NDSU | UPPER GREAT PLAINS TRANSPORTATION INSTITUTE
ADVANCED TRAFFIC ANALYSIS CENTER

Near Southside Historical Neighborhood Traffic Study

Final Report

October 2018

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Grand Forks-East Grand Forks MPO

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Notice

The preparation of this document was funded in part by the United States Department of Transportation with funding administered through the North Dakota Department of Transportation, Minnesota Department of Transportation, the Federal Highway Administration, and the Federal Transit Administration. Additional funding was provided through local contributions from the governments of Grand Forks, East Grand Forks, Grand Forks County, and Polk County.

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INTRODUCTION

The Grand Forks-East Grand Forks Metropolitan Planning Organization (MPO), working with the City of Grand Forks (City) and the Near Southside Neighborhood Association requested the Advanced Traffic Analysis Center (ATAC) to explore possible traffic calming and safety countermeasures in the Near Southside Historic Neighborhood. The study area limits under consideration are 1st Ave. S. to the north, 13th Ave. S. to the south, Cherry St. to the west, and the Red River to the east. Figure 1 shows a general map of the area.

Figure 1. Study area

The Near Southside Neighborhood has been organized and has pursued many improvements or betterment projects within its confines. Improvements have included investments in making key intersections and sidewalks more accessible, adding street lighting, and updating intersection traffic control devices.

One chronic issue that has been identified by the neighborhood is the perception of speeding vehicles and the use of the neighborhood streets for cut through traffic, particularly Reeves Drive. This is traffic that is neither originating nor destined within the neighborhood. Rather it is traffic using Reeves Drive as a way to reach the southernmost bridge over the Red River.

Included in this history of issues is the traffic along Belmont and 4th Ave. S. These two streets are designated to carry the through traffic within the neighborhood; both are functionally classified as minor arterials. Speeding is a perceived issue along these two roads and the close proximity of Phoenix Elementary School is a major concern for pedestrian safety. The intersection of 4th Ave S and Belmont also had a crash in 2015 that damaged one of the traffic signal poles. As this is an older neighborhood with older signals, replacement parts for the equipment were difficult to purchase. Another crash in 2016 further hampered the situation resulting in another traffic signal pole knocked down. After careful data collection, analysis, and neighborhood involvement, it was decided to not replace the signals. Rather, the intersection would be converted into an all way stop. The neighborhood continues to voice traffic issues besides the speed and cut through traffic.

The neighborhood has presented concepts of how intersections could be reimagined to include safer crossings for pedestrians, especially for the Phoenix bound students and parents. The concepts were presented to the city and the resulting action was to agree to conduct the Near Southside Historical Neighborhood Study. See Appendix A.

OBJECTIVES

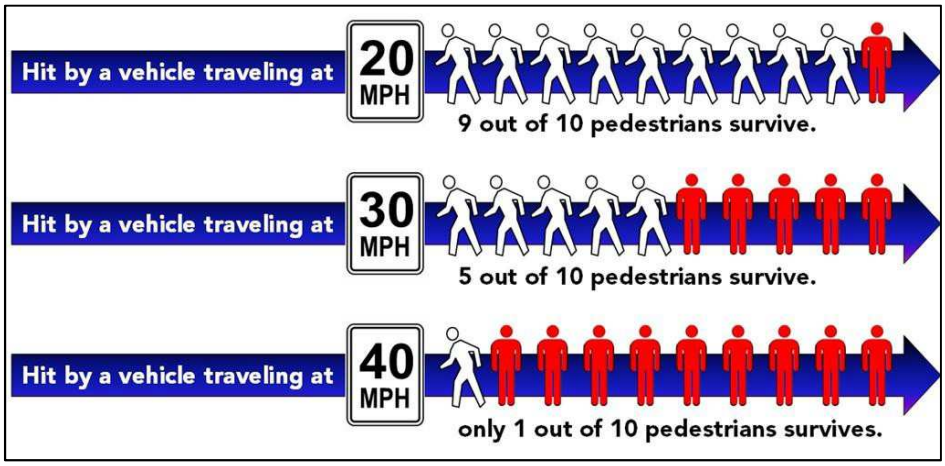
The objective of this study is to identify countermeasures to calm traffic, enhance safety, improve overall traffic flow, and optimize intersections, while targeting the perceived speeding issue. This study is comprised of several tasks.

- Speed Study
- Temporary and Permanent Improvements
- Crash Data Analysis
- Intersection Analysis
- Walkability Assessment
- Travel Demand Model Run Scenarios
- Select Link Analysis

The MPO retained the Advanced Traffic Analysis Center (ATAC) to assist in traffic data analysis, public engagement, and recommendations. Also retained was CPS Consultants whose primary task was to help develop concepts of alternative improvements to address the issues that were being identified. A group of stakeholders from the neighborhood have also volunteered to work with the MPO team and City staff.

SPEED STUDY

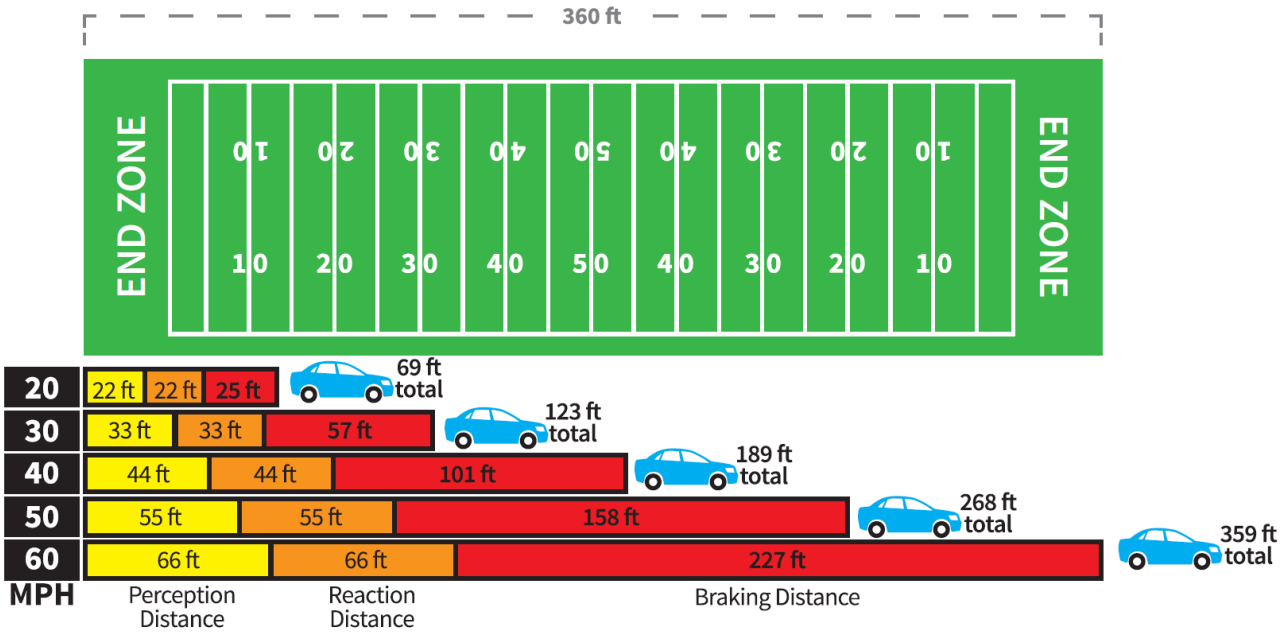
Speeding in residential neighborhoods with low posted speed limits can greatly increase the fatality rate if a pedestrian is struck. Figure 2 shows the likelihood of a pedestrian surviving vehicle crash. The trend shows that as speed increases, the chance of surviving decreases. As seen in the figure, just by increasing the speed from 20 mph to 30 mph, the fatality rate increases by 40%.



Source: FHWA Pedestrian Safety Strategic Plan: Background Report, 2010

Figure 2. Pedestrian survivability

A driver's ability to stop quickly is also impacted negatively as speed increases. As shown in Figure 3, driver reaction time and the stopping distance both increase with speed. Increasing the speed from just 20 mph to 30 mph creates a ten foot difference in stopping distance.



SOURCE: Florida Department of Highway Safety and Motor Vehicles

Figure 3. Braking/thinking distance

Speed Study

In July 2016, the City conducted a speed study by using a speed radar trailer operated by the Grand Forks Police Department. One of its main functions is to display individual vehicle speed via a feedback display. It also has the capability to capture speeds without the display (stealth mode). The data gathered by the Police Department did not prove that speeding was an issue even though residents in the neighborhood claimed to still see the speeding. The Police Department speed trailers have "Police" marked very visibly. It is thought that this causes drivers to be more compliant with the speed limit. ATAC was requested to conduct speed studies using other equipment that is more discrete in order to catch more natural driving behavior.

Grand Forks Police Department Speed Trailer Study April 2016

Grand Forks Police Department's speed trailers were used to gather speed data for the southbound traffic midblock of Belmont Rd 500 block. For the first day of data collection, the speed trailer had the speed feedback display turned off (stealth mode) in an attempt to capture more natural driving speeds. Data collected show that 85.69% of vehicles are driving below the posted speed limit of 25 mph with a 85th percentile speed of 25 mph, indicating speeding was not an issue. See Appendix B for additional information

On the following day, the feedback speed was set to have the speed feedback display on. Again, data collected show 88.03% of vehicles traveling under the posted speed limit of 25 mph, an increase of 2.34%. This does prove the stealth mode does capture higher speeds, however the 85th percentile remains at 25 mph and there was no collected evidence to suggest speeding as an issue.

Baseline Data

The neighborhood expressed safety and traffic concerns stemming from increased vehicle traffic, excessive speeds, and disregard to the stop signs at intersections. The MPO gathered traffic data in early April of 2017 to establish baseline traffic data. Included in this data were turning movement counts at

key intersections and a speed study on the three functionally classified north-south streets: Reeves, Belmont, and Cherry.

ATAC Spot Speed Study April 2017

The data collected by the Police speed trailer causes drivers to be more compliant with the speed limit. ATAC was requested to conduct speed studies using other equipment that is more discrete in order to catch more natural driving behavior. Spot speed studies were conducted in April of 2017 prior to any temporary improvements at four midblock locations along Belmont Road, Reeves Drive, and Cherry Street. As shown in Figure 4, the four locations are:

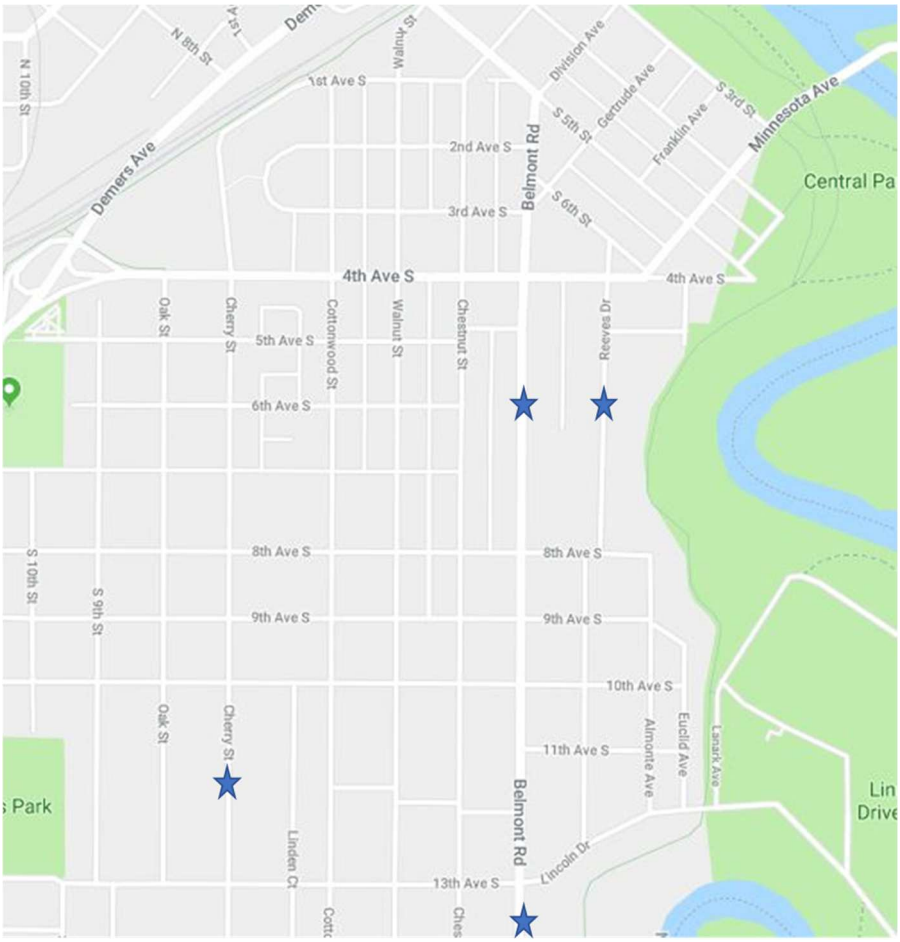


Figure 4 Spot Speed Study Sites

Site on Cherry Street was between 10th Ave. S. and 13th Ave. S. The posted speed limit is 25 mph. The northern Site on Belmont Road was between 4th Ave. S. and 8th Ave. S. Posted Speed Limit is 25 mph. The southern Site on Belmont Road between 13th Ave. S. and 17th Ave. S. Posted Speed Limit is 30 mph. Site on Reeves Drive was between 4th Ave. S. and 8th Ave. S. Posted Speed Limit is 25 mph

Data were collected between April 19 and April 26 of 2017 while schools were in session. Data was collected during weekdays for a continuous 48-hour period. At each site, both northbound and southbound directions of travel were recorded.

Results

As previously mentioned, various parameters were calculated from speed observations. A summary of the results is presented below. These results were presented to the public during a meeting on May 19. The results showed an increase in the speed data collected, indicating that the police speed trailers were "dampening" vehicle speeds. The 85th percentile speed was found to be 30 mph when ATAC collected data. This is a 20% raise in this speed from 25 mph from the Police speed trailer compared to the 30 mph. As will be reported later in this report, speeding-related crashes were examined. Findings indicated there was no significant issue with speeding relative to the amount of total crashes in the study area. However, there has been an increase in the number of speeding-related crashes which may indicate a potential issue in the future. See Appendix B for additional information.

Site 1- Cherry Street

At Site 1, average daily traffic (ADT) of 2,874 was recorded. Less than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be in the range of 24-25 mph. Also, less than 1% of traffic was recorded speeding over 30 mph.

Site 2- Belmont Road North

At Site 2, ADT of 4,985 was recorded. Significantly more than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be 29 mph. Also, approx. 6% of traffic was recorded speeding over 30 mph.

Site 3 – Belmont Road South

At Site 3, ADT of 6,187 was recorded. More than 15% of traffic was recorded speeding over the posted limit of 30 mph during both days of observation. The 85th percentile speed was found to be in the range of 32-33 mph. Also, approx. 5% of traffic was recorded speeding over 35 mph.

Site 4 – Reeves Drive

At Site 4, ADT of 2,225 was recorded. Significantly more than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be 30 mph. Also, between 9%-14% of traffic was recorded speeding over 30 mph.

Turning Movement Counts

Turning movement counts were done manually and the observers noticed numerous running of the stop signs at the 8th Ave. S. intersection with Reeves Dr. The turning movement counts also confirmed that much of the traffic on Reeves Dr. was through traffic rather than what would be typical for a residential neighborhood. The average daily traffic recorded for Reeves is much higher than one would expect for a typical residential neighborhood in Grand Forks. The nearby adjacent streets that are similar in land use type confirm that the traffic on Reeves consists of a large amount of through traffic. Given Reeves Drive proximity to the Point Bridge and the southern and southwestern origins/destinations of Grand Forks, cut-through traffic is using Reeves Dr. rather than using the functionally classified roadways like Belmont or 4th Ave S.

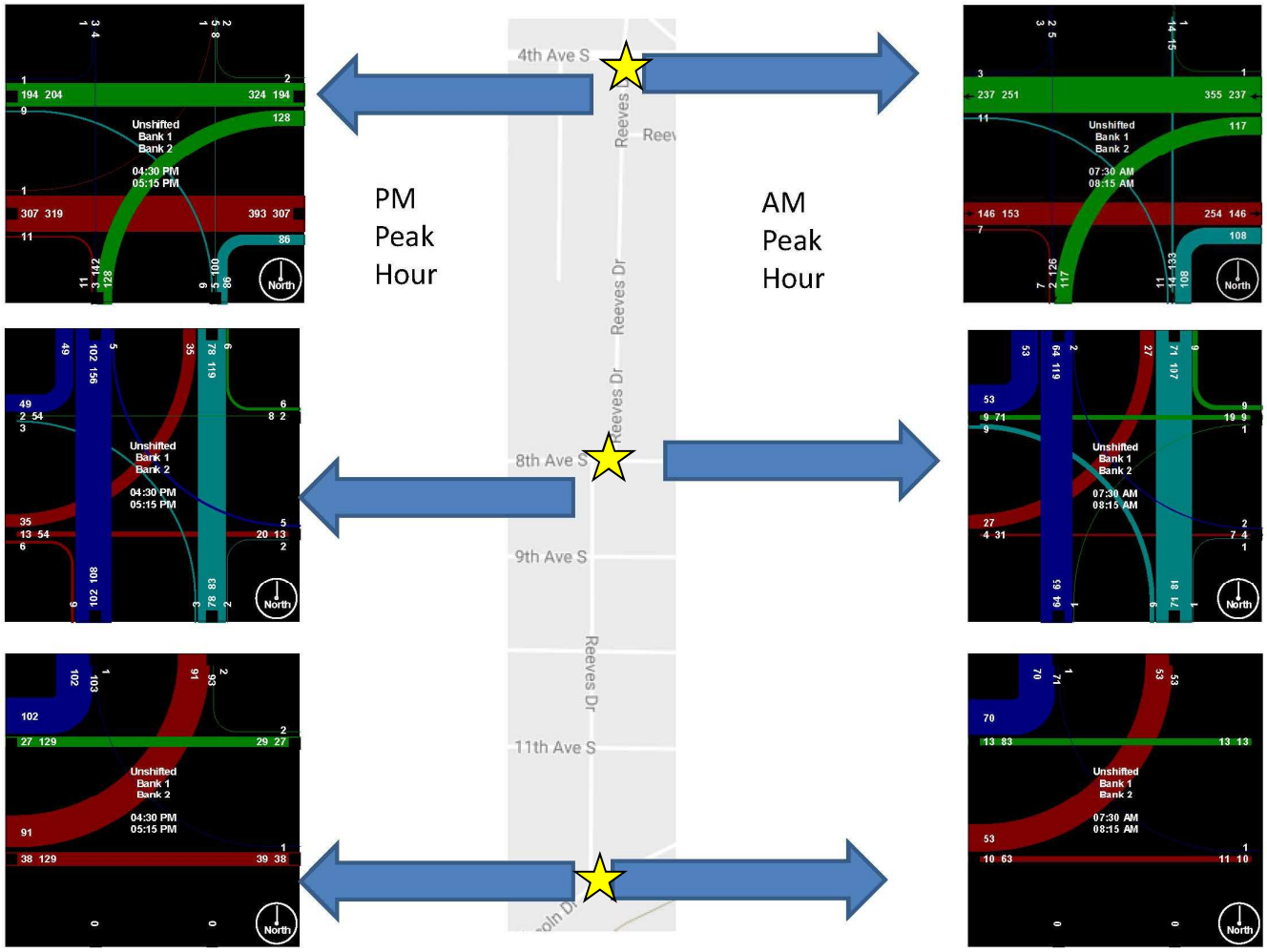


Figure 5. Reeves Dr. turning movements

Figure 5 shows that much of the traffic flow is through the neighborhood. The width of the lines depict the amount of traffic taking that travel line. The wider the line, the more traffic. The desire line of flow is to get from the southern portions of Grand Forks to the Point Bridge. Traffic uses the southern end of Reeves to divert from the Belmont Road corridor. That traffic proceeds through the Reeves Drive area and then turns to go to the bridge. The

reverse traffic flow is also shown in the Figure 5. As the data shows, more traffic is northbound in the morning and then southbound during the evening peak hours.

Some traffic uses the 8th Ave S one block connection between Belmont Road and Reeves Drive. The traffic is trying to find another route to take instead of continuing along Belmont or Reeves. The unusual intersection of Reeves and 8th Ave S compounds this issue of traffic flow. Traffic at this intersection was also observed to have a number of vehicles not stopping completely. The traffic observers did not take a separate count to obtain an exact number. But did report that it was observed.

TEMPORARY AND PERMANENT IMPROVEMENTS

Preliminary data of speeding and cut-through traffic made it clear that there were issues at a few locations within the study area. The City and MPO were proactive in finding an immediate solution in these areas. In 2017, Reeves Drive had temporary traffic calming measures in place to address the speeding issue. After the trials were completed, the temporary improvements were converted into permanent installations.

Reeves Drive Temporary Improvements

This section includes studies completed by MPO and the City. Note that curb extensions in the form of pinch-points (chokers) were installed midblock on Reeves Dr. by the City. Traffic data was collected in 2016 by the City. Refer to Appendix E for details. Traffic speed and count data was also collected by the MPO before and after the installations. Refer to Appendix B for details.

Working with the neighborhood, the city installed two temporary, or pilot, traffic calming techniques on Reeves Dr. In 2017 in late April, early May, two techniques were installed to be tested. Figure 6 is a photo of the technique used at the intersection of 8th Ave. S. and Reeves Dr. Traffic cones and barricades were strategically placed to narrow, or choke down, the radius of the intersections curbs. Additionally, a stop sign was position at a new location closer to the stop and turning point of the north-south traffic.

This technique was used to test whether it would result in improved stopping at the stop signs. It was also installed to test whether it would impact the speeds on Reeves Dr. by forcing vehicles to maneuver through a tighter turning radius at the intersection. Lastly, it was installed to test whether this tighter turning movement and slower travelling through the intersection would divert any traffic to alternate routes.

A second traffic calming technique was temporarily installed at the intersection of Reeves Court and Reeves Drive. The curb was bulbed out on the west side. The distance from the curb was also replicating about what a parked vehicle would be into the street space. Figure 7 is a photo of the temporary bulb-out implementation. The thought behind this installation is that restricting the perception of street space available to drive would potentially result in reducing the speed.

Figure 6. Reeves Dr. and 8th Ave. temporary improvement

Figure 7. Reeves Dr. temporary improvement

In early August, the MPO gathered traffic data to gauge the impact these two temporary pilot techniques had. The method was to recount the turning movements at the intersection of Reeves Dr. and 8th Ave. S. The data gathered would be compared to the data collected prior to the test techniques. Speed data would also be collected to compare that data to the speeds recorded in the spring.

The results of the August 2017 observations show that the intersection of Reeves Drive and 8th Ave. S. had some improved adherence to stop signs. Again, the counts were taken manually and the same observer noticed that vehicles were more likely to have to come to stops at the stop signs. Traffic during the peak periods being observed usually had other vehicles entering into the intersection. With less space within the intersection to maneuver, vehicles tended to stop first in order to determine proper right of way and determine what other vehicles were doing as they entered the intersection. However, significant amount of traffic still did not come to complete stops and a number of vehicles traveling north and south were still observed not coming to a complete stop.

The turning movement counts themselves showed little difference in actual traffic counts. Figures 8 and 9 show the counts from April 2017 compared to the counts in August 2017. The AM Peak and PM Peak periods are used to show representative comparisons. The analysis would suggest that the technique did not divert any traffic to other routes. It would have been anticipated that there would be actually fewer vehicles than were counted. A typical traffic pattern in Grand Forks is that there are usually fewer vehicles traveling most streets in early August 2017 than are traveling in early April 2017. Schools not being in session yet in August 2017 are the biggest reason for this. At this intersection, the counts were not that much different, with even a slight increase in some movements.

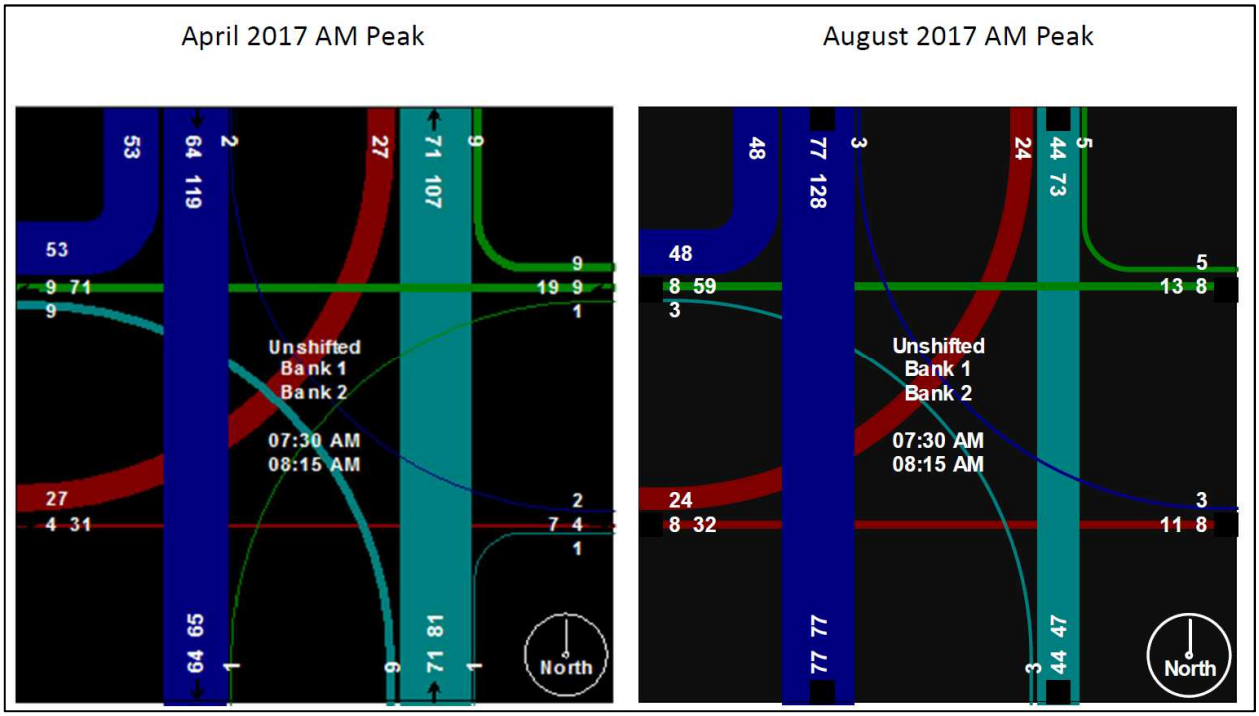


Figure 8. AM 8th Ave S Reeves Dr Intersection peak traffic counts

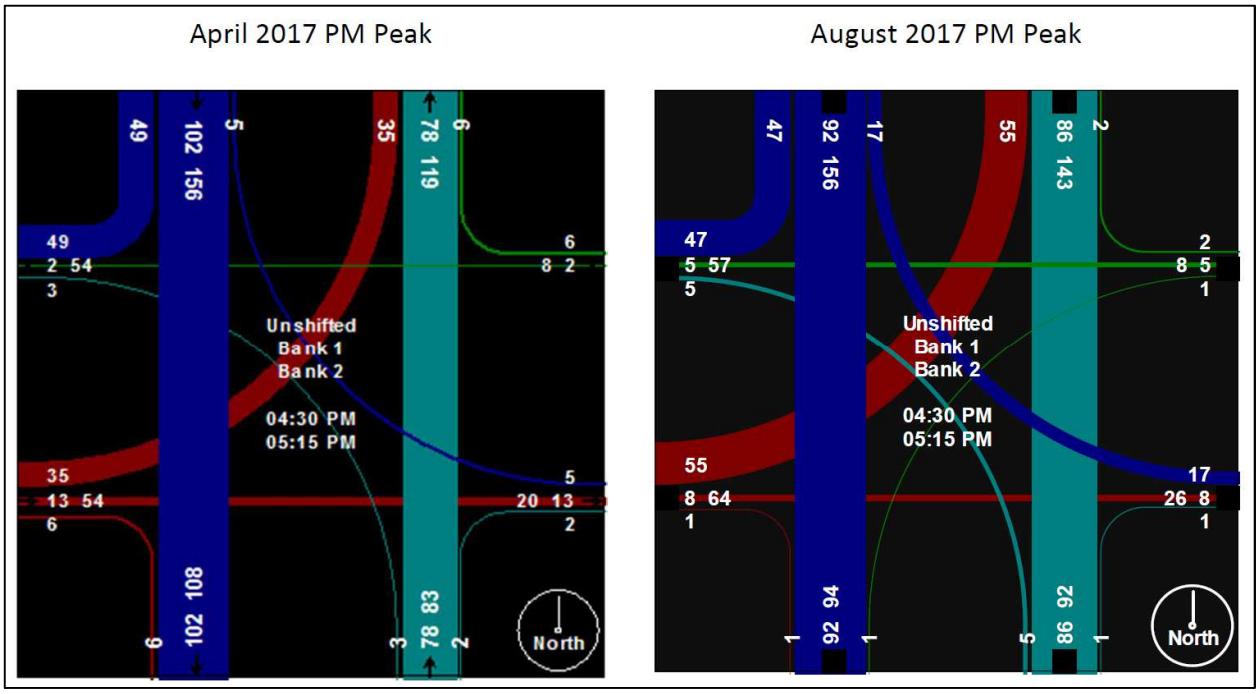


Figure 9. PM 8th Ave S Reeves Dr Intersection peak traffic counts

Temporary Improvements Speed Data

The speed data was collected at the same time the turning movements were collected. A different method of collecting the speed data was utilized. The equipment in April 2017 was radar based whereas the equipment in August 2017 relied on changes in magnetic fields when a vehicle passes over it. See Appendix B for additional

information. The data is collected for the direction the vehicle travels whereas the radar units collected both directions. The following sections contain the results. Traffic speed was collected for both north and south of the Reeve Drive/8th Ave. S. intersection. The north location was very near the same spot the April data was collected. The south location was a new collection point of speed data.

Reeves Drive 700 block northbound traffic August 2017
Significantly more than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be between 32 to 34 mph. Also, under 20% of traffic was recorded speeding over 30 mph.

Reeves Drive 700 block southbound traffic August 2017
Significantly more than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be between 32 to 34 mph. Also, under 20% of traffic was recorded speeding over 30 mph.

As part of the public input, neighbors express a desire to include as part of the speed study the collection of vehicle speeds on the southern part of Reeves. The data was collected and found that there were similar speed concerns experienced here by the residents.

Reeves Drive 1000 block northbound traffic
Significantly more than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be between 30 to 32 mph. Also, under 20% of traffic was recorded speeding over 30 mph.

Reeves Drive 1000 block southbound traffic
Significantly more than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be between 30 to 32 mph. Also, under 20% of traffic was recorded speeding over 30 mph.

Reeves Drive Permanent Installation

During the months of July and August of 2017, the neighborhood and city agreed to make the temporary traffic calming techniques more permanent. Concrete was poured to take the place of the bollards and traffic barricades. Curbs were installed and dirt with grass seed was installed where previous driving pavement existed behind the new curbs.

Figure 10. Reeves/4th Ave S curb extension

As seen in figures 10 and 11, the turning radius at the intersection was greatly reduced. Before, a vehicle could make the turning movements at a higher speed due in part to the allowance of a large turning radius. The reduction in radius was done on all sides of the intersection. This resulted in a much tighter space to make the movements necessary to continue through traffic movements. The stop condition was also enhanced by placement of the stop sign closer to the intersection.

Figure 11. Reeves/4th Ave S curb extension

With this tighter turning geometry, there was some hope that this would deter cut through traffic from using Reeves Drive. Turning movement counts were taken in early October 2017 after the improvements were installed. The comparisons of the 3 different turning movement counts are depicted in Figure 12.

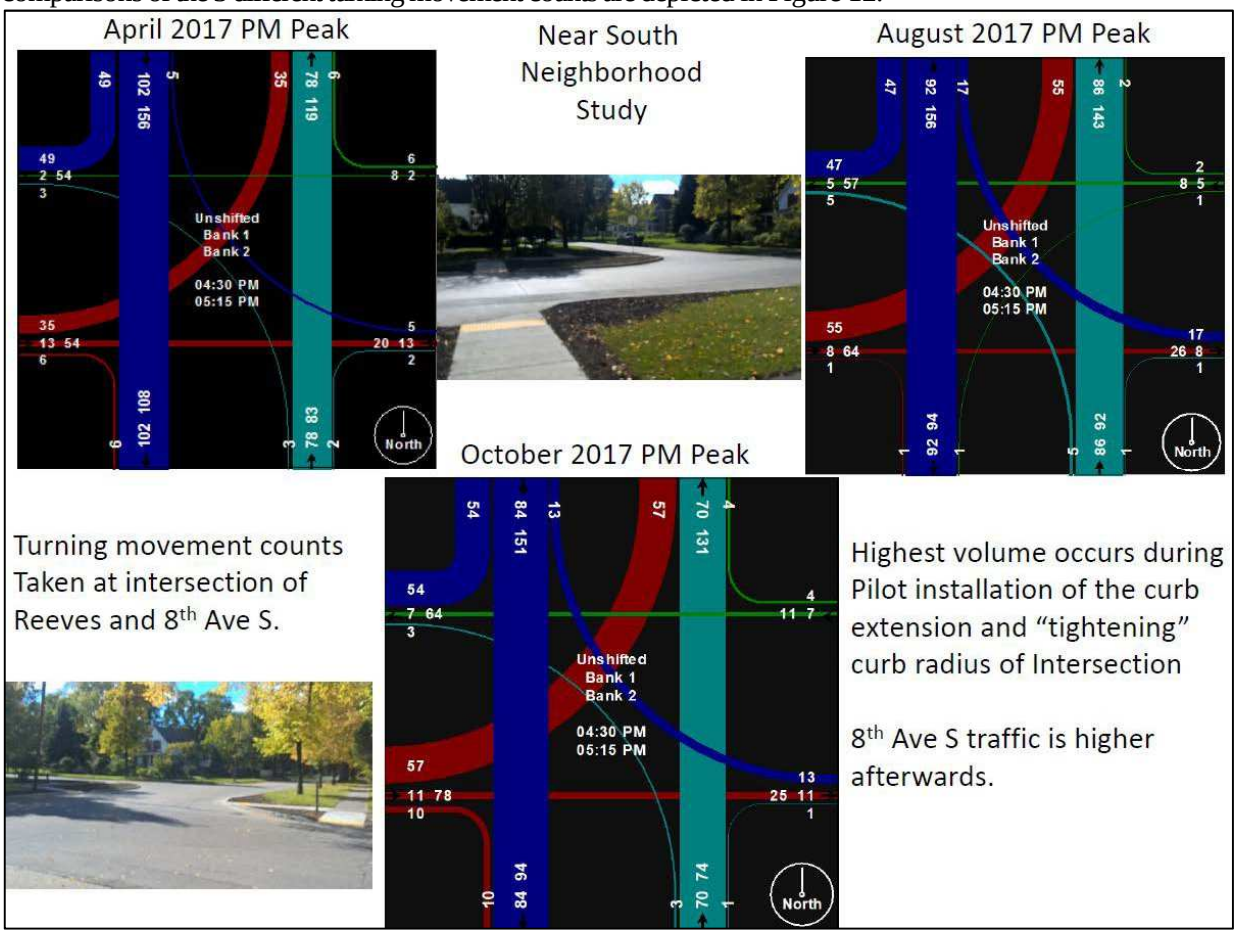


Figure 12. Reeves/4th Ave S curb extension data

Little diversion of cut through traffic was detected. The tighter intersection geometry did not cause much, if any, traffic to be persuaded to not use this route. However, the positive impact both the temporary and permanent installations did achieve was much greater compliance with stopping at the stop signs on Reeves Drive. This better stopping behavior followed through with better lane assignment of vehicles as they maneuvered their turns at this intersection.

The curb bulb-out at the intersection of Reeves Drive and Reeves Court was converted from its temporary materials to the concrete installation shown in Figure 13.

Figure 13. Reeves Drive bulb-out

The photo on the left shows the installation partially hidden by a work trailer. The view is looking southbound on Reeves. The trailer makes a more imposing impediment to the traffic than the curb bulb-out. The photo on the right reveals more detail about the curb bulb-out permanent installation.

Permanent Installation Speed Data October 2017

Speed data was again collected after the permanent installation was done. The data was collected in early October 2017 using the same equipment as in August 2017.

Reeves Drive 700 Block Speed Data Northbound Lane

Significantly more than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be between 32 to 34 mph. Also, under 20% of traffic was recorded speeding over 30 mph. Not much change resulting from the permanent installation.

Reeves Drive 700 Block Speed Data Southbound Lane
Significantly more than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be between 32 to 34 mph. Also, under 20% of traffic was recorded speeding over 30 mph. Little change resulting from the permanent installation.

Reeves Drive 1000 block southbound traffic
Significantly more than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be between 30 to 32 mph. Also, under 20% of traffic was recorded speeding over 30 mph. No significant change recorded.

Reeves Drive 1000 block northbound traffic
Significantly more than 15% of traffic was recorded speeding over the posted limit of 25 mph during both days of observation. The 85th percentile speed was found to be between 30 to 32 mph. Also, under 20% of traffic was recorded speeding over 30 mph.

Speeding is still an issue despite the new permanent techniques. Generally, northbound traffic is slightly speeding higher than southbound traffic. Most parking takes place along the west side of Reeves Drive which results in southbound drivers perceiving more confined driving conditions when parked vehicles are present.

City of Grand Forks Engineering Department Speed Study April 2018

The City of Grand Forks Engineering Department obtain equipment similar to the equipment ATAC used for their speed study. City staff conducted a spot speed study on Reeves Drive. The result closely mirror the result obtained by ATAC. This verifies that speeding is still experienced by the neighborhood residents as a concern despite the traffic calming techniques.

CRASH DATA ANALYSIS

The purpose of crash analysis is to improve motor vehicle and pedestrian safety by identifying crash patterns, mitigating crash severity, and reducing the number of crashes by adopting suitable countermeasures. The MPO asked ATAC to perform corridor crash analysis within the study area using 2014-2016 NDDOT crash data.

Methodology

Utilizing ArcMap GIS software, crash data provided by the NDDOT was organized and categorized to give visual representation of crash trends within the study area. This method proved useful in analysis when isolating certain roadways or intersections to find trends in selected crashes/crash types. Refer to Appendix C for NDDOT crash summary sheets.

Using the NDDOT crash summaries, which contained a shortened narrative of the crashes and more descriptive conditions, study area crashes were studied to identify any observable trends in crashes. Crashes within the study area for the years 2014-2016 are shown in figure 14.

Figure 14. 2014-2016 study area – all crashes

Results

From the crash data, it was recorded that there were 155 total crashes within the study area from 2014-2016.

2014 – 52 total crashes
2015 – 56 total crashes
2016 – 47 total crashes

Intersections of Concern

Each intersection was investigated and the number of crashes, crash severity and crash types were noted. Intersections with higher numbers of crashes were listed in descending order from most concerning to least concerning as seen below in Table 1.

Table 1. Intersections of concern

Intersection	Total Crashes
Belmont Rd. and 4th Ave. S.	8
Cherry St. and 4th Ave. S.	8
Cherry St. and 8th Ave. S.	6
Reeves Dr. and 4th Ave. S.	6
Cottonwood St. and 4th Ave. S.	5
Cottonwood St. and 8th Ave. S.	4
Cherry St. and 10th Ave. S.	4
Cottonwood St. and 3rd Ave. S.	4
Minnesota Ave. and 4th St.	3

The geometric, traffic control, and other existing conditions for these intersections of concern are listed as follows.

Belmont Rd. and 4th Ave. S.

- 4-way stop controlled intersection
- Parking along southbound lane
- Eastbound and westbound approaches have exclusive left-turn lanes (2014-15 data sets)
- Located on northeast corner of Phoenix Elementary

Cherry St. and 4th Ave. S.

- Traffic signal controlled intersection
- Eastbound approach has an exclusive left-turn lane
- All approaches are very wide

Cherry St. and 8th Ave. S.

- 4-way stop controlled intersection

Reeves Dr. and 4th Ave. S.

- North-south traffic is stop controlled
- Driver speed feedback sign currently located west of intersection facing westbound traffic

Cottonwood St. and 4th Ave. S.

- North-south traffic is stop controlled
- Parking along southbound lane
- Cracked and uneven pavement

Cottonwood St. and 8th Ave. S.

- North-south traffic is stop controlled
- Parking along southbound lane

Cherry St. and 10th Ave. S.

- East-west traffic is stop controlled

Cottonwood St. and 3rd Ave. S.

- No traffic control within intersection

- Parking along southbound and westbound lanes
- Cracked and uneven pavement

Minnesota Ave. and S 4th St.

- North-south traffic is stop controlled
- Parking along southbound lane
- Exclusive left-turn lane marked on southbound approach

Angle Crashes

It was recorded that there were a high number of angle crashes at the intersections of concern. This type of crash is otherwise known as right-angle, broadside, or T-bone type of crash and occurs when either side (driver or passenger) of one vehicle is impacted by the front of another vehicle. Note that 50% - 100% crashes at the intersections of concern are of angle type as shown in Table 2. Most injury crashes that occurred within the neighborhood were angle crashes.

Table2. Angle and injury crashes at intersections of concern

Intersection	Total Crashes	Angle Crashes	Injury Crashes
Belmont Rd. and 4th Ave. S.	8	50%	2
Cherry St. and 4th Ave. S.	8	50%	1
Cherry St. and 8th Ave. S.	6	83.3%	3
Reeves Dr. and 4th Ave. S.	6	66.7%	3
Cottonwood St. and 4th Ave. S.	5	80%	1
Cottonwood St. and 8th Ave. S.	4	50%	2
Cherry St. and 10th Ave. S.	4	100%	1
Cottonwood St. and 3rd Ave. S.	4	75%	1
Minnesota Ave. and S 4th St.	3	66.7%	2

Parked Motor Vehicle Crashes

Crashes with parked motor vehicles were recorded to be rampant within the study area. From 2014 to 2016, approximately 26 percent of all crashes were with parked motor vehicles. Each street was investigated and the number of parked motor vehicle crashes per street is listed in Table 3. Note that 8 of these crashes were alcohol related while 12 were hit and runs.

Table 3. Parked motor vehicle crashes

Street	Parked Motor Vehicle Crashes
Belmont Rd.	10
Walnut St.	7
Cherry St.	5
Cottonwood St.	4
Chestnut St.	4
1st Ave. S	3
4th Ave. S	3
Reeves Dr.	2
8th Ave. S	2

Figure 15 shows parked motor vehicle crashes plotted by year and the hour of day. These were compared to number of all study area crashes by the hour of day in figure 16. ATAC looked into the notion that most of the parked motor vehicle crashes occurred during overnight (bar-close) hours. This was found to be not true, as only 7 of the total 40 crashes involving parked motor vehicles occurred between midnight and 4 a.m. However, upon further scrutiny, it was found that majority (7 out of 11) of crashes between midnight and 4 a.m. involved parked motor vehicle crashes as compared to the rest of the day (33 out of 144). The number of people crashing into parked cars is disproportionately higher between the hours of midnight to 4 a.m. (63.64%) as compared to the rest of the day (22.92%).

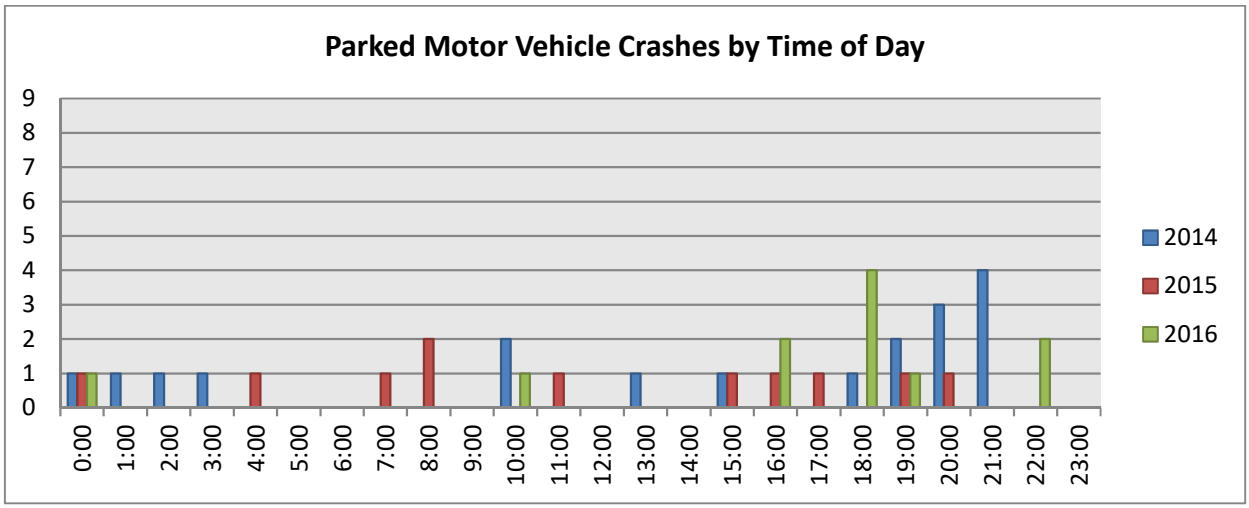


Figure 15. Parked motor vehicle crashes by time of day

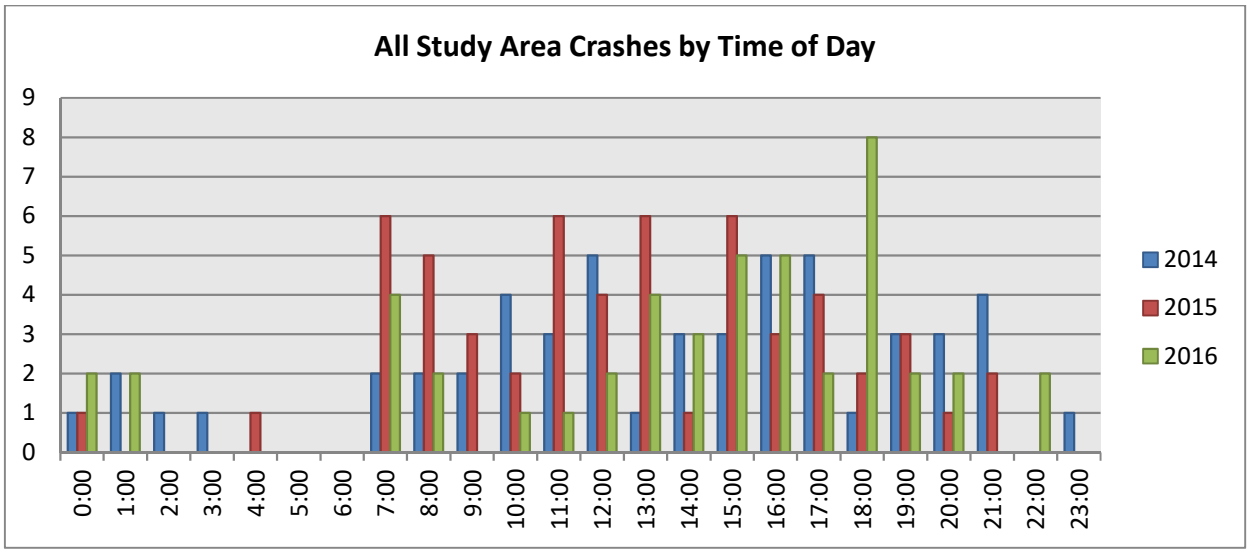


Figure 16. All study area crashes by time of day

Speeding Crashes

Speeding was expressed as a major concern for the local residents. Therefore speeding-related crashes were examined. Findings indicated there was no significant issue with speeding relative to the amount of total crashes in

the study area. However, there has been an increase in the number of speeding-related crashes which may indicate a potential issue in the future.

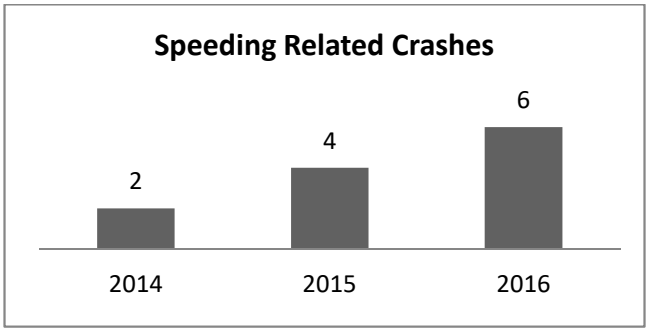


Figure 17. Speeding related crashes

Note that out of the 12 total speed related crashes (2014-2016), there was only one injury crash. This particular injury crash involved alcohol use by a minor driver as well as illicit drug use. As such, speed was not a primary factor in this crash. All of the other 11 crashes were non-injury property damage only type of crashes.

INTERSECTION ANALYSIS

Evidence suggests three problem intersections within the study area. Considerations for the selections include lane geometry, crash data, turning movement counts, and residents' observational concerns. The three intersections addressed are: Belmont Street and 5th/Division, Belmont Street and 4th Ave S, and Reeves Drive and 4th Ave S. Figures 18 and 19 show the turning movement counts for intersections in the study area.

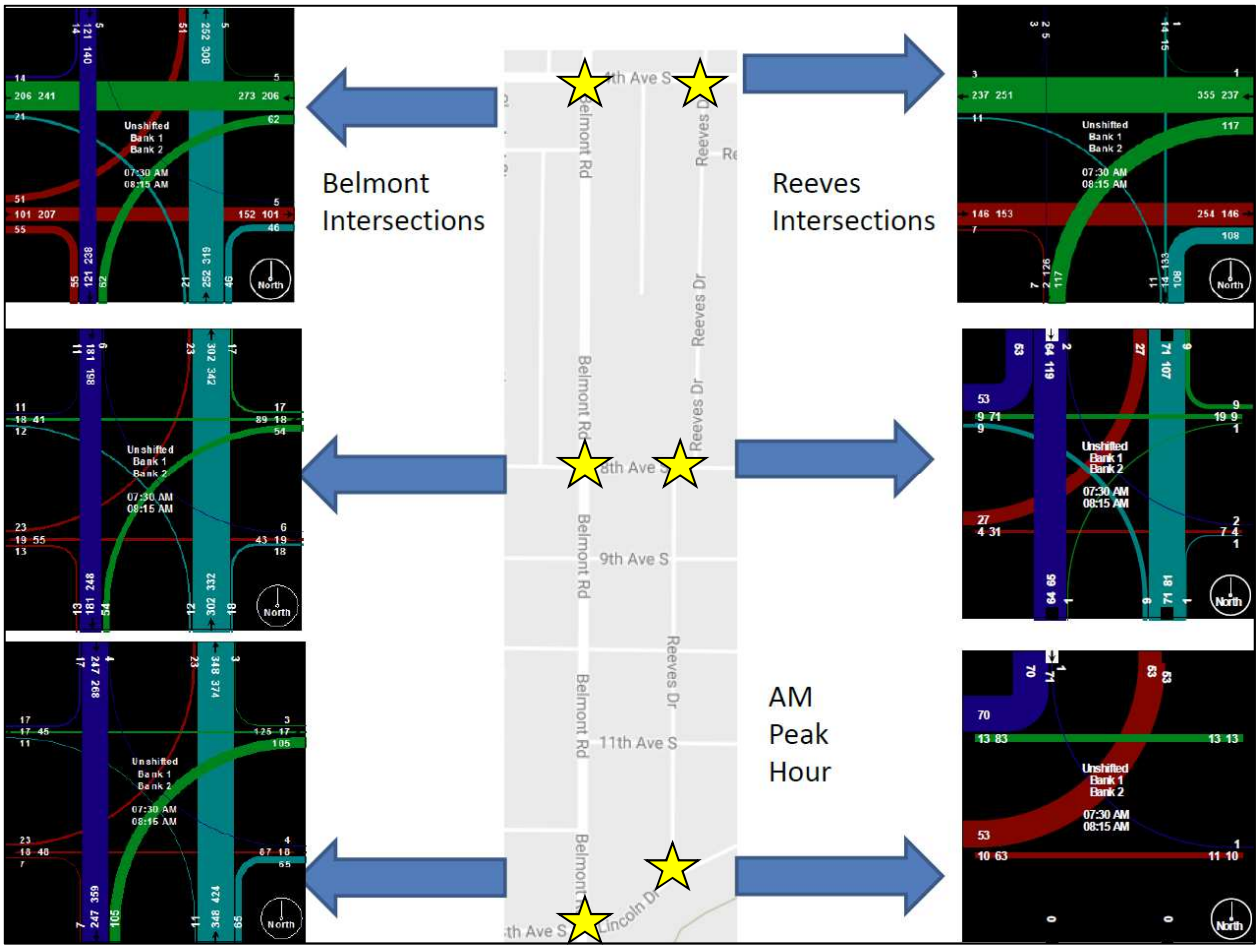


Figure 18. Reeve and Belmont AM turning movements

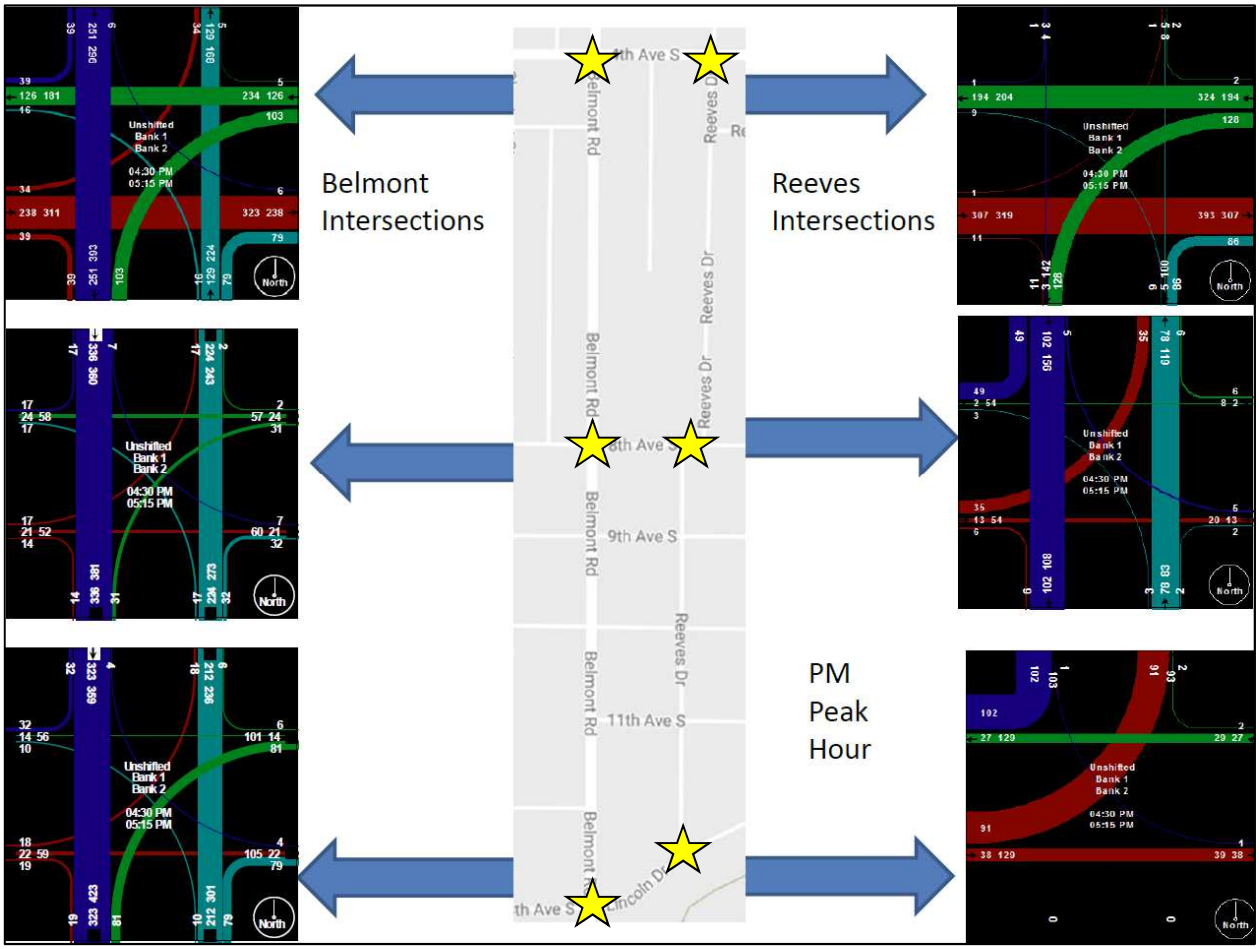


Figure 19. Reeve and Belmont PM turning movements

Traffic flow in the study area is heaviest for east/west movement along the Minnesota/4th Ave S corridor. The 8th Ave S corridor and the 13th Ave S corridor also have some traffic flowing east/west for the neighborhood. The traffic controls of these corridors, at the intersections west of Belmont, have stop condition for the north/south movement and give preference to the east/west movement. However, traffic volumes are not the only criteria for installation of stop signs.

Belmont Road corridor carries the heaviest north/south movement with Cherry St representing the next highest north/south movement. However, Reeves Drive has more than "its fair share" of traffic. A single family residential street should expect around 1,000 adt; Reeves has twice that. This has been documented earlier in this report.

Belmont Road and 5th/Division

The Belmont/5th/Division intersection has unusual approaches from the adjoining streets intersecting at this location. This intersection is on an edge of how the street network transitions from being orientated with the Red River to being orientated with the geological survey grid system. 5th St. and Division reference the river; whereas, Belmont Road is based upon the grid. Figure 20 shows the unusual intersection.

Figure 20. Belmont/5th/Division intersection

Due in part to its unusual geometry, the intersection has become known locally as "confusion corner". The confusion is said to center on which movement through the intersection has the right of way. Turning movement counts were taken at this intersection in an effort to understand the traffic patterns at the intersection. The predominant movement is traffic using Belmont Road to connect to and from the southern reaches of Grand Forks. These vehicles move through the intersection to continue to travel on 5th St. on the northerly side of the intersection. Technically, this movement is for northbound traffic a left turn from Belmont onto 5th St.; conversely, the southbound movement is a right turn from 5th St. onto Belmont.

Traffic Volumes

The results of the turning movement counts are displayed in Figure 21. As shown, there is over half (870 vehicles from the total 1,568 heading northbound) the northbound traffic during the period the turning counts were taken that turned left to proceed on S. 5th St. The counts reveal that near two-thirds of the southbound traffic on S 5th St. turn right to proceed southerly on Belmont Road.

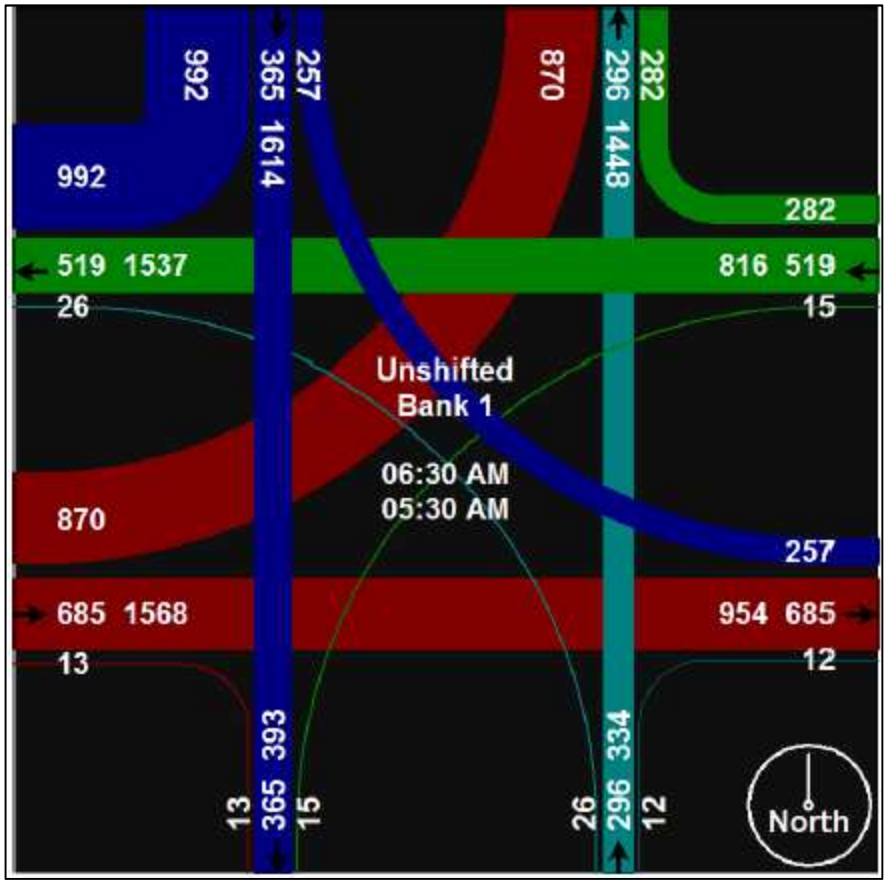


Figure 21. Belmont and 5th/Division AM turning movements

Movements between Division-Belmont and movements between Belmont -S 5th St create a conflicting movement significant enough to create confusion. This traffic could be viewed as the "through" movement at the intersection. There are enough of these through movements that are conflicting with the left turn movements and right turn movements. Thus the creation of bewilderment of which vehicle has the right of way.

The traffic control at this intersection attempts to allow the northbound left turn movement to have "free flow" by not having any northbound traffic regulated by a stop sign. For traffic heading westbound on Division that wishes to proceed "through" the intersection to be heading south on Belmont, the driver expectation is that traffic should be stopping, or at least left turn vehicles yielding. Adding to the atypical expectations are the free flow right turns of southbound right turning vehicles moving from 5th St. onto Belmont Road.

The turning movement data also reveals some unusual turning movement counts. For the vast majority of intersections in Grand Forks, the peak hour occurs during the pm period, typically between 4:30 and 5:30 pm. For this intersection, there is a high concentration of traffic during the am peak period, see Figure 22. There is one of two high schools located north of this intersection with school starting at a similar time that most workers begin work downtown which causes the peak in the am. During the afternoon/evening times, the school ends at an earlier time than most employment ends downtown which causes many mini peaks occurring during those hours.

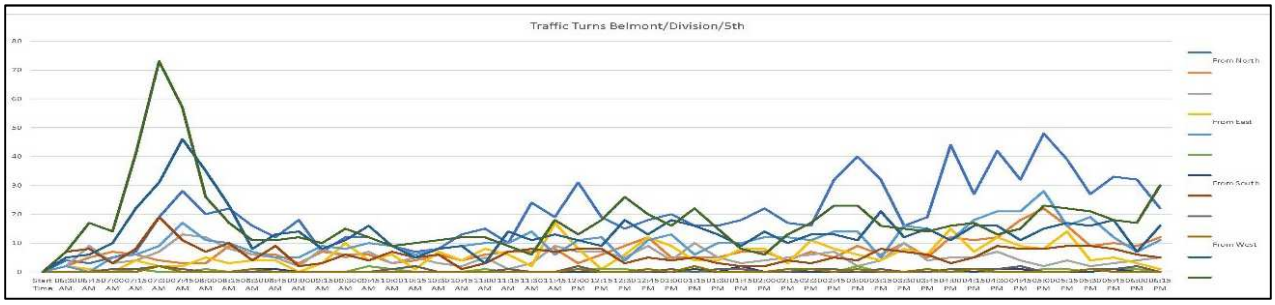


Figure 22. Belmont/5th/Division Traffic Turns

Improvements

The City traffic staff implemented two different strategies during the Study period. The first was to add signage to give further guidance to vehicular movements. As shown in Figure 23, the southbound approach from 5th St. had turning lanes demarked to better align vehicles to provide other drivers at the other approaches to see better what the likely movement the approaching vehicle would be taking. Further, signage was added to clarify that right turning vehicles were free to turn without stopping. Finally, added signage was installed to inform westbound vehicles on Division that left turning vehicles did not have a stop control situation.

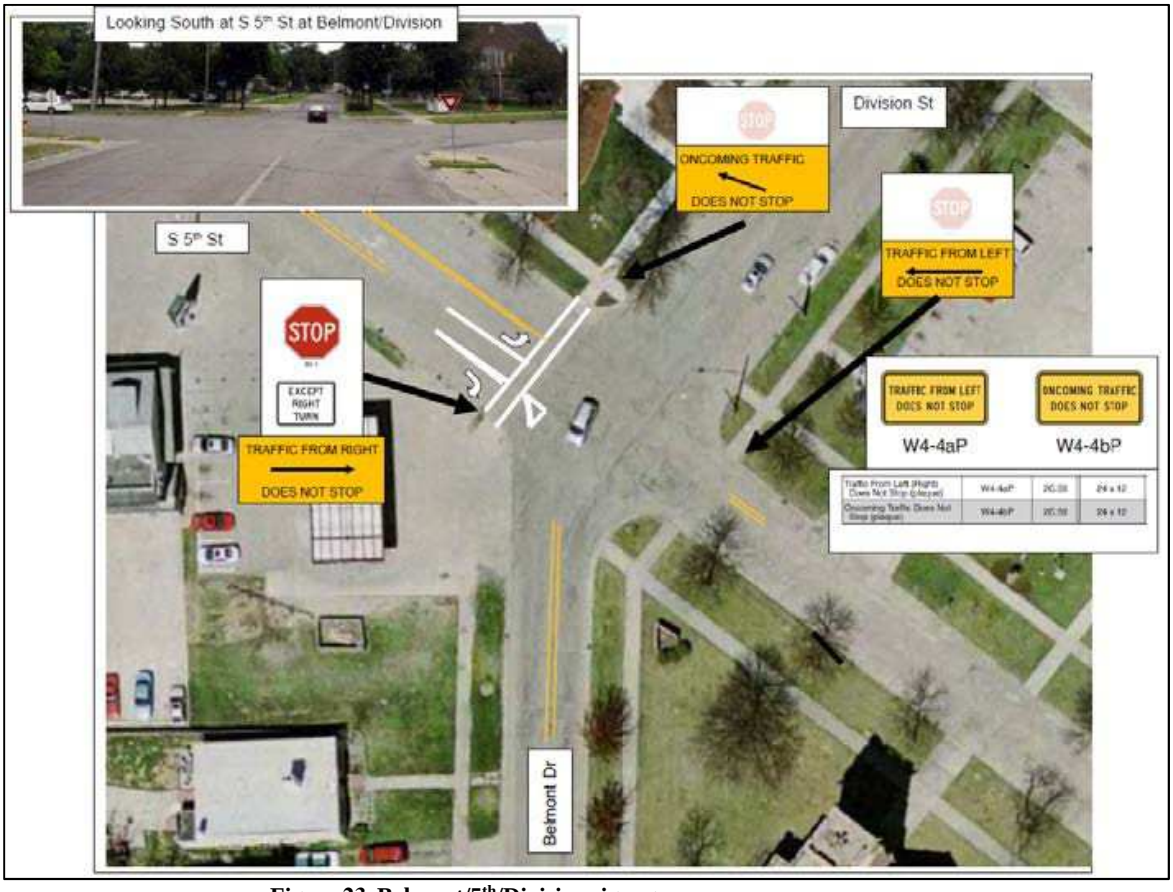


Figure 23. Belmont/5th/Division signage

This strategy was later augmented with the conversion of the southbound approach from 5th St. having the left turn lane and the through lane combined into one lane at the usual location of a left turn lane. The former space that was used for the through lane was striped to shift traffic away from the space so that a stop sign could be installed "in the middle of the street". Hence, the left turn and through movements are controlled by the stop sign. The City installed a yield sign for the right turning movements so that they are directed to yield to traffic from Division Ave passing through the intersection. See Figure 24.

Figure 24. Belmont/5th/Division SB approach

Belmont Road and 4th Avenue S

Belmont Rd. is a paved, two-lane, two-way, north/south Minor Arterial Street; posted as 25 mph and 20 mph When Children are Present. It traverses the eastern part of the city between the Downtown Area and 62nd Ave S. The north leg intersects 4th Ave S at an approximate 85° angle, but does not affect sight distance or the operation of the intersection. The pavement width on Belmont at 4th Ave S is 30 feet wide. This area has mature landscaping/trees, there are no sight restrictions noted approaching the intersection or at a stopped position. Belmont Road has an offset centerline stripe, permitting parking on the west side of the street. The loading/unloading zone is posted on the west side at Phoenix Elementary. See Figure 25.

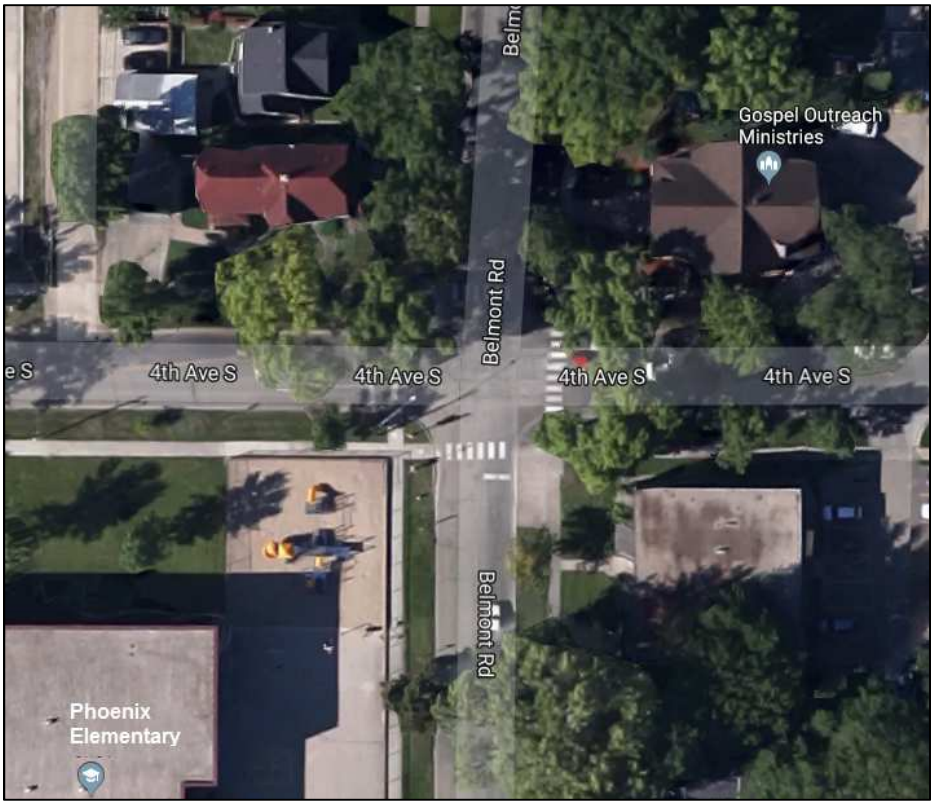


Figure 25. Belmont and 4th Ave S

Fourth Ave. S. is a paved, two-lane, two-way, east/west Minor Arterial Street posted as 25 mph and 20 mph When Children are Present. It traverses the northern part of the city between Demers Ave and the state line with Minnesota and serves as primary access to the Point Bridge over the Red River of the North. The pavement width on 4th Ave S near Belmont Rd is 30 feet wide and is striped for one lane in each direction. This area has mature landscaping/trees, there are no sight restrictions noted approaching the intersection or at a stopped position. If exceeding the 25 mph speed limit visibility of the traffic signal poles may be obstructed for both east and westbound approaches by the trees. Parking is not permitted on either side of 4th Ave S.

This intersection has a bus stop on the southeast corner for Routes 1 and 2. This intersection was controlled by a traffic signal up until July 13, 2015 when a traffic crash knocked down the northeast traffic light. Due to the significant cost to repair/upgrade the intersection, a study was conducted to determine if the intersection still warranted the stop lights. It was revealed they were no longer needed and the intersection was converted to a 4-way stop.

Traffic Volumes

Traffic volumes appear to peaking slightly more in the pm than the am.. This may be due to the nearby one-way streets forcing drivers to take different paths in the am vs. pm. As seen in figure 26 the majority of traffic is northbound and westbound in the am peak, and eastbound and southbound and eastbound in the pm peak.

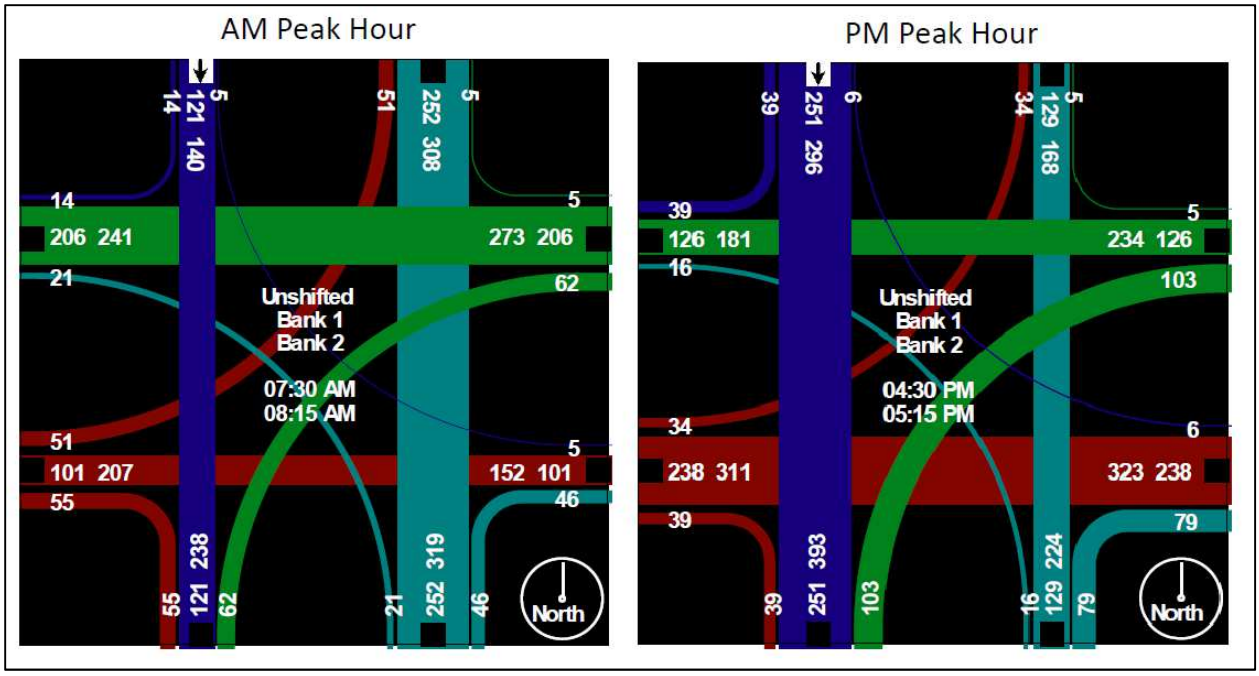


Figure 26. Belmont and 4th Ave S turning movements

Crash Analysis

The data collected for the study area includes crashes from years 2014-2016. Within this range there were eight reported crashes at this intersection. Four of these crashes occurred in 2016 after the 4-way stop conversion. Though these four crashes had no reported injuries, four were angle crashes and one was head-on. Statistically, these crash types are highly prone to result in an injury.

As part of the Metropolitan Transportation Plan update, the MPO analyzed intersections across the entire metropolitan area. From that effort, the results revealed that this intersection had a higher than expected crash rate. The actual crash rate (2012-2015) is 1.00 for Belmont @ 4th Ave S whereas the expected crash rate per million vehicles entering the intersection is 0.52. With having the highest amount of crashes within the study area, it is clear there is an issue at this intersection. Keeping in mind the proximity of Phoenix Elementary and the number of pedestrians crossing this intersection at the am peak hour, there is significant reason for concern for not only driver safety, but also pedestrian safety.

Reeves Drive and 4th Ave Ave S

As stated similarly in the previous intersection, 4th Ave. S. is a paved, two-lane, two-way, east/west Minor Arterial Street posted as 25 mph. It traverses the northern part of the city between Demers Ave and the state line with Minnesota and serves as primary access to the Point Bridge over the Red River of the North. The pavement width on 4th Ave S near Reeves Dr. is 30 feet wide and is striped for one lane in each direction and left turn pockets at the intersection. This area has mature landscaping/trees, there are no sight restrictions noted approaching the intersection or at a stopped position. West of the intersection is a "Your Speed" speed feedback sign facing the westbound lane. There is no traffic control for the east and west bound traffic. Parking is not permitted on either side of 4th Ave S. See Figure 27.

Reeves Drive is a paved, two-lane north/south local street, posted as 25 mph. The pavement width is 30 ft. and parking is permitted on the southbound lane and restricted only on Mondays from 8am to 4pm for the northbound lane. At the 4th Ave S intersection, north and south traffic is controlled by two-way stop control signs.

Figure 27. Reeves and 4th

Observations have been reported that westbound vehicles coming from Point Bridge are traveling at a higher rate of speed. This can create hazardous conditions when entering the intersection and school zone.

Traffic Volumes

Local residents have expressed great concern for cut-through traffic along Reeves Drive. Follow-up turning movement counts at Reeves and 4th Ave S. and Reeves Dr. and 8th Ave S. proved that cut-through traffic is an issue. Similarly to the Belmont and 4th Ave S., peak hour traffic volumes appear to peaking slightly more in the pm than the am.. This may be due to the nearby one-way streets forcing drivers to take different paths in the am vs. pm. See Figure 28.

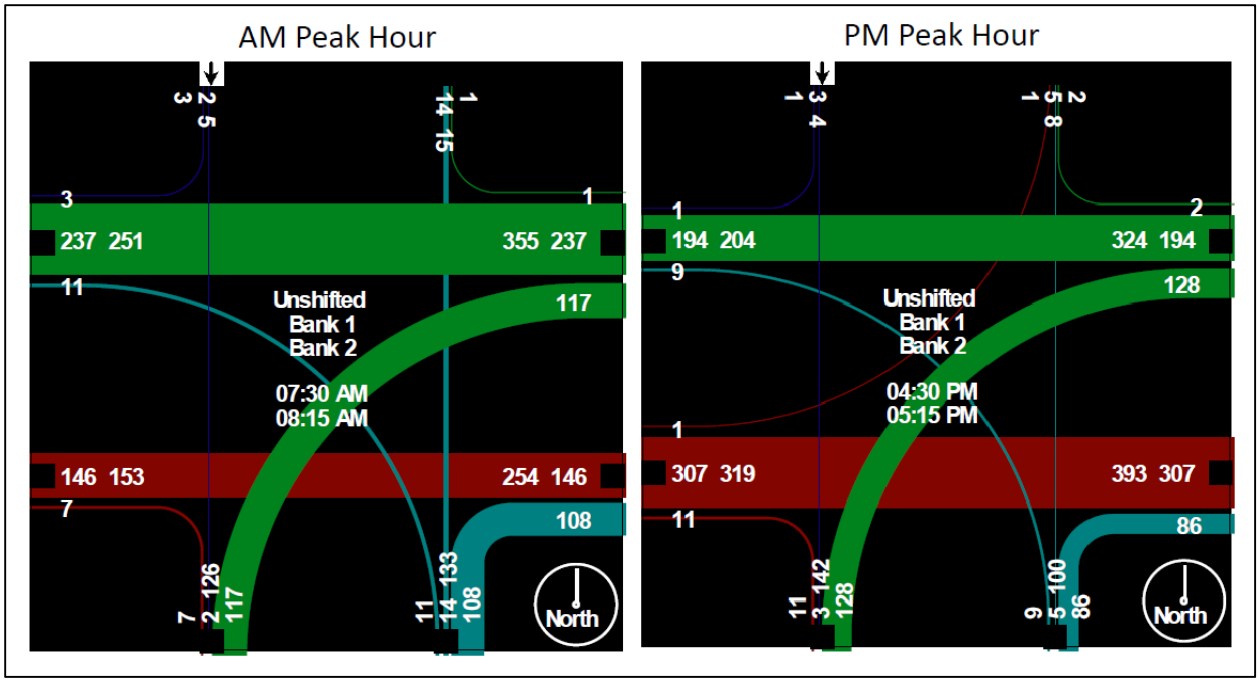


Figure 28. Reeves and 4th Ave S turning movements

Crash Analysis

The data collected for the study area includes crashes from years 2014-2016. Within this range there were six reported crashes at this intersection. Four of the crashes were angle crashes and one was a rear end. Two of the angle crashes and the one rear end crash resulted in a possible injury.

WALKABILITY ASSESSMENT

A community may be designated walkable if it is easy, as well as safe, for the pedestrians to walk about (to school, stores, parks, post office etc.) Additionally, a walkable community encourages safe usage of existing infrastructure while expanding transportation options for users with varied ranges of mobility.

The purpose of this assessment was to bring all the stakeholders together to try and identify the problems facing the area residents with regard to walking about in the area.

Site Selection

Three routes were selected for assessment within the Near Southside Historic Neighborhood study area. These routes are listed in Figure 29.

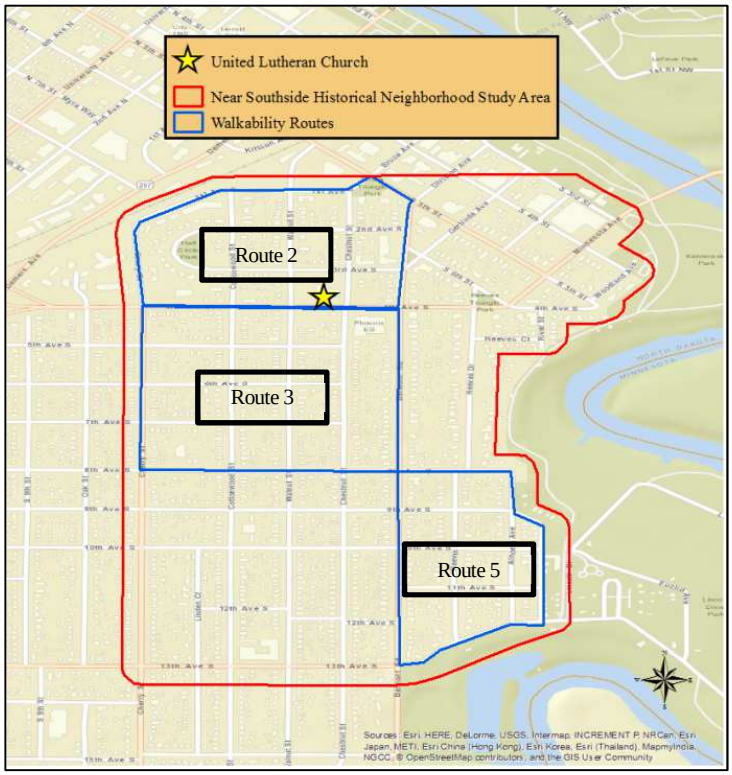


Figure 29. Walkability assessment routes

Assessment Tool

The Walkability Checklist from www.pedbikeinfo.org was used as an assessment tool. Volunteers from the neighborhood, Safe KidsGF, and GF Police Department participated. A brief training was provided prior to the site visit/assessment. The training included background information regarding the checklist and also detailed information regarding the rating scale used in the assessment.

The checklist includes the following main questions:

1. Did you have room to walk?
2. Was it easy to cross streets?
3. Did drivers behave well?
4. Was it easy to follow safety rules?
5. Was your walk pleasant?

Each of these questions includes a rating from 1 to 6 categorized as:

1. Awful
2. Many Problems
3. Some Problems
4. Good
5. Very Good
6. Excellent

The corresponding total ratings add up to a range of 5-30 as classified:

1. 26 – 30 Celebrate! You have a great neighborhood for walking.
2. 21 – 25 Celebrate a little. Your neighborhood is pretty good.
3. 16 – 20 Okay, but it needs work.
4. 11 – 15 It needs a lot of work. You deserve better than that.
5. 5 – 10 It's a disaster for walking!

Site Visit/Assessment

The training, site visit, and assessment were completed Sept. 7, 2017. The assessment started at United Lutheran Church and consisted of three groups covering three different regions within the Near Southside Historic District. The checklists were completed post assessment. The participants also provided written comments. The comments covered issues included those identified during the assessment and those recorded at other times of the year. Refer to Appendix C for completed assessment checklists and comments.

Observations

For the assessment, sidewalk quality had the most negative impact towards the overall score. Throughout the study area there were repeated reports of the sidewalks being broken, cracked, or discontinuous, and being obstructed by objects or shrubbery.

Figure 30. Sidewalk quality

Figure 30 shows images depicting the sidewalk quality issue in the neighborhood. Old/cracked sidewalk can be seen predominately along Cherry St.

Figure 31. Sidewalk hazards

Figure 31 shows sidewalks in the neighborhood that are unsafe due to tripping or slipping hazards. These areas may be dangerous, especially when walking at night.

Figure 32. Sidewalk obstructions

Figure 32 shows a few images of the sidewalk blockage issue facing the neighborhood. Property owner negligence prohibits pedestrians from walking comfortably without obstructions.

Figure 33. Sidewalk accessibility issues

Figure 33 shows a collection of images showing the accessibility issue in the neighborhood. Some areas provide access to a crosswalk on only one side of the street. Some of the crosswalk accesses do not provide a ramp into the street. In some cases, the sidewalk is not distinct. In others, there is no sidewalk along a section of the street, which forces the pedestrians in the neighborhood to walk unsafely within the vehicle travel lanes.

Figure 34. 1st Ave. bus stop

One serious pedestrian safety issue is at the bus stop on the north side of 1st Ave. S. between Cherry and Cottonwood streets as seen in Figure 33. With all trip origins/destinations on the south side of the street, pedestrians are forced to cross 1st Ave. at this bus stop location. As seen in Figure 34, there are no ramps and the location lacks a marked crosswalk. This presents a potentially dangerous situation as the traffic along 1st Ave. receives no warning that there may be pedestrians crossing the street.

During the course of this study, the local transit authority has looked into making improvements for this bus stop. Details can be found under the recommendation section within this report.

Assessment Results

Most of the attendees rated the area between 24 and 25 as can be seen in Figure 35.

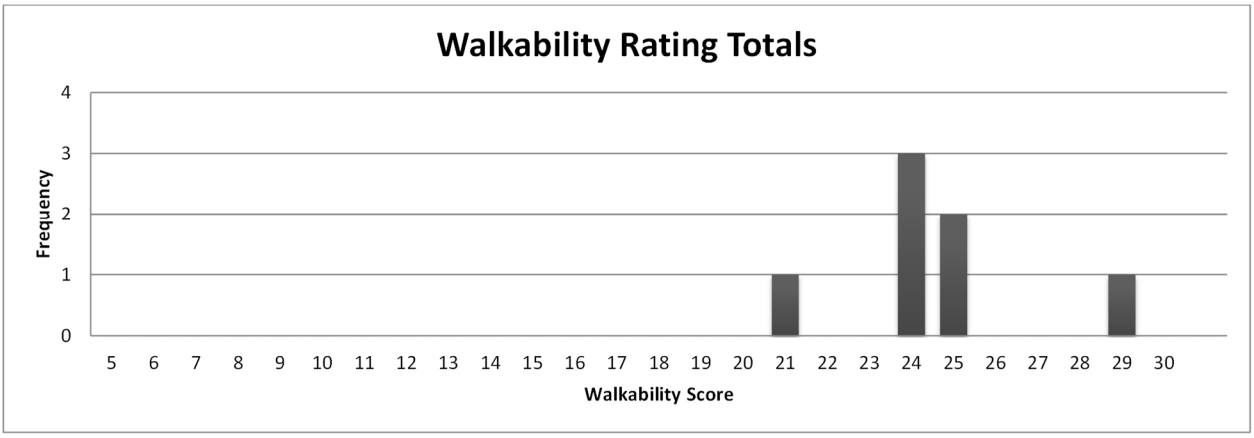


Figure 35. Walkability rating totals

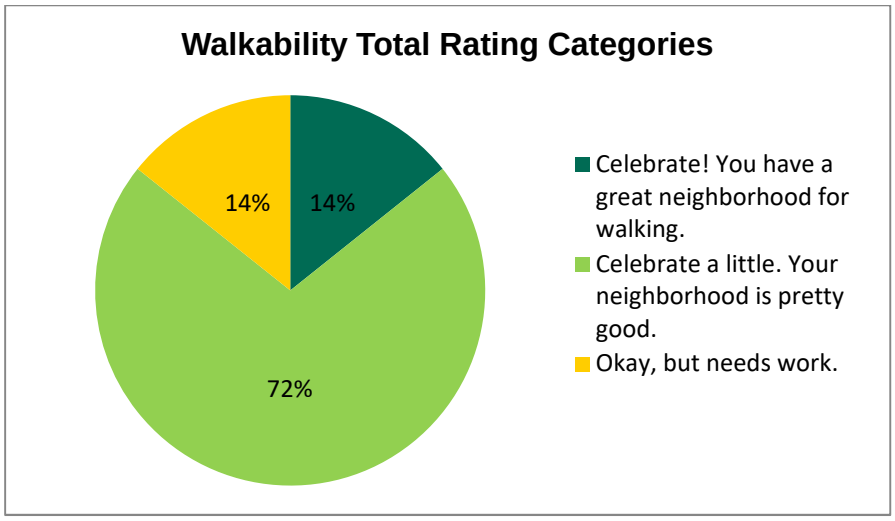


Figure 36. Walkability total rating categories

These ratings led to most of the responses to land in the "Celebrate a little. Your neighborhood is pretty good." category as shown in Figure 36.

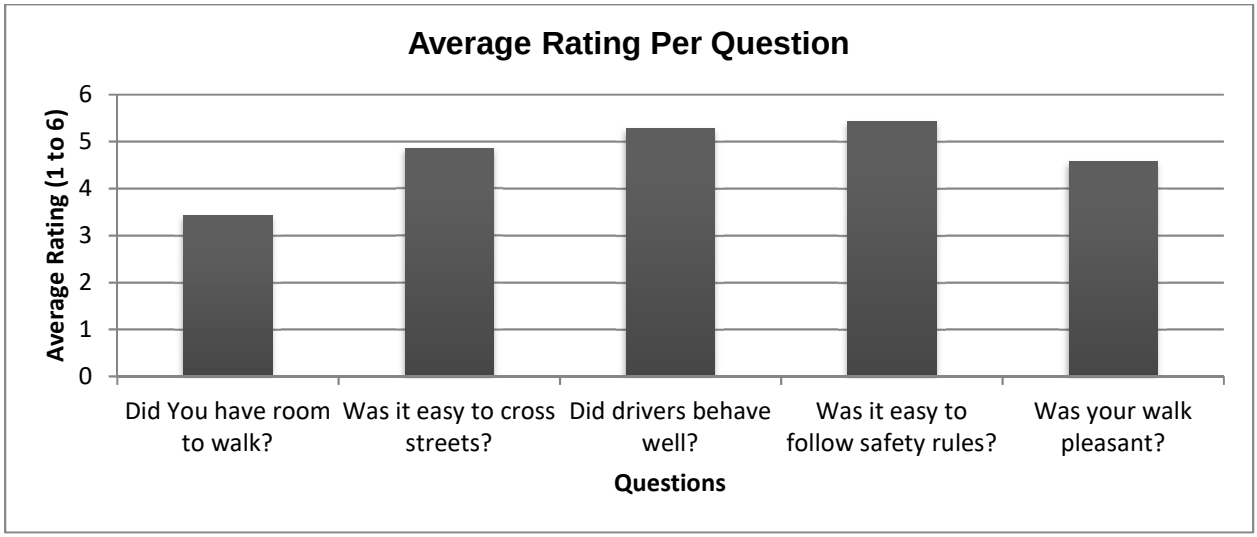


Figure 37. Average walkability rating per question

No aggressive driver behavior was observed and the walk was otherwise pleasant. This is seen in Figure 37 as the corresponding questions are rated between 4 (good) and 6 (excellent). However, as expected, the other questions regarding infrastructure, etc. were rated between 1 (awful) and 4 (good).

The attendees reported problems with existing infrastructure including cracked concrete, absence of sidewalks, blockages etc. The issues that were reported the most are shown in Figure 38.

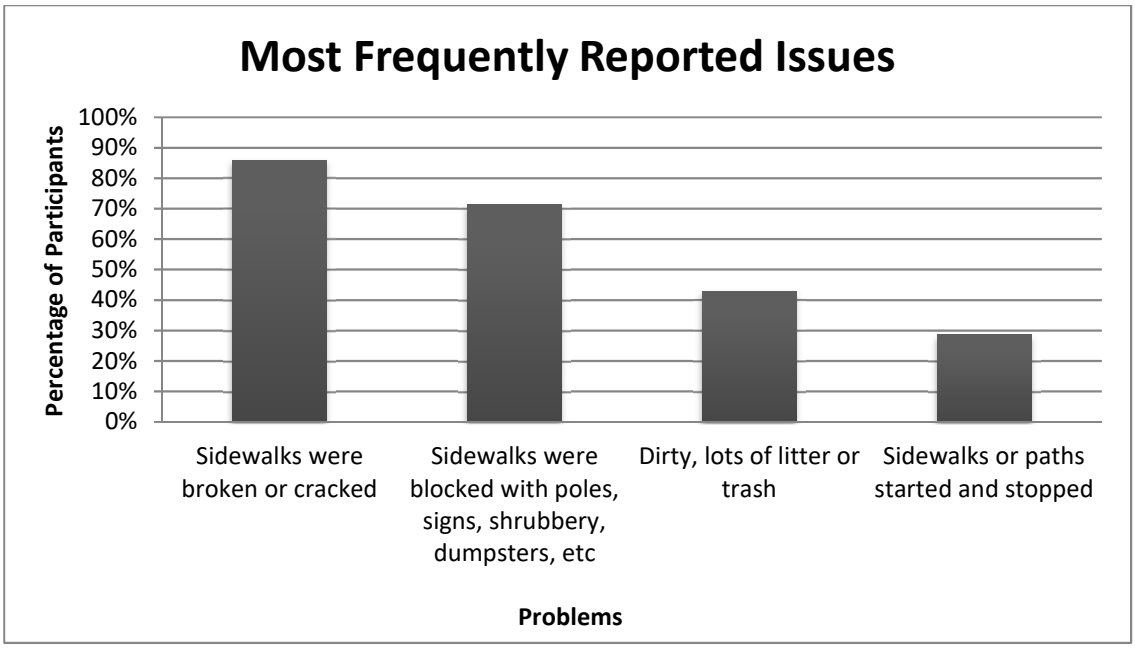


Figure 38. Most frequently reported issues

TRAVEL DEMAND MODEL RUN SCENARIOS

These scenarios are termed Scenarios 1-4 and were developed for both the 2010 base year (using 2010 Data) and the 2025 Forecasted Travel Demand Model. The traffic volumes discussed are daily traffic counts. Base year scenarios were also developed with each to incorporate Reeves Dr. from 13th Ave. S. to 4th Ave. S. (Reeves Dr. was not included in the original model). As part of the study, traffic counts were collected in the spring of 2017 on:

- Cherry St. between 10th Ave. S. and 13th Ave. S.
- Belmont Rd. between 8th Ave. S. and 4th Ave. S.
- Belmont Rd. between 17th Ave. S. and 13th Ave. S.
- Reeves Dr. between 4th Ave. S. and 8th Ave. S.

To validate the model output that included Reeves Dr., the base year modeled ADTs were compared to the traffic counts and deviations between the modeled and counted volumes and found to be reasonable. Each of the scenarios was then compared with the modeled volumes from their respective base year (2010 and 2025) to see how each scenario affected traffic in the Near Southside Historic Neighborhood. Each scenario and the results of each scenario with respect to the four intersections that were counted recently are described. Maps showing the overall modeled volumes for each of the scenarios are also included.

Scenario Descriptions

Scenario 1: Through Movement Restriction of Reeves Dr. and 8th Ave. S.

Restricted movements on the intersection of Reeves Dr. and 8th Ave. S. so that no "through" north-south movements occurred. Northbound movements could only turn right to go west on 8th Ave. S. and southbound on Reeves can only turn left to go west on 8th Ave. S.

Scenario 2: Convert Reeves Dr. and Belmont Rd. into one-way pairs

Reeves Dr. and Belmont Rd. were converted into one-way pairs between 4th Ave. S. and 13th Ave. S.

Scenario 3: Prohibit westbound turns from 4th Ave. S. to Reeves Dr.

Prohibition of left turn movements from 4th Ave. S. to Reeves Dr. (Westbound to Southbound movement).

Scenario 4: No through traffic through the Near Southside Historic Neighborhood

Increased speeds on 4th Ave. S. to 35mph; reduced speeds from 25mph to 10mph on Reeves Dr., Belmont Rd., Chestnut St., Walnut St., Cottonwood St., and Cherry St., between 4th Ave. S. and 13th Ave. S. Other changes were considered like restricting turns off from 4th Ave. S. to the Southside Historic Neighborhood but did not have a big impact with the reduction of speeds to 10mph.

Model Results

Table 4 shows the resulted modeled volumes for the four intersections where traffic counts were recently collected, the base year model traffic for each forecast year and the modeled volumes for each scenario for each forecast model years respectively.

Table 4. Scenario model volume output

Intersection	Cherry St. between 10th Ave. S. and 13th Ave. S.		Belmont Rd. between 8th Ave. S. and 4th Ave. S.		Belmont Rd. between 17th Ave. S. and 13th Ave. S.		Reeves Dr. between 4th Ave. S. and 8th Ave. S.	
Count Date	19-Apr	20-Apr	19-Apr	20-Apr	25-Apr	26-Apr	25-Apr	26-Apr
Traffic Counts	2,853	2,894	4,984	4,986	6,279	6,094	2,306	2,143
2010 Modeled ADTs								
Base 2010	2,865		4,175		5,308		1,982	
2010 Scenario 1	2,903		5,302		5,305		873	
2010 Scenario 2	3,013		3,422		4,754		1,892	
2010 Scenario 3	2,895		4,505		5,366		1,702	
2010 Scenario 4	1,274		797		1,291		1,074	
2025 Modeled ADTs								
Base 2025	3,494		4,935		8,031		3,253	
2025 Scenario 1	3,529		7,091		7,829		958	
2025 Scenario 2	3,603		4,537		7,125		2,801	
2025 Scenario 3	3,503		5,935		7,969		2,148	
2025 Scenario 4	1,381		1,044		1,913		1,187	

Scenario 1 (through movement restriction on Reeves Dr. and 8th Ave. S.) Results

Scenario 1 base 2010 had a reduction of traffic volumes from 1,982 (base year) to 873 for the Reeves Dr. between 4th Ave. S. and 8th Ave. S. count location. The Belmont Rd. count location between 4th Ave. S. and 8th Ave. S. showed increased volumes from 4,175 to 5,302. Similar results were found for 2025 Scenario 1 with the Reeves Dr. count location decreasing from 3,253 to 958 and the Belmont Rd. count location (between 8th Ave. S. and 4th Ave. S.) increasing from 4,935 to 7,091.

The other two count locations had very similar modeled volumes to the base year for both 2010 and 2025. The results indicated that restricting through movements on Reeves Dr. and 8th Ave. S. shifted through traffic from Reeves Dr. to Belmont Rd. but did not have any significant impact on the adjacent streets. Figure 39 shows the comparison of Scenario 1 to the base year models for both 2010 and 2025 results.

Scenario 2 Results (Belmont and Reeves one-way pair conversion)

For the 2010 Scenario 2 results, the Belmont Rd. (between 8th Ave. S. and 4th Ave. S.) count location showed a traffic reduction from 4,175 to 3,422 while the second Belmont Rd. (between 17th Ave. S. and 13th Ave. S.) location showed a reduction in traffic from 5,308 to 4,754.

The Reeves Dr. (Reeves Dr. between 4th Ave. S. and 8th Ave. S.) showed only a slight reduction in traffic from 1,982 to 1,892. The Cherry St. Count location showed a slight increase in traffic of 148. The traffic reduction on Belmont Rd. and Reeves Dr. after converting them to one-way pairs mostly moved to adjacent streets within the neighborhood like Chestnut St. as shown in Figure 40. Thus converting Belmont Rd. and Reeves Dr. into one-way pair shifts traffic to adjacent roadways within the neighborhood.

Scenario 3 Results (Prohibit westbound turns from 4th Ave. S. to Reeves Dr.)

Prohibiting westbound to southbound turns from 4th Ave. S. to Reeves Dr. reduces the traffic on Reeves Dr. for the Reeves Dr. count location (Reeves Dr. between 4th Ave. S. and 8th Ave. S.) slightly by 280 for the 2010 model and by 1,105 for the 2025 models respectively. This reduction in traffic is reflected by an increase in traffic on Belmont Rd. of 330 and 1,000 for the 2010 and 2025 model years for the Belmont Rd. (between 8th Ave. S. and 4th Ave. S.) count location. The other count locations showed insignificant changes in traffic. Figure 41 shows the Scenario 3 modeled output volumes compared to the base year modeled volumes for 2010 and 2025 respectively.

Scenario 4 Results: (No through traffic through the Near Southside Neighborhood)

Scenario 4 discouraged any through traffic through the neighborhood by reducing speeds on the north-south corridors from 25mph to 10mph. The reduction in speed was meant to replicate conditions that will discourage through traffic from using the Southside Neighborhood for their trips. The scenario was created to examine to what "extremes" traffic conditions would have to change before the model would begin to shift traffic away from the neighborhood.

Scenario 4 base 2010 had a reduction of traffic volumes from 1,982 (base year) to 1,187 for Reeves Dr. between 4th Ave. S. and 8th Ave. S. count location. For the 2025 year, this location showed a reduction in traffic from 3,253 to 1,187. Compared to Scenario 1, Scenario 4 shows slightly higher volumes because it attempts to restrict through traffic in the entire neighborhood but not traffic that originates from the neighborhood on Reeves Dr. Scenario 1, on the other hand, restricts through movement on Reeves Dr. and 8th St. S. regardless of whether the traffic originated from within the Southside Neighborhood.

The Belmont Rd. count location between 4th Ave. S. and 8th Ave. S. showed a significant reduction in volumes from 4,175 to 797 and from 4,935 to 1,044 for 2010 and 2025 scenario 4's respectively.

The Belmont Rd. between 17th Ave. S. and 13th Ave. S. count location also showed a significant reduction in traffic from 5,308 to 1,291, and 8,031 to 1,913 for the 2010 and 2025 model years respectively.

The Cherry St. count location (between 10th Ave. S. and 13th Ave. S.) showed a reduction in traffic volumes from 2,865 to 1,274 and 3,494 to 1,381 for the 2010 and 2025 model years respectively.

Figure 42 shows the respective modeled volumes for Scenario 4 for the 2010 and 2025 modeled scenarios respectively.

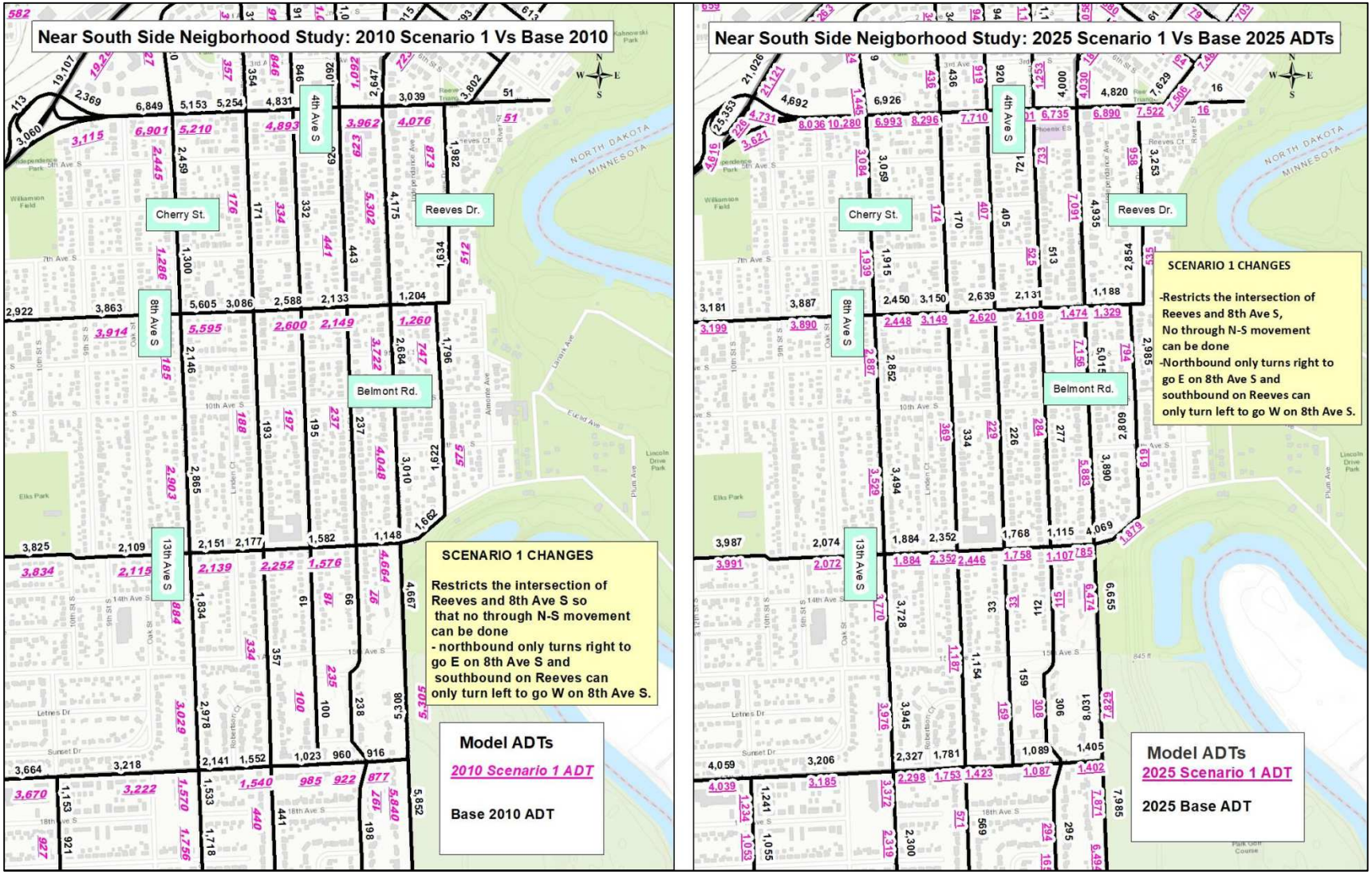


Figure 39. 2010 and 2025 scenario 1 ADT

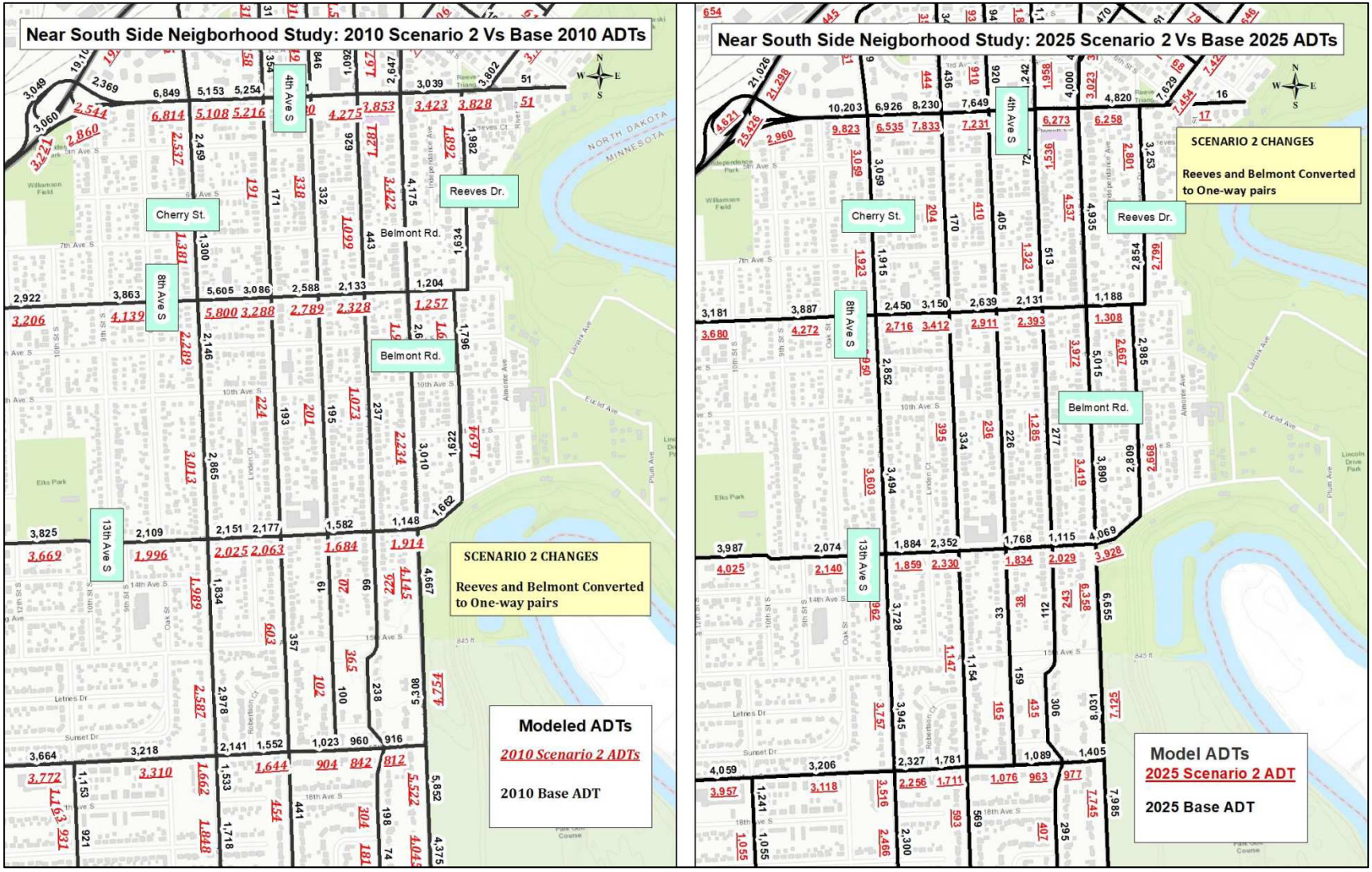


Figure 40. 2010 and 2025 scenario 2 ADT

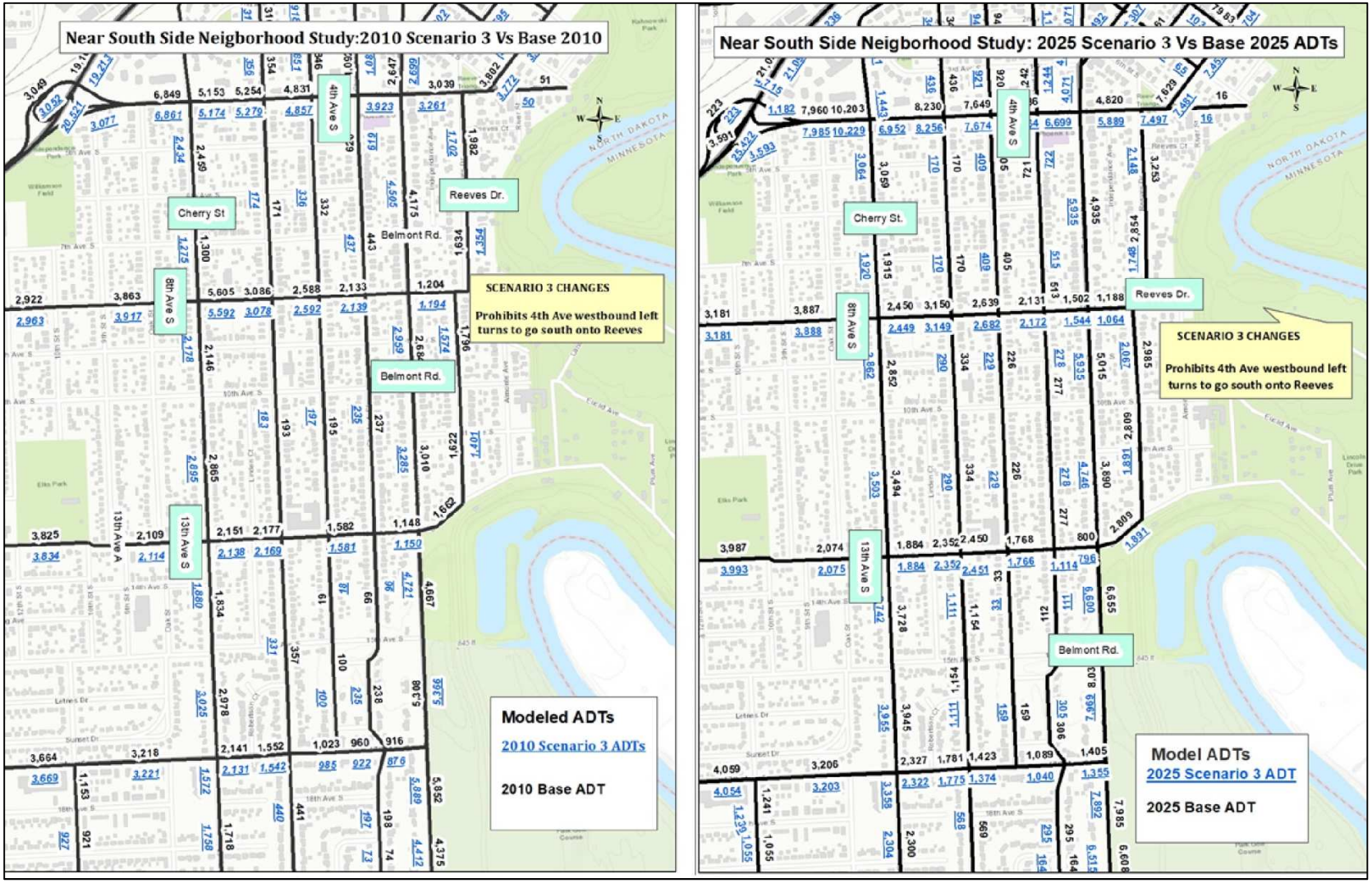


Figure 41 2010 and 2015 scenario 3 ADT

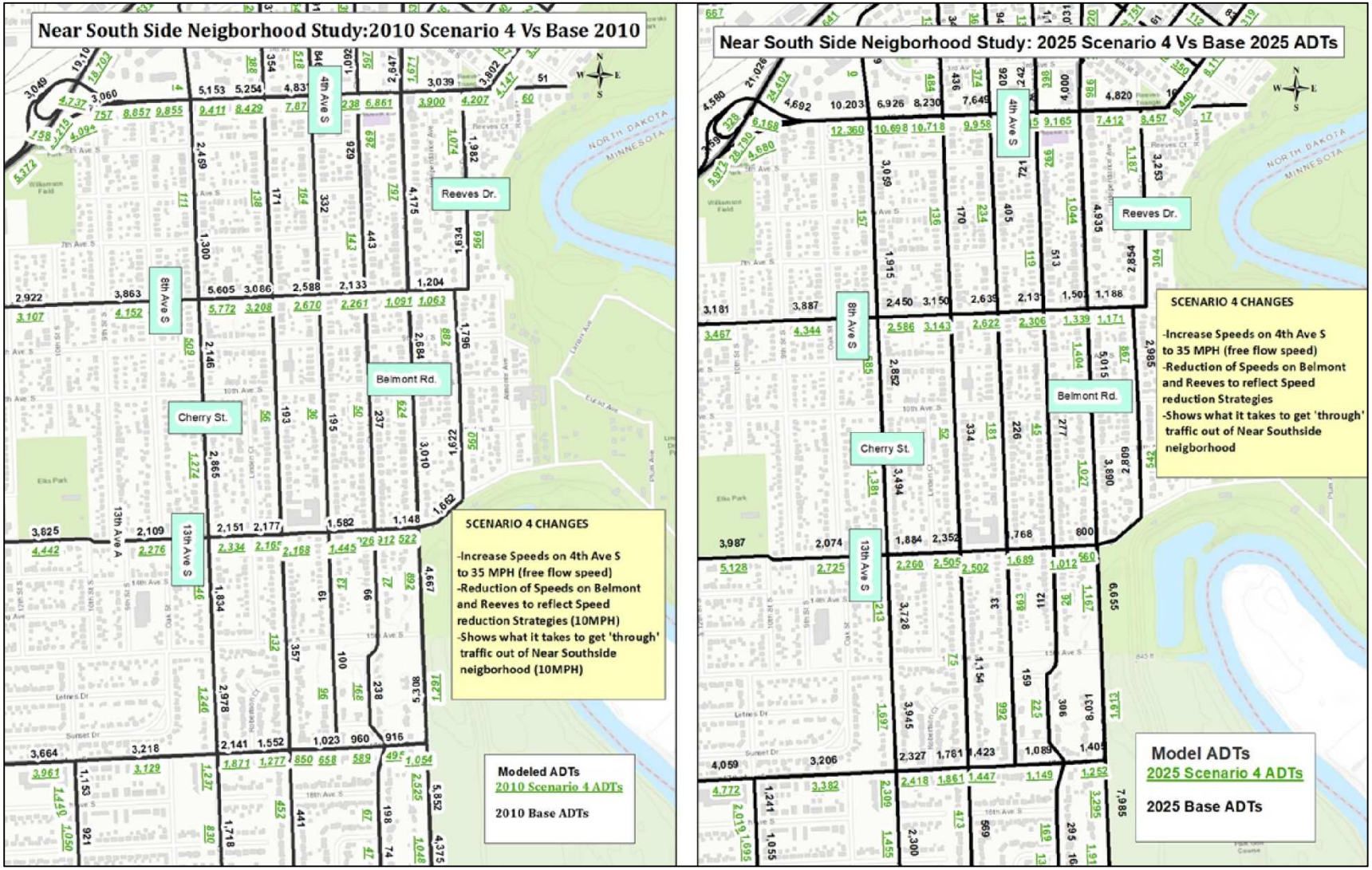


Figure 42. 2010 and 2025 scenario 4 ADT

SELECT LINK ANALYSIS

This section summarizes the travel demand model results for evaluating the amount of through traffic passing through the Near Southside Historic Neighborhood. The analysis was performed using the select link/node tool within the travel demand model. The select link/node analysis allows the model to provide modeled traffic volume output that shows traffic using particular links or nodes only. Thus for the Near Southside Historic Neighborhood, it shows the model output volumes that originate or terminate within the neighborhood for all the links in the network. All the Traffic Analysis Zones (TAZ) within the Near Southside Historic Neighborhood were used for the select link analysis. The results are reported for a northern location (links between 4th Ave. S. and 8th Ave. S.); and for a southern location (links between 8th Ave. S. and 13th Ave. S.). The results are reported for the north-south corridors including Reeves Dr., Belmont Rd, Chestnut St, Walnut St, Cottonwood St. and Cherry St. The select node model ADT were compared to the total modeled ADTs using these links to develop the percent of through trips.

2010 Through Trip Model Results

Table 5 shows the select link analysis for the zones within the neighborhood for the base 2010. It shows the total trips, the local trips (trips that originate or terminate within the Transportation Analysis Zones in the neighborhood), the through trips indicating the amount of through traffic and the through trip percentage. Overall, 68% of total trips between the neighborhoods were through trips.

Table 5. 2010 through trip model runs

Between 4th Ave. S. and 8th Ave. S.				
	Total	Local	Through	% Through
Reeves Dr.	1,971	1,114	857	43%
Belmont Rd.	4,498	928	3,570	79%
Chestnut St.	627	529	98	16%
Walnut St.	360	322	38	11%
Cottonwood St.	223	191	32	14%
Cherry St.	2,485	716	1,769	71%
Total	10,164	3,800	6,364	63%
Between 13th Ave. S. and 8th Ave. S.				
	Total	Local	Through	% Through
Reeves Dr.	1,638	781	857	52%
Belmont Rd.	2,973	290	2,683	90%
Chestnut St.	225	127	98	44%
Walnut St.	196	158	38	19%
Cottonwood St.	230	129	101	44%
Cherry St.	3,087	679	2,408	78%
Total	8,349	2,164	6,185	74%

Overall, the north location between 4th Ave. S. and 8th Ave. S. showed 63% of the trips were through trips. Belmont Rd. had the highest percent through trips at 79%; followed by Cherry St. and Reeves Dr. with 71% and 43% respectively. Chestnut St., Walnut St., and Cottonwood St. showed through trip percentages ranging from 11% to 16%.

The southern location between 8th Ave. S. and 13th Ave. S. had higher through trips percentages compared to the northern location with and overall through trip percentage of 74%. Belmont Rd. had the highest through trip percentage at 90%. Cherry St. had a 78% through trip rate. Reeves Dr. had a 52% through trip rate. Cottonwood St. and Chestnut St. both had 44% through trip rates. Walnut St. had a through trip percentage of 19%.

2025 Through Trip Model Results

Overall, for the north location between 4th Ave. S. and 8th Ave. S., 67% of trips were through trips for the 2025 model compared to 63% for the base 2010 year. Belmont Rd. had the highest percentage of through trips at 85% compared to 79% for the base 2010 year. Cherry St. had a 74% through trip rate compared to 60% for the base year. On Reeves Dr., 55% of trips were through trips compared to 43% for the 2010 base year. Cottonwood St. showed through trip percentages of 33% compared to 14% for the 2010 base year. Chestnut St. and Walnut St. had through trip percentages of 15% and 11% respectively.

Table 6 shows the through trip analysis for the 2025 base year model output. Overall, through trips increased slightly from 65% to 71% between the 2010 and 2025 base years. This reflects the comparatively higher growth rate in jobs and households to Transportation Analysis Zones to the South of the Near Southside Historic Neighborhood in comparison to the Near Southside Historic Neighborhood.

Table6. 2025 through trip model runs

Between 4th Ave. S. and 8th Ave. S.				
	Total	Local	Through	% Through
Reeves Dr.	3,486	1,565	1,921	55%
Belmont Rd.	5,008	751	4,257	85%
Chestnut St.	792	673	119	15%
Walnut St.	412	368	44	11%
Cottonwood St.	369	248	121	33%
Cherry St.	3,061	791	2,270	74%
Total	13,128	4,396	8,732	67%
Between 13th Ave. S. and 8th Ave. S.				
	Total	Local	Through	% Through
Reeves Dr.	3,012	1,095	1,917	64%
Belmont Rd.	3,942	357	3,585	91%
Chestnut St.	323	178	145	45%
Walnut St.	231	187	44	19%
Cottonwood St.	488	234	254	52%
Cherry St.	3,412	618	2,794	82%
Total	11,408	2,669	8,739	77%

Overall, for the north location between 4th Ave. S. and 8th Ave. S., 67% of trips were through trips for the 2025 model compared to 63% for the base 2010 year. Belmont Rd. had the highest percent through trips at 85% compared to 79% for the base 2010 year. Cherry St. had a 74% through trip rate compared to 60% for the base year. 55% of trips on Reeves Dr. were through trips compared to 43% for the 2010 base year. Cottonwood St. showed through trip percentages of 33% compared to 14% for the 2010 base year. Chestnut St. and Walnut St. had through trip percentages of 15% and 11% respectively.

The southern location between 8th Ave. S. and 13th Ave. S. showed an overall through trip percentage of 77% compared to the 74% for the base 2010 model output. Belmont Rd. had the highest through trip percentage at 91% compared to 90% for the base year. Cherry St. had an 82% through trip rate compared to 78% for the base 2010 year. Reeves Dr. had a 64 % through trip rate compared to 52% for the 2010 base year. Cottonwood St. had a 52% through trip rate compared to 44% for the base 2010 model. Chestnut St. had 45% through trip compared to 44% for the 2010 base year. Walnut St. had a through trip percentage of 19%, identical to the base 2010 model.

RECOMMENDATIONS

After careful consideration, we recommend the following innovative countermeasures to tackle the problems identified during the course of this project. The comments received during presentation to the public at a meeting Dec. 11 have also been addressed in the following section. Especially note that a before-and-after comparison of speeds with respect to traffic calming devices including midblock bulb-outs (chokers) and dynamic speed feedback signs revealed that such measures did not result in any long-term reduction in travel speeds.

Install Mini Roundabouts

Based on their design, application criteria, traffic calming characteristics, injury mitigation benefits and other considerations, it is recommended that mini roundabouts be installed at the following intersections:

1. Belmont Rd. and 5th St./Division
2. 4th Ave. S. and Belmont Rd.
3. 4th Ave. S. and Reeves Dr.
4. 8th Ave. and Belmont Rd.
5. 8th Ave. and Cherry St.

Mini roundabouts are especially applicable within the neighborhood because they dramatically reduce angle-type crashes. Installations of mini roundabouts have proven to be effective in calming traffic and increasing pedestrian and driver safety. Studies have shown that the mini roundabout can reduce all crash types by 20% to 50% while reducing right angle type crashes by 60% to 90%. There are possible installation methods that allow these concepts to be temporarily installed to gauge how they could work. Examples exist nation-wide of how temporary mini-roundabouts have been installed. There are far ranging methods and materials including just the use of paint to using parking lot stall curbs to using hay bales to demark the inner circle. FHWA has sponsored development of a mat like material that can be laid down. The cost of the mini roundabout is dependent on several factors including features and material. Typically they range between $40,000 and $500,000. Based on FHWA guidance, mini roundabouts should have an inscribed circle diameter of 90 ft or less, and typically range from 50-80 ft. Diameters shown on the concepts are as follows:

Location	Face of Curb Diameter (ft)
Belmont / Division	80
Belmont / 4th	53
Reeves / 4th	53
Belmont / 8th	68
Cherry / 8th	68

Typically, mini roundabouts are used where total traffic is less than 15000 vehicles per day and the 85th percentile speed is less than 30 mph, and are designed to achieve 15 mph entry speed and to accommodate design vehicles.

Belmont Road and 5th/Division

To eliminate any confusion at this unusual intersection, a mini roundabout application, as seen in the concept in Figure 43, would force all drivers into right turn movements, giving less confusion to who has the right of way. The bulb out and splitter islands will also cause drivers to reduce their speed when entering the intersection. Another added benefit to the bulb out and improved crosswalk is the pedestrian safety. With high pedestrian activity due to the shelter on the north corner, pedestrians should gain more refuge when crossing the street. The new construction of the mini roundabout should also improve the indistinct sidewalk on the west side of the intersection.

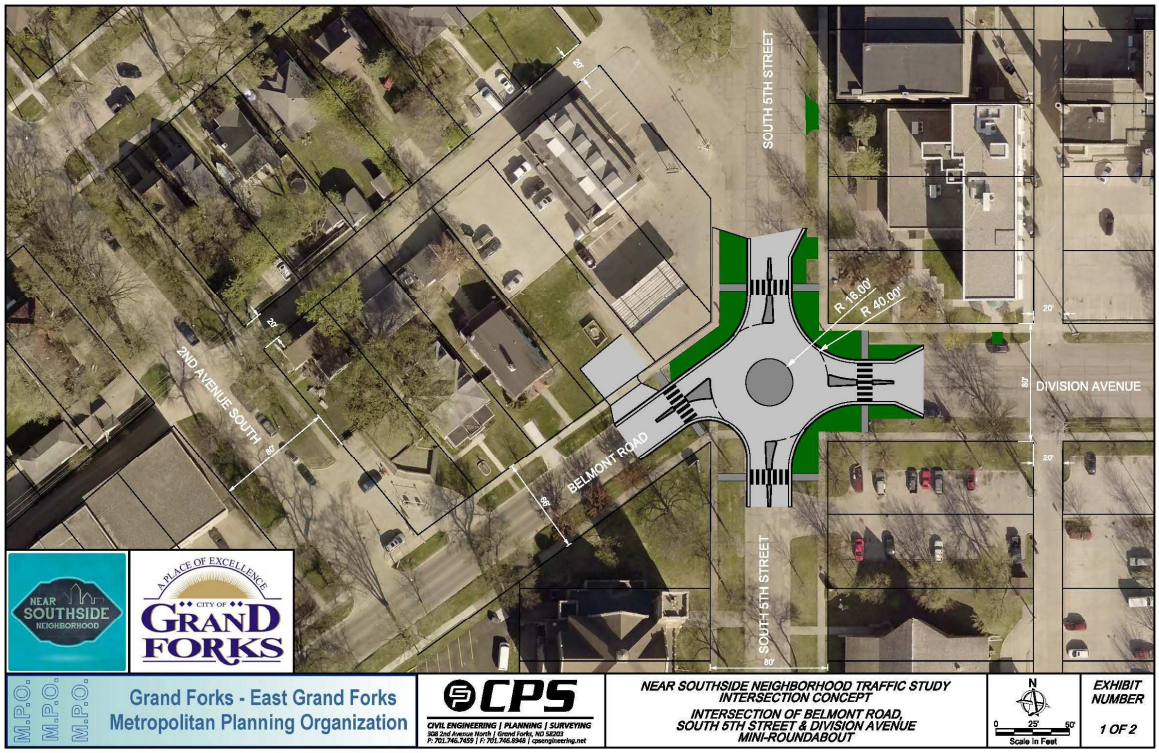


Figure 43. Belmont/5th/Division concept (not for construction)

Belmont Road and 4th Avenue S

The NSS residents have proposed painted crosswalks that are vibrant and decorative to make more apparent that children are around. Though this may seem like a good idea, FHWA studies gathered contradictory results. ATAC looked into all possible options and the most apparent solution for this intersection is the mini roundabout. See Figure 44.

With proper design, a roundabout could be a focal point where school buses, passenger cars, pedestrians such as school children, and bicycles are able to share the road safely. In the United States, roundabouts near school zones are slowly increasing in number. Further project development and traffic operations engineering will need to take place to convert these concepts into actual, functioning mini-roundabouts. The 2017 installation of push buttom red flashing lights at the stop signs at the intersection could be implemented, with revisions, as a pedestrian hybrid beacon with the mini-roundabout. Thus being able to stop traffic when a pedestrian, or bicyclists riding on the sidewalk, wish to cross the intersection.

Figure 44. Belmont and 4th Ave S concept (not for construction)

The application of a mini roundabout at the 4th and Belmont intersection has many potential benefits in safety. As stated previously, studies have shown that the mini roundabout can reduce all crash types by 20% to 50% while reducing right angle type crashes by 60% to 90%. This intersection with the higher than normal crashes, desires these reductions. For pedestrians, the mini roundabout reduces the pedestrian to vehicle conflict point from 16 to 8. The crosswalk becomes pushed farther from the intersection with a splitter island that provides refuge in the center of the roadway. When coupled with pedestrian beacons and/or other signage, these safety features can greatly increase school children safety when crossing the road. The mini roundabout has also been proven to calm traffic speeds while improving traffic flows. These effects provide less delay for critical movements and the improved traffic flows can encourage drivers to avoid cutting through Reeves Drive.

Reeves Drive and 4th Ave S

The mini roundabout at this intersection takes on the same benefits and operational impacts as previously stated. For this intersection in particular, a mini roundabout at this location would calm westbound traffic coming from Point Bridge entering both the intersection and school zone. This is beneficial to not only reduce speeds at the intersection, but also optimize school speed zone compliance west of the intersection. A reduction in angle crashes is expected to be nearly eliminated at this intersection where angle crashes is a current problem. East and west traffic would maintain free flow traffic and improve the traffic flow along the arterial corridor. This benefit is expected to reduce cut-through traffic on Reeves Drive. See Figure 45.

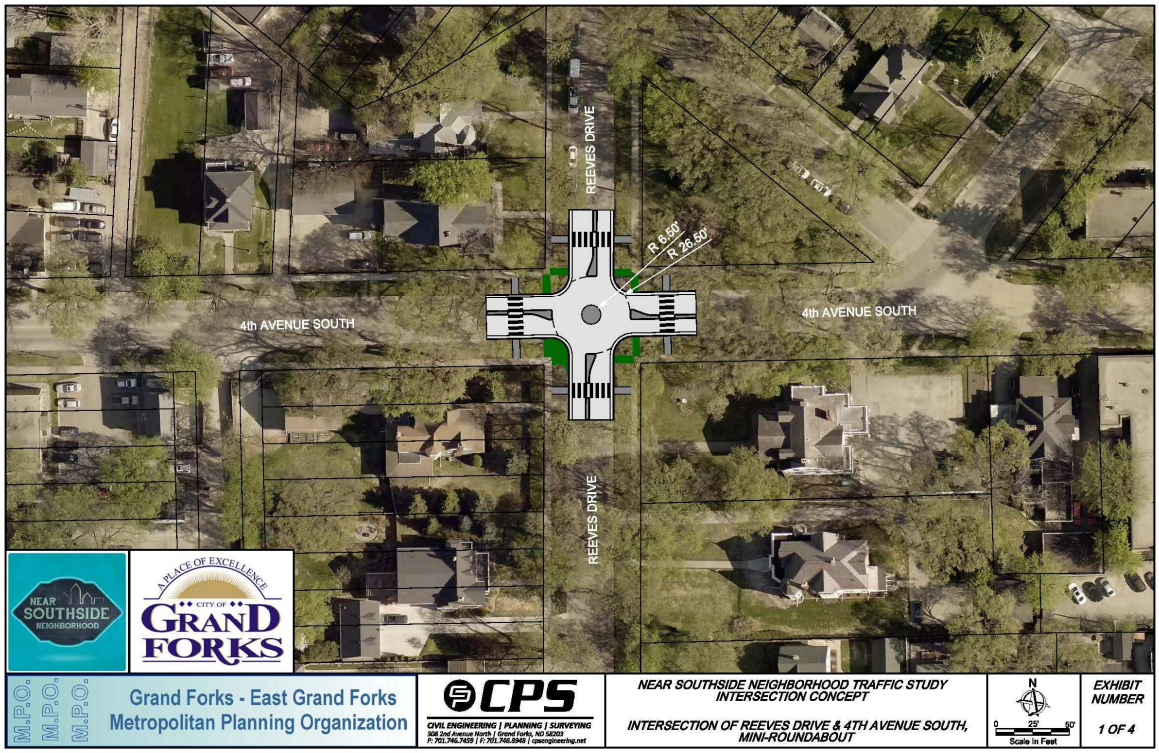


Figure 45. Reeves and 4th Ave S concept

Belmont Road and 8th Ave S

Though this intersection does not experience a high number of crashes relative to the other intersections, this section of roadway desires calmer traffic speeds with improved traffic flow. Improving the traffic flow at this intersection encourages traffic along Belmont to not cut through to Reeves Drive. Residents near this intersection also expressed concern of vehicles "drag racing" once stopped at this intersection. The mini roundabout should eliminate this action as well as reduce any noise pollution caused by vehicles stopped and starting at the stop sign. Figure 46 shows the concept for this intersection.

Figure 46. Belmont and 8th Ave S concept (not for construction)

Cherry Street and 8th Avenue S

This intersection experienced the highest amount of injury and angle crashes within the study area from 2014 to 2016. In order to reduce angle crashes and the injuries that are commonly associated from them, a mini roundabout is recommended. Figure 47 shows a concept of the application at this intersection.

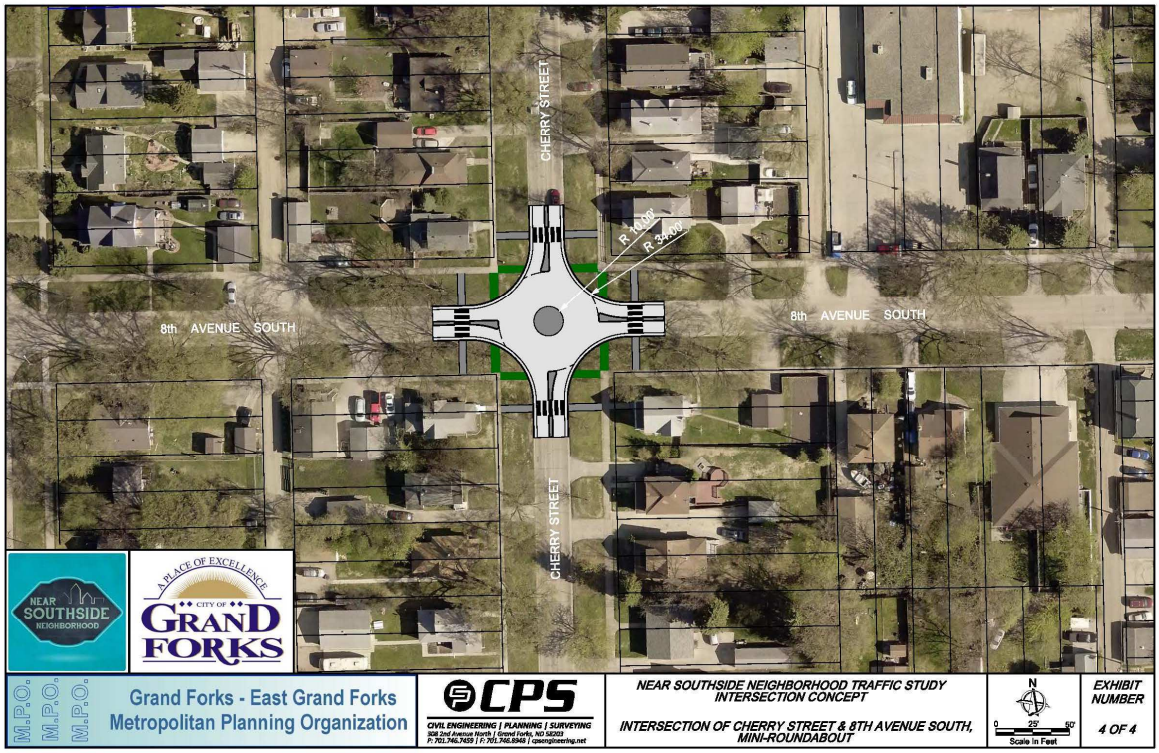


Figure 47. Cherry and 8th Ave S concept (not for construction)

Increased Patrol/Targeted Enforcement

It is recommended that increased patrol along with strict & targeted enforcement be carried out during the hours between midnight and 4 a.m. as it is likely that drivers crashing into parked motor vehicles are impaired. An increase in patrol and enforcement will result in significant reduction in property damage only (PDO) type crashes and will potentially prevent injuries/fatalities while acting as a deterrent to impaired driving.

Also, it is recommended that speed limits be strictly enforced along the following stretches within the neighborhood:

1. Belmont Rd. between 4th Ave. S. and 8th Ave. S.
2. Reeves Dr. between 4th Ave. S. and 8th Ave. S.
3. Belmont Rd. between 13th Ave. S. and 17th Ave. S.

Strict speed limit enforcement will result in reduced traffic speeds and it is expected that the upward trend in speed-related crashes within the neighborhood will also be reversed as a consequence.

Speed Humps or Table

Another strategy to consider for speeds in the study area is to consider installing speed humps or speed tables. Streets with speed limits of 30 mph and under are good candidates for vertical speed control, especially where those streets have higher than desired operating speeds or are used by cut-through traffic on a regular basis. Vertical speed control has been shown to slow traffic speeds, creating a safer and more attractive environment.

Speed humps are vertical traffic calming devices intended to slow traffic speeds on low volume, low speed roads. Speed humps are 3–4 inches high and 12–14 feet wide, with a ramp length of 3–6 feet, depending on target speed. Speed humps are often referred to as “bumps” on signage and by the general public. Speed tables

are midblock traffic calming devices that raise the entire wheelbase of a vehicle to reduce its traffic speed. Speed tables are longer than speed humps and flat-topped, with a height of 3–3.5 inches and a length of 22 feet. Spacing for vertical speed controls should be determined based on the target speed of the roadway. To achieve greater speed reductions, space speed humps or tables close together. They can be used with or without a pedestrian crosswalk at the highest portion of the feature and curb bulb-outs or extensions. See Figures 49 and 50.

Again, these could be temporary installations. Data can be collected during the trail period to determine what impact, if any, the feature has on speeds. Vertical speed control elements are most effectively implemented at a neighborhood level where traffic calming treatments should be targeted or coordinated in a comprehensive way. Speed data confirms that traffic is going faster than the posted speed limit, as evidenced by the 85th percentile on Belmont Road, 4th Ave S and Reeves Drive.

For this study area, neighborhood impact on reduction of through traffic may be tough to obtain. As shown in the traffic count data, as a result of just three bridges over the Red River, traffic must flow through the study area to get to and from the Point Bridge, which is the southernmost bridge of the three. Travelers used to experiencing the current network may express frustrations over having a series of additional features impeding their trip. However, this is a residential neighborhood and should be given, if nothing else, the benefit of having some more value to the residences' quality of life versus cut through traffic.

Figure 49. Speed Table concept (not for construction)

Figure 50. Speed Table concept (not for construction)

Bridge Feasibility Study

It is recommended that feasibility of a bridge over Red River, south of the Point Bridge be looked into. Funding opportunities for this bridge need to be identified. It is imperative that such efforts be combined with other major area improvements such as I-29 interchange(s) and US Highway 2 intersection(s).

A bridge, south of Point Bridge, will relieve the neighborhood of cut-through traffic.

Conduct Traffic Control Signal Needs Study

The intersection of 4th Ave S. at Cherry St. has a higher than expected number of crashes. A recent study at a nearby intersection (Belmont and 4th Ave S) concluded that there was no longer a need for a traffic signal and the intersection was converted to a 4-way stop controlled intersection. It is recommended that a traffic control signal needs study be conducted at 4th Ave S. at Cherry St. to see if this intersection no longer warrants traffic signals as well.

If, in the needs study it is concluded that a traffic signal is warranted, it is recommended to revisit the programmed clearance interval timings. Also, the pedestrian heads that are no longer facing the correct direction should be re-aimed.

If a traffic signal is not warranted, it is recommended to retrofit a mini roundabout at this location to eliminate angle crashes and the resulting injuries. A mini roundabout at this location will eliminate angle crashes and significantly improve traffic safety.

Sidewalk Improvements

As concluded in the Walkability Assessment, much of the sidewalk throughout the neighborhood needs updating. It is recommended the sidewalk be replaced at locations where the sidewalk is less than 5 feet wide or if the sidewalk is in a general state of disrepair.

Another observation was that debris from gravel alleyways was scattered onto the sidewalks. It is suggested to improve the maintenance at these areas.

Many sidewalks throughout the neighborhood were obstructed by a private fence. According to city ordinance 16-0310, a person cannot obstruct any sidewalk and may be subject to a penalty for every 48 hours the person fails to remove the obstruction. Education as well as enforcement of this ordinance is encouraged to improve neighborhood walkability.

Near the Belmont Dr. and 5th St. /Division intersection, the sidewalks were hard to distinguish from the parking lots and furniture zones. These sidewalks do not represent a clear and safe designated path of travel for pedestrians. The recommendation is to reconstruct the sidewalk to be consistent with the rest of the neighborhood.

Review Access Management

Some driveways were located at or very near intersections. Review of all accesses within the neighborhood to determine those that should be relocated or eliminated.

Regionwide Parked Motor Vehicle Crash Analysis

It is likely that similar to the Near Southside Historic Neighborhood, other parts of the cities of Grand Forks and East Grand Forks are experiencing a disproportionately higher number of drivers crashing into parked motor vehicles. It is recommended that this issue be seriously looked into and that a regionwide study be conducted to locate affected neighborhoods and to identify countermeasures/recommendations.

Such an analysis will help identify problem areas and thus provide basis for funding prioritization with likelihood of high benefit-to-cost ratio for area transportation agencies while significantly reducing road user costs.

Regionwide Bus-stop Pedestrian Safety Analysis

It is possible that, similar to the bus stop located on 1st Ave. S, other locations lack appropriate pedestrian infrastructure. It is recommended that a regionwide bus-stop pedestrian safety analysis be conducted to identify issues facing transit network users. Such analysis should ideally include walkability and bikeability assessments.

1st Avenue S bus stop Improvement

The bus stop along 1st Ave S. is one of the CAT's most used for boarding the bus. The recent Transit Development Plan (TDP) includes Figure 51 for Route #3. The graphic labels the stop as serving the "Link" housing complex and the Senior Citizens' Center; however, the particular stop serves an apartment complex north of these two facilities.

A new residential building is being built a few blocks to the east of this bus stop; it is at the corner of 1st Ave S and Walnut. This residential building is intended to serve as a housing transition facility in which previously

homeless can establish a “residence” and begin to recapture having a home. Given the likelihood of that population using public transit, CAT has considered how to improve the bus stop identified west of Cottonwood to shift eastward to not only improve the bus stop but to serve the new housing facility as well.

CAT will implement a new route system this summer. While significant changes to existing routes are proposed, for this part of the system, no change is being proposed. Therefore, improving this stop and trying to serve two locations with one stop has some merit.

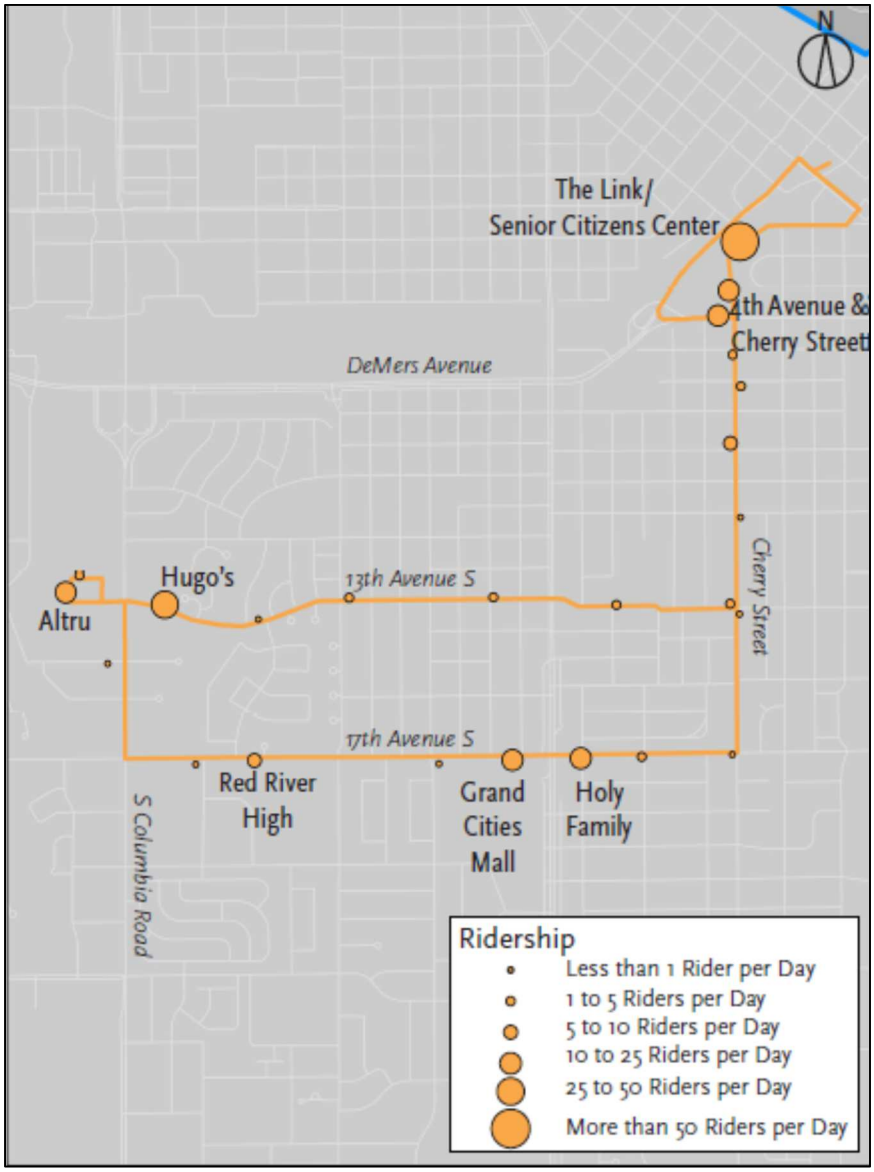


Figure 51. Bus ridership

Some concepts have been developed showing how a new bus stop could be implemented. The intent is to locate it between the two main housing areas and also provide some traffic calming techniques. The concept tries to “land” the bus stop at a location that would allow the construction of a shelter. Given the already large number of passengers boarding, a shelter is needed. The current location of the bus stop does not provide room for a shelter given a multi-use trail exists at the curb. See Figure 52.

Particulars are still being considered and further speed studies will be done to determine whether the perception of speed is backed-up by data.

Figure 52. Bus stop concept

APPENDICES

Appendix A: Neighborhood Ideas
Appendix B: Speed Data Collection Methodology and Data
Appendix C: NDDOT crash summary sheets
Appendix D: Walkability assessment checklists and comments
Appendix E: Grand Forks police and engineering department studies
Appendix F: MPO turning movement counts