		
	Washington Street / 44th Avenue	1. Install traffic signal system (NB/SB protected/permissive left turn operation, EB/WB permissive only)	Long-term (2)	3/4 access median reconstruction at 42nd Avenue and 46th Avenue and Engineering Study determines it to be warranted Construct with traffic signal installation Required with Wellness Center 3/4 access median reconstruction at 42nd Avenue and 46th Avenue Construct with traffic signal installation	GF Engineering	\$650,000	
		2. Reconstruct center median to provide positive offset left turn lanes	Long-term (2)				
		3. Re-stripe EB/WB Approaches to provide an exclusive right turn lane and shared left turn/through lane	2013				
4. Lengthen SB left turn lane		Long-term (2)					
5. Construct exclusive NB/SB right turn lanes		Long-term (2)					
Washington Street / 47th Avenue	1. Construct an exclusive EB right turn lane	Mid-term	Coordinate with 47th Avenue roadway improvements	GF Engineering	\$52,000		
	2. Extend NB left turn lane	Long-term	Construct with future 4-lane divided roadway extension of Washington Street	GF Engineering	\$26,000		
	3. Construct exclusive NB right turn lane	Long-term	Construct with future 4-lane divided roadway extension of Washington Street	GF Engineering	\$52,000		
47th Avenue / Cherry Street	1. Install all-way stop control	Long-term	Monitor traffic volumes, install when warranted	GF Engineering	\$650		
Washington Street Corridor	1. Install traffic signal coordination timing plans between 32nd Avenue and 47th Avenue 2. Construct 3/4 access median closure at Washington Street/38th Avenue and Washington Street 34th Avenue 3. Potential Frontage Road between 34th Avenue and 38th Avenue (west side of Washington Street). Contingent upon development plans and/or future 36th Street roadway alignment to the west 4. Construct 3/4 access median closure at Washington Street/46th Avenue and Washington Street/42nd Avenue 5. Improve access at 47th Avenue/Assisted Living Property (full access) and maintain internal circulation 6. Optional -- Construct exclusive NB/SB right turn lanes at Washington Street/46th Avenue	2013	Required with Wellness Center	GF Engineering	\$12,000		
		Long-term	When determined needed	GF Engineering	\$208,000 (\$104,000 ea.)		
		Long-term	Closure of 34th Avenue and 38th Avenue medians or warranted by development	GF Engineering	\$625,000		
		Long-term	When determined needed	GF Engineering	\$208,000 (\$104,000 ea.)		
		Mid-term	Coordinate with 47th Avenue roadway improvements or closure of the Washington Street/46th Avenue median	GF Engineering	\$26,000		
		Long-term	When determined needed	GF Engineering	\$104,000		
11th Street Corridor	1. Construct 3-lane section along 11th Street between 44th Avenue and 40th Avenue (40 foot streetwidth minimum) 2. Install thru-stop control at 11th Street/42nd Avenue, 44th Avenue and 46th Avenue	2013 (2)	Required with Wellness Center	GF Engineering	\$858,000		
		2013 (2)	Required with Wellness Center	GF Engineering			

Mid-term = Expected necessary within 5-15 years  
 Long term = expected necessary within 15-25 years  
 Note: (1) Preliminary cost estimates are based on 2010 average construction costs, which have been increased by 30% to account for preliminary and final engineering design service fees, utilities and contingency.  
 (2) Included in the FTA Livability Loop Grant Application. Construction costs provided by Grand Forks Engineering Department.  
 (3) Included in the FTA Livability Loop Grant (11th Street Extension). The sidewalk along 11th Street (east side) is estimated at \$140,000 and the west side is estimated at \$115,000. The sidewalk along 44th Avenue (north side) is estimated at \$32,500.

Table 5.1 Implementation Plan and Cost Estimates Continued

Transportation Mode	Location	Improvement Measure Description	Suggested Priority	Implementation Trigger	Lead Agency	Preliminary Cost Estimate	Notes
Bicycle / Pedestrian	47th Avenue	1. Remove existing sidewalk and Replace with a 10 foot multi-use trail between Washington Street and 11th Street 2. Construct 10 foot multi-use trail, east of 11th Street to connect into Wellness Center site trail system	Mid-term Mid-term	Construct concurrent with future trail extension on Washington Street (south of 47th Avenue) or development of adjoining parcel Construct with completion of Wellness Center trail loop.	GF Engineering Park District	\$49,400 (4)	
	11th Street	1. Construct sidewalk on east side of 11th Street between 47th Avenue and 40th Avenue 2. Construct sidewalk on west side of 11th Street between 47th Avenue and 40th Avenue	2013 Mid-term	Required with Wellness Center Construct with development of each parcel	Park District Property Owners	(3) (3)	Include in Development Site Plan
	44th Avenue	1. Construct sidewalk on north side of street between Washington Street and 11th Street	Mid-term	Required with Altru Clinic development	Altru Clinic	(3)	Include in Development Site Plan
	11th Street/40th Avenue	1. Construct 10 foot multi-use trail connection between existing trail on 40th Avenue and Wellness Center internal trail loop.	Mid-term	Construct with completion of Wellness Center trail loop.	Park District	(4)	
	Washington Street / At-Grade Trail Crossing	1. Conduct Feasibility Study to Grade separate (tunnel)	Long-term	Construct with future 4-lane divided roadway extension of Washington Street	GF-EGF MPO	\$156,000	Construct with Future 4-Lane Expansion Project
	Wellness Center Access Bridges (42nd, 44th and 46th Avenues)	1. Construct sidewalk on one side of the bridge connecting 11th Street into on site sidewalk system	2013	Required with Wellness Center	Park District	Included in Bridge Contract (Project Let 2011)	
	Wellness Center Trail Loop	1. Construct on-site internal trail loop (west side of property) 2. Construct segments of the trail loop (east side/south side of Wellness Center) to connect facility with Great Plains Court. 3. Construct remaining on-site internal trail loop (east side of property)	TBD (2) TBD (2) TBD (2)	Required with Wellness Center As funding becomes available or adjoining parcels are developed As funding becomes available or adjoining parcels are developed	Park District Park District Park District	 \$1,029,600 	
	11th Street (47th Avenue to South)	1. Potential 10 foot multi-use trail connection to South	Mid-term	Construct with development of parcel	Property Owners	\$117,000	Include in Development Site Plan
	Neighborhood Connection	1. Construct sidewalk connection between 46th Avenue and the east side of the Wellness Center property 2. Construct sidewalk on existing 10 foot Easement between Great Plains Court and east side of Wellness Center Property 3. Construct sidewalk between the Timberline Townhome Development and east side of Wellness Center Property	Mid-term Mid-term Mid-term	Construct concurrent with implementation of internal trail system on east side of Wellness Center property Investigate feasibility and construct when or if possible. Private Sidewalk as Determined Necessary by Timerblime Townhome Association	GF Engineering / Park District GF Engineering / Park District GF Engineering / Park District	\$6,500 \$15,600 \$15,600	
	Transit	Brown Route	1. Re-route onto 11th Street and 44th Avenue (Circulate through Wellness Center site) 3. Increase Brown Route service frequency from 1 bus per hour to every 30 minutes 4. Consider adding evening and Sunday service (based on actual user demand)	2013 Mid-term Long-term	Required with Wellness Center Required with Wellness Center Grand Forks city wide Night CAT and Sunday service consideration.	Cities Area Transit Cities Area Transit Cities Area Transit	NA \$252,760 / year NA
Transit Shelter		1. Install bus shelter and bench on northwest corner of 11th Street/44th Avenue intersection. 2. Incorporate bus shelter and bench into main entrance way of the Wellness Center building. Consider secondary shelter at 11th Street/44th Avenue intersection.	Mid-term (2) 2013	Construct with Altru Clinic property Required with Wellness Center	Cities Area Transit Cities Area Transit	\$20,000 Included in Building Contract	
Transit Signal Priority		1. Install traffic signal priority equipment at the Washington Street/44th Avenue intersection	Long-term	Install with traffic signal system	Cities Area Transit / GF Engineering	\$13,000	

Mid-term = Expected necessary within 5-15 years  
Long term = expected necessary within 15-25 years

Note: (1) Preliminary cost estimates are based on 2010 average construction costs, which have been increased by 30% to account for preliminary and final engineering design service fees, utilities and contingency.  
(2) Included in the FTA Livability Loop Grant Application. Construction costs provided by Grand Forks Engineering Department.  
(3) Included in the FTA Livability Loop Grant (11th Street Extension). The sidewalk along 11th Street (east side) is estimated at \$140,000 and the west side is estimated at \$115,000. The sidewalk along 44th Avenue (north side) is estimated at \$32,500.  
(4) Included in the FTA Livability Loop Grant (Wellness Center Trail Loop). The trail connection stubs between Wellness Trail Loop and existing roadway trail (both at 47th Avenue and at 40th Avenue) are estimated at \$12,600 each.

**Appendix A:**

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**Study Review Committee (SRC) Meeting Minutes**

**Appendix B:**

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**Policy Advisory Committee (PAC) Meeting Minutes**

**Appendix C:**

**Public Open House and Public Comments**

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