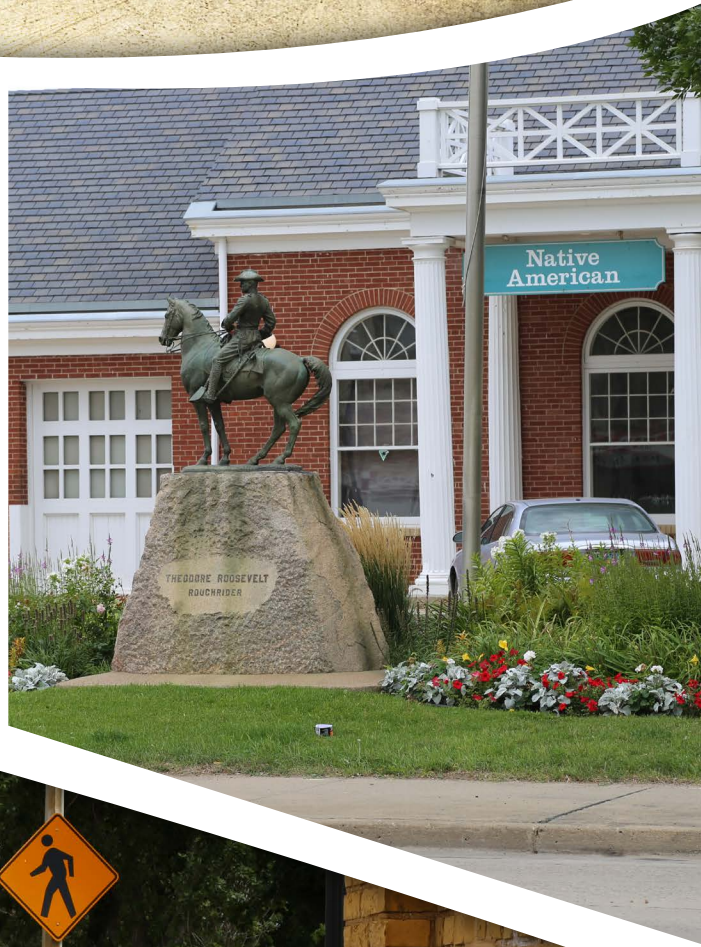
MANDAN DOWNTOWN SUBAREA STUDY

Mandan, ND



January, 2018

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CONTENTS

BACKGROUND

Downtown Mandan has a uniqueness that embodies the entire city. It is historic, with several buildings on the National Register of Historic Places. It is quaint, with several niche and specialty shops you will only find in Mandan. And it is lively, with many special events. As a critical element of the community, Mandan is ready to fully embrace a new vision and framework for its downtown. There are many opportunities for growth, development and redevelopment in the built environment and safety and multimodal improvements in the transportation network.

Study Area

The Downtown Mandan Subarea Study is primarily focused on Main Street and 1st Street North. The specific boundaries of the study area are illustrated in Figure 1.

Main Street, throughout the study area, serves as the backbone of Downtown Mandan. Freight-intensive industrial businesses, daily commuters, pedestrians and bicyclists all use the roadway. East of 2nd Avenue NE, Main Street is primarily suburban in nature, with development, land use, access, parking generation and traffic generation different than Main Street west of 2nd Avenue NE.

Like Main Street, 1st Street serves a different function east and west of 2nd Avenue NE. On the west side, 1st Street is primarily used by downtown businesses, City and County government buildings, pedestrians and bicycles. To the east, 1st Street is more of a residential corridor that is frequently used by regional traffic bypassing congestion on Main Street.

Figure 1: Study Area

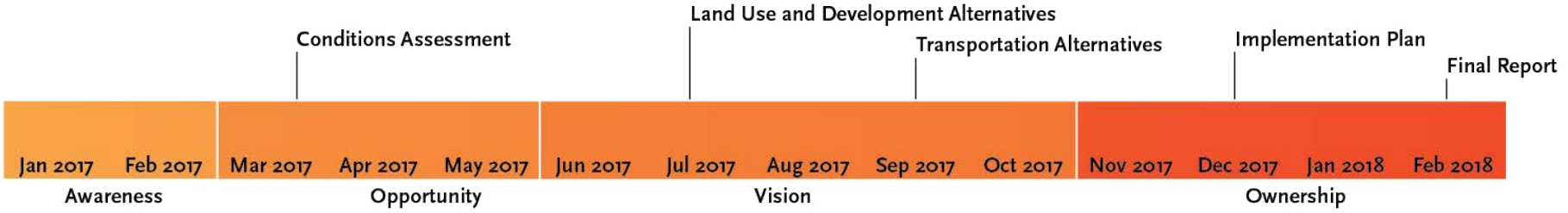
Approach

The approach to the Downtown Mandan Subarea Study included four phases.

Figure 2: Study Approach

The study covered approximately 14 months from beginning to end. It kicked off in January 2017 and concluded in February 2018. The general study process is shown in Figure 3. A separate timeline for public engagement is shown later.

Figure 3: Study Timeline



PUBLIC AND STAKEHOLDER INVOLVEMENT

Public and stakeholder involvement occurred regularly throughout the study process and brought together a diverse set of stakeholders and opinions. The following includes a summary of the different stakeholders, process, and marketing plan used.

Timeline and Process

Monthly Bismarck-Mandan Metropolitan Planning Organization (MPO) Technical Advisory Committee (TAC) and Policy Board (PB) Updates

Every month during the study process, the project team briefed the MPO TAC and PB. Members of the TAC include representation from the City of Mandan, Morton County, North Dakota Department of Transportation (NDDOT), Federal Highway Administration (FHWA), MPO, as well as Burleigh County, Bismarck, and Lincoln. Members of the PB included Mandan Mayor Tim Helbling, Morton County Commissioner Andy Zachmeier, as well as leadership from Burleigh County, Bismarck, and Lincoln.

Focus Groups

The study team held six focus groups with 44 attendees. The purpose of the focus group meetings was to develop a vision for the study and to understand needs, values, and goals. Attendees of the focus group meetings included the Mandan Growth Fund, Renaissance Zone, Community Beautification, Architectural Review, Parking Authority, Remediation Trust, Mandan Progress Organization, Chamber Arts and Culture representatives, Bismarck-Mandan Development Association, and others.

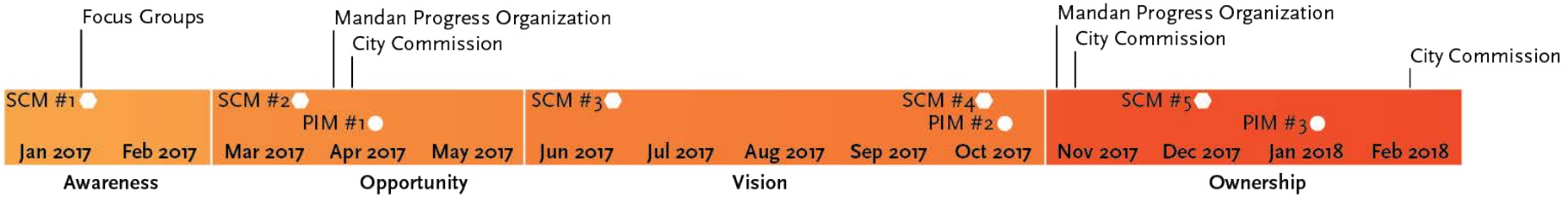
Figure 4: Focus Group Meeting

Steering Committee Meetings

Five times throughout the process, the project's Steering Committee met to discuss, review, and refine methods, assumptions, and technical analysis. Members of the Steering Committee included City of Mandan Engineering, City of Mandan Administration, City of Mandan Business Development, FHWA, NDDOT, the MPO, private businesses, Mandan Progress Organization, Mandan Renaissance Zone, Mandan Architectural Review, and Beautification Committee. The five meetings covered various topics, discussed below.

- The Project Kick Off meeting discussed the overall intent and purpose of the project, reviewed previous planning efforts, and brainstormed issues and potential solutions.
- The second meeting summarized the existing issues and opportunities identified in the Existing Conditions Analysis. This involved a land use and development workshop.
- The third meeting reviewed the Land Use and Development Concepts report which summarized land use scenarios and development opportunities. This meeting also include a transportation preferences and brainstorming workshop.

Figure 5: Timeline of Public and Stakeholder Involvement



» The fourth meeting reviewed future conditions based on the land use scenarios and presented transportation alternatives. This meeting involved alternative refinement and scoring.

» The fifth meeting presented the improvement plan and steps for implementation.

Figure 6: Steering Committee Meeting

Mandan Progress Organization Presentations

The project team gave updates to the Mandan Progress Organization twice during the study. The first generally reviewed the study process and public input opportunities, and summarized existing transportation issues and opportunities and the land use and development assessment. The second summarized the study's activities to that point and presented the transportation alternatives. The first meeting had more than 40 attendees, the second set a record with more than 50 attendees.

Figure 7: Mandan Progress Organization Meeting

City Commission Presentations

Three presentations were given to the Mandan City Commission. The first presentation occurred early in the study that discussed the study process, the public engagement strategy, and existing issues and opportunities. The second presentation summarized the study's activities to that point and presented the transportation alternatives. The final presentation summarized feedback related to alternatives, alternative scoring, and outlined next steps.

Public Input Meetings

Three public input meetings were held during the development of the Downtown Mandan Subarea Study.

» The first was held in April at Mandan City Hall that sought input on key issues on the transportation system, land uses, development and redevelopment opportunities.

» The second was held in October at Mandan City Hall and presented the transportation improvement strategies and solicited feedback.

» The third was held in January at Mandan City Hall and summarized feedback, alternative scoring and outlined next steps.

Figure 8: Public Input Meeting

Online Survey

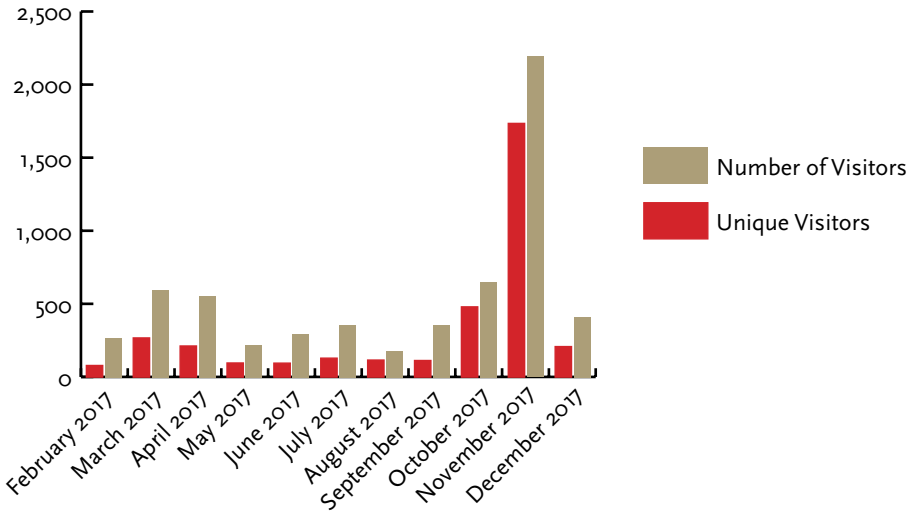
The online survey was taken by 186 members of the community. About half of the public elected no changes at all within the subarea, while the other half preferred changes to one or multiple segments of downtown Mandan. To ensure the prioritized alternatives fully respected the public engagement process, the survey

results were incorporated at face value into the overall score, which averaged the technical score, Steering Committee score, and public support scores. This allowed for the most transparency in the ranking of alternatives.

Website

The project website, www.downtownmandan.com, was a repository for all the study's activity and effort. It included the project background, news and articles, reports, videos, and a portal for comments. Throughout the course of the study, there were more than 3,500 unique visitors, with more than 6,000 visits to the website.

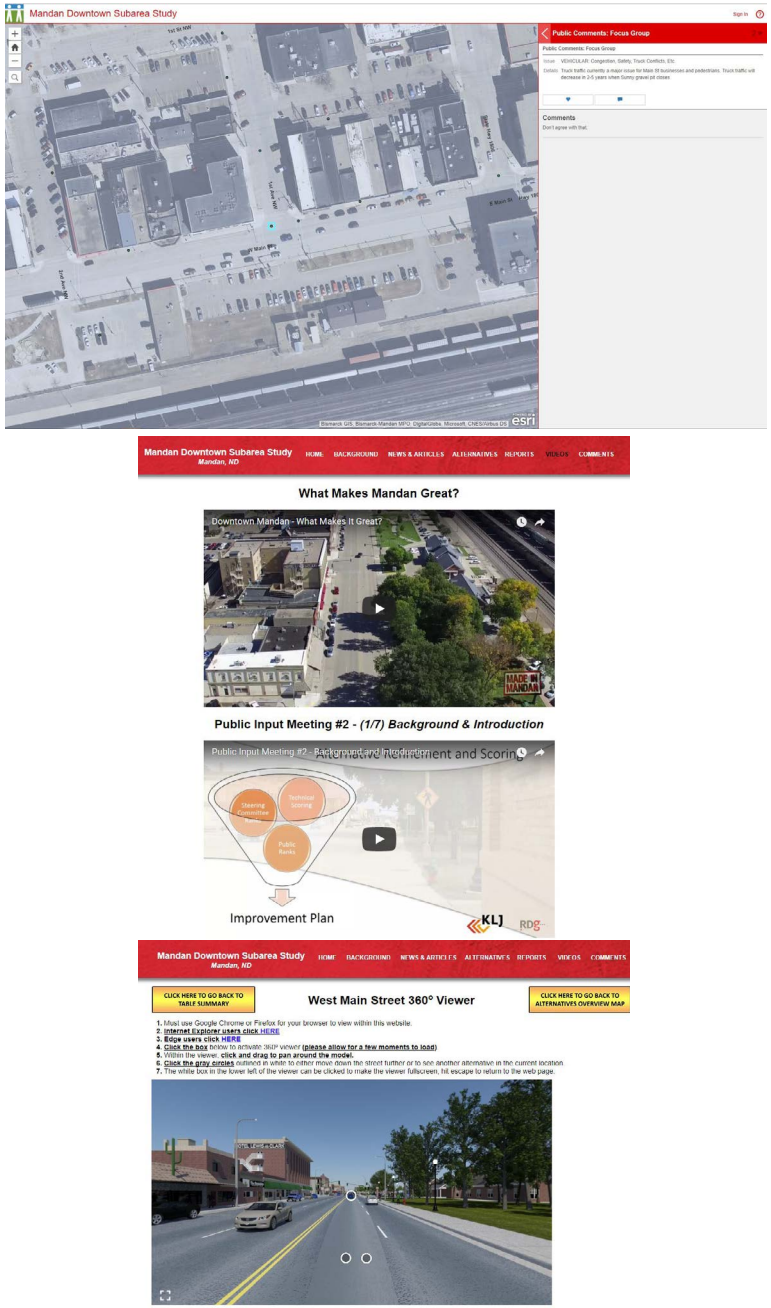
Figure 9: Website Unique and Total Visitors



The website included nearly 20 updates throughout the process, on average once every three weeks. The updates included public engagement opportunities and summaries, reports, videos, and the following specialty activities

- The key opportunities and issues mapping exercise allowed the public to identify issues and "like" and comment on other's identification.
- The meeting recordings included segmented videos from the public input meeting presentation.
- Interactive alternatives map allowed users to see how different alternatives would look and feel.
- A survey was posted asking the public to prioritize the transportation alternatives. There were 186 responses.
- Virtual tours of the highest scoring alternatives were developed and posted.

Figure 10: Screenshots from Website



FUTURE CONDITIONS

The expected future traffic conditions are heavily influenced by future land use and development. The Land Use and Development Scenarios Report evaluated changes in land use, development, and redevelopment opportunities to establish different land use scenarios:

- Current. There are no substantial changes to land use or development beyond what is currently in downtown Mandan.
- Hybrid. The hybrid scenario assumes reuse of existing buildings and redevelopment on some sites. It maintains existing parking supply and density.
- Mixed Build Out. The mixed build out scenario assumes reuse of existing buildings but larger demand for redevelopment. Incorporates higher density in downtown core.
- Build Out. The build out scenario assumes property experiences redevelopment at a moderate to aggressive rate and incorporates higher density buildings.

These various land use and growth scenarios were incorporated into the 2040 demand model to understand their implications to the transportation network. Even under the highest land use growth scenario, the impact to the transportation network is moderate. This is due to an increased emphasis on higher density development and mixed and complementary uses. This internalized much of the new traffic to short trips that can be accommodated by walking or biking. This is common in active downtowns.

Ultimately, the Hybrid scenario was determined the most likely scenario based on current and forecasted demand for redevelopment. However, given the minimal deviation between the Hybrid Scenario and Build Out Scenario, the Build Out scenario was used for traffic flow analysis. A myriad of potential land uses and development opportunities were identified for 19 subject-to-change sites including some big ideas such as relocating the library, adding a new marketplace, reconfiguration of City Hall and expanding the Dykshoorn and Heritage Parks. The purpose of this report is not to solidify (re)development plans, rather to understand what makes sense and evaluate the transportation implications.

Table 1: Basic Block Scenario Comparison

	Retail, Restaurant, Service Square Footage	Service Square Footage	Office Square Footage	Civic/ Other	Residential Dwelling Units	Probable Parking Demand**
Current	18,098	0	5,480	79,937*	55	201
Hybrid	30,785	28,841	40,906	35,915	93 Core 99 Fringe	648
Mixed Build-Out	40,223	50,130	86,536	46,926	182 Core 99 Fringe	1,004
Build-out	60,895	89,222	155,811	71,044	261 Core 267 Fringe	1,769

Figure 11: Subject to Change Sites

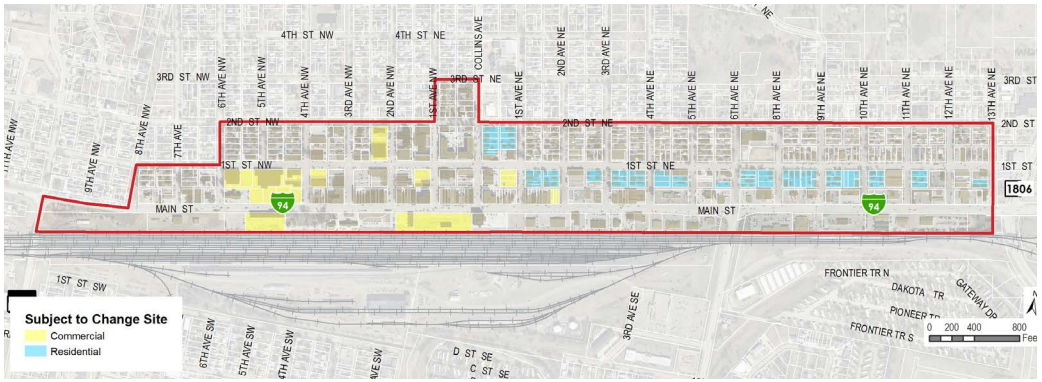
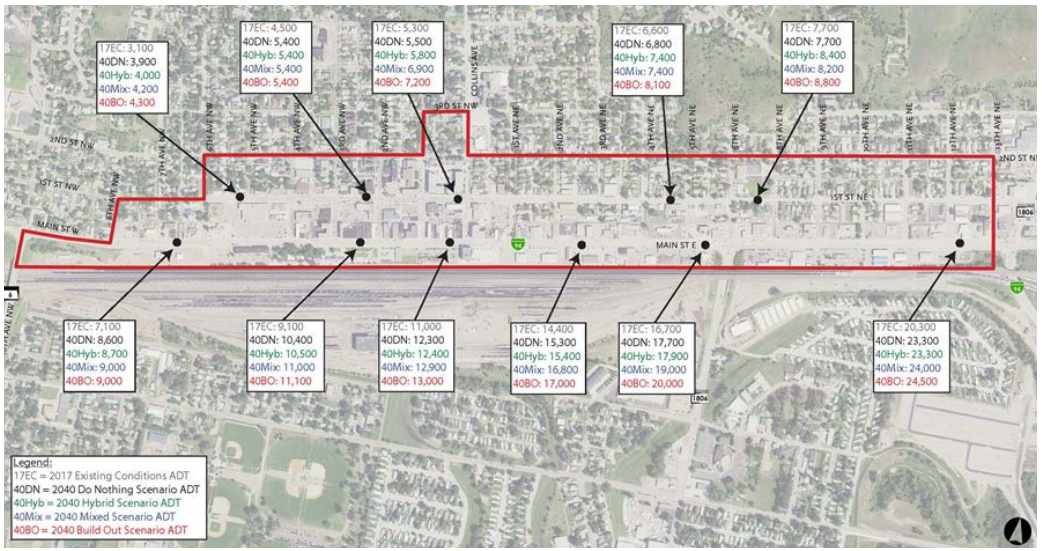


Figure 12: 2040 Traffic Forecasts based on Land Use Scenarios



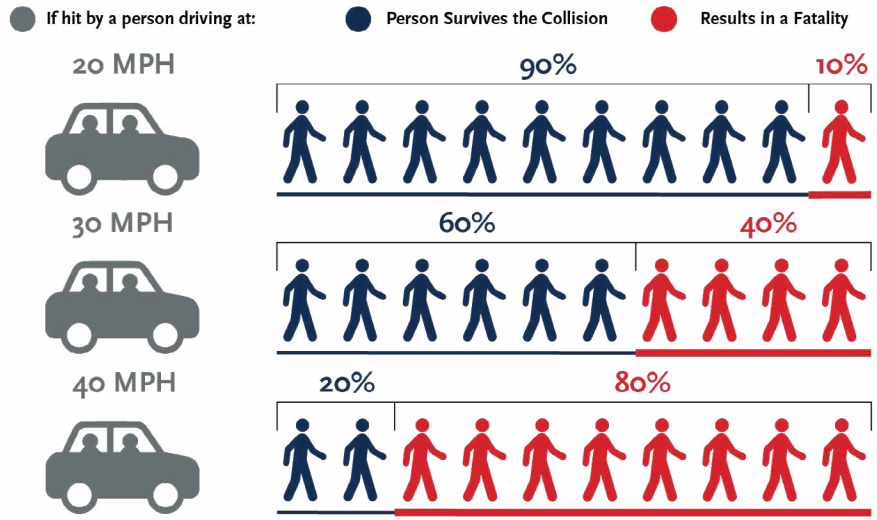
WEST MAIN STREET

Summary of the Issues

West Main Street (from 10th Street NW to 2nd Street NE) extends through the core of downtown Mandan. Main Street is also classified as I-94 Business Route, as well as a truck route, meaning it is maintained and controlled by NDDOT and that with its current classification, trucks cannot be prohibited from using it. It has two-through lanes in each direction plus a lane of parking on the north side of the road. This configuration contributes to an increased crash trend from vehicles making left-turns in the center through lane, highlighted by 40 percent of all crashes being rear-ends along this corridor section. With 7,000-11,000 cars per day currently, there is excess capacity that leads to 95 percent of traffic speeding, based on data collected for this study. By comparison, traffic volumes of 15,000 to 18,000 generally triggers congestion on a two-lane roadway. For example, 1st Avenue west of Mandan Avenue has similar traffic volumes, two through lanes, and it operates very effectively.

The 85th percentile speed is 11 to 13 miles per hour higher than the speed limit. This speeding contributes to some vehicular crash trends in this segment and increases the likelihood that a vehicle-pedestrian crash results in a fatality. If traffic were to drive the speed limit, the survivability of a pedestrian in a pedestrian-vehicle crash would be as high as 90 percent. With traffic driving over 40 miles per hour, on average, the survivability is less than 20 percent. Public and key stakeholders noted various multimodal deficiencies that do not support the desired design of a downtown. This included proximity to traffic, aesthetics, crossing safety, and lack of bicycle facilities

Figure 13: Survivability of Car Crashes based on Speed



Improvement Strategies

Four different strategies were evaluated for this segment. All build alternatives incorporated roadway reconfiguration to calm traffic speeds, reduce crashes from left-turns in the center through lane, and improve pedestrian crossing safety (traffic calming, traffic control and bulb outs).

Based on technical scoring, Steering Committee support, and public support, the top scoring alternative was the 3-Lane Parking Option, which would convert one travel lane in each direction into a two-way left-turn lane (TWLTL) and parallel parking on the south side of Main Street. This was followed closely by a similar alternative that would convert two through lanes into a TWLTL and a bi-directional separated bike facility on the south side of the road. Both alternatives are expected to reduce crash potential by adding a center turn lane, improve pedestrian crossing safety by reducing speeds, and reduce crossing length through bulb-outs. The 3-Lane Parking Option has an estimated cost of $420,000.

Table 2: West Main Street Cross-Section Alternatives Rankings

Alternative	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
3-Lane Section: Parking Option				
3-Lane Section: Cycle Track Option				
3-Lane Section: Bike Lanes Option				
Do Nothing				
2-Lane Section: Wider Sidewalks Option				

As a truck route, truck traffic is a concern on Main Street. All of the proposed 3-lane sections can easily accommodate normal truck sizes. If the fourth travel lane is be removed, oversized loads will be able to encroach into the center left-turn lane without issue. However, these large loads should be encouraged to move during off-peak periods to limit conflicts in the center left-turn lane. This is not anticipated to be an issue; Main Street was previously a 3-lane section and had limited conflicts with agricultural truck traffic.

Spot improvements were also evaluated at 1st Avenue NW, 4th Avenue NW, and 10th Avenue NW. At 1st Avenue NW and 10th Avenue NW, the prioritized alternatives were to maintain the signal and add detection and interconnect. The signals are estimated to cost $200,000 each. At 4th Avenue NW, the prioritized alternative was to add a pedestrian crossing beacon. Beacons are estimated to cost $12,500.

Implementation

NDDOT has announced a competitive grant program associated with the Main Street Initiative. This program will allow Mandan, and other urbanized communities (those with populations greater than 5,000), to apply for grant funds for projects in downtowns that will preserve existing transportation assets, improve safety for all users (particularly pedestrian and bicycle), and enhance the economic vitality of the area, among other criteria. The West Main Street improvement package is an excellent candidate for Urban Grant Program funds because it improves multimodal facilities in downtown and will help support existing and new businesses.

The City of Mandan can also leverage ND Moves, the statewide active and public transportation planning study. ND Moves will be doing pop-up projects across the state to demonstrate how active transportation (biking and walking) projects can be implemented across North Dakota communities. This would be a good opportunity to implement temporary strategies (i.e. roadway reconfiguration) to see how they would function and operate.

Figure 14: Rendering of West Main Street 3-Lane Section with Added Parking

WEST 1ST STREET

Summary of the Issues

West 1st Street (from 6th Street NW to 2nd Street NE) extends through the core of downtown Mandan, but carries about half the traffic of West Main Street. It has one through lane in each direction with angle parking on both sides. There are bulb outs and colored pavement to increase visibility of pedestrians at intersections, but the angle parking can constrain sight distance. There are no bicycle facilities in this area. Future operations of the AWSC at Collins Avenue found that this intersection operated deficiently under future growth scenarios due to long vehicular delays.

Additionally, the all-way stop control at 6th Avenue NW, 4th Avenue NW, and 2nd Avenue NW do not meet traffic volume requirements for the traffic control device. Unwarranted traffic control has been proven to lead to an increase in crashes, which is evident at 6th Avenue, where 60 percent (6/10) of all crashes are related to motorists ignoring the traffic control based on five-years of data collected. There is also anecdotal evidence that suggest non-compliance is common during peak hours when long queues on 1st Street stop for minimal side-street traffic. Finally, studies have found unwarranted AWSC leads to increased vehicular acceleration as motorists try to make up for lost time due to perceived unnecessary stops. This has ramifications to pedestrian crossings.

Improvement Strategies

Two different strategies were evaluated for this segment to improve multimodal activity and reduce sight-distance conflicts. All incorporated some form of bicycle facilities with minimal impact to vehicular operations.

- Cycle Track Option removed parallel parking on the south side of the roadway and incorporated a two-way cycle track and parallel parking.
- Shared Lanes with Reverse Angle Parking Option marks "sharrows" on the pavement and restripes the angle parking to be back-in to improve sight lines for vehicles exiting parking stalls.

Table 3: West 1st Street Cross-Section Alternatives Rankings

Alternative*	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
Shared Lanes and Reverse Angle Parking				
Cycle Track				
Do Nothing				

*Shared Lanes with Front Angle Parking alternative was discarded

Based on technical scoring, Steering Committee support, and public support, the top scoring alternative was the Shared Lanes and Reverse Angle Parking Option. This has an estimated cost of $340,000.

Traffic control improvements were also analyzed and improvement strategies included:

- Revise to Two-Way Stop Control/Signal Control which would convert the all-way stop control at 4th Avenue NW and 2nd Avenue NW to two-way stop control with in-roadway pedestrian crossing signs which increase driver compliance to nearly 90 percent, and install a traffic signal at the Collins Avenue intersection. If federal warrants allow, a traffic signal at 6th Avenue NW could be built in the future.
- Roundabout Corridor would replace the all-way stop control with roundabouts, improving operations to LOS "B" through 2040. Roundabouts have been found to reduce total crashes by 37 percent and injury and fatality crashes more than 75 percent.

Table 4: West 1st Street Intersection Alternatives Rankings

Alternative	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
Roundabout Corridor				
Traffic Signals, TWSC and In-Roadway Signs				
Do Nothing				

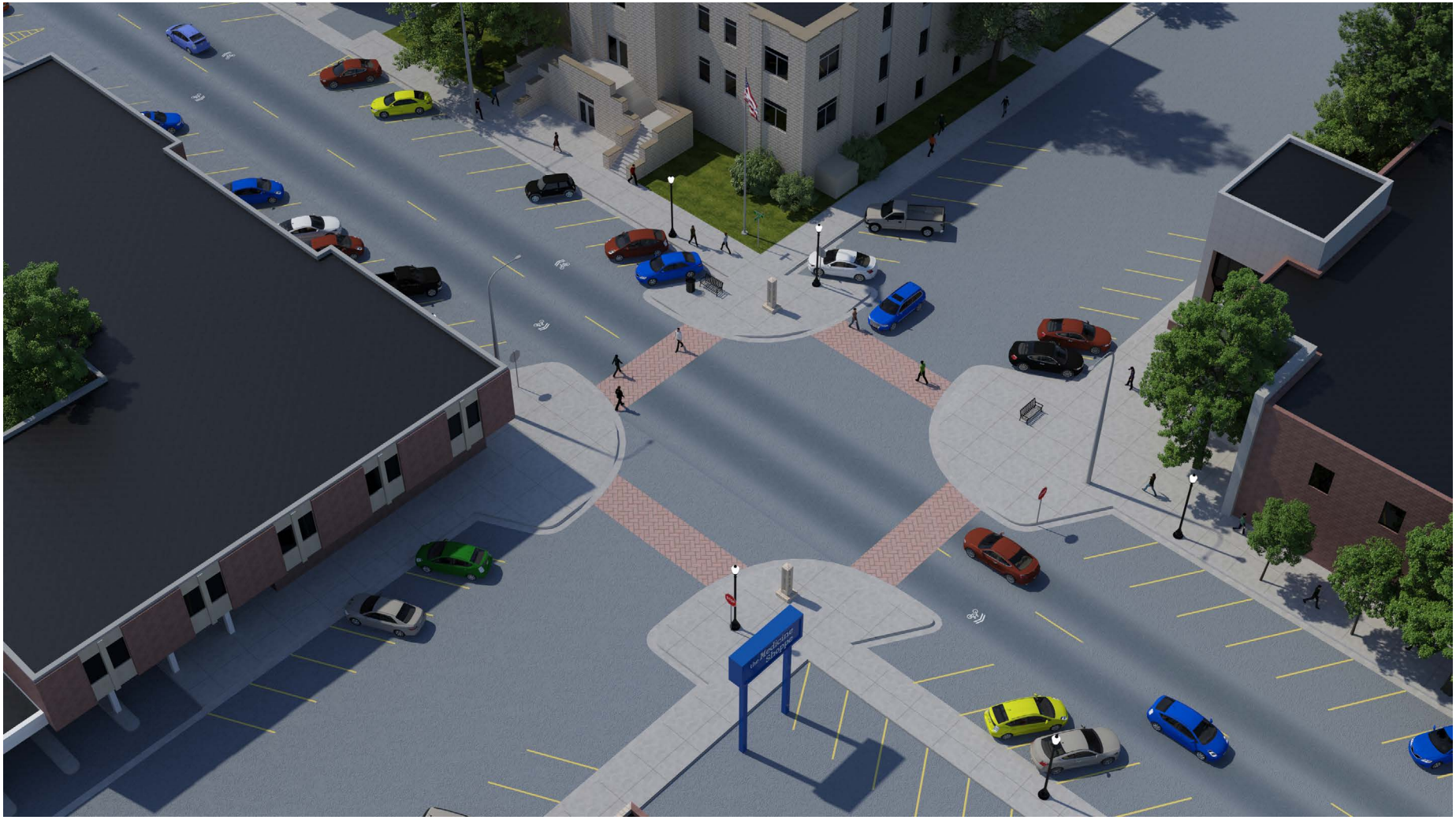
Based on technical scoring, Steering Committee support, and public support the top scoring alternative was the roundabout corridor. This alternative had strong technical and Steering Committee support but did not receive broad public support. It has an estimated cost of $650,000.

Implementation

The West 1st Street improvement packages improves traffic efficiency and safety, provides basic bicycle facilities, and improves pedestrian visibility and safety. This multimodal approach makes West 1st Street a great candidate for the Urban Grant Program.

To improve support for the improvement strategy, the City may need to conduct demonstration projects, which would require the use of local funds, but allow the city to gauge support for and educate the public on the different alternatives before wholesale changes are constructed. Demonstration projects could include rubber roundabouts at one intersection or installing reverse angle parking on one block to test the implementation and public reaction. These demonstration projects should be paired with a public involvement campaign and evaluation of input.

Figure 15: Rendering of West 1st Street Shared Lanes and Reverse Angle Parking



EAST MAIN STREET

Summary of the Issues

East Main Street serves a more suburban land use and carries between 14,400 and 20,300 cars each day currently and is expected to carry up to 23,300 cars by 2040. This is nearly three times as much traffic as West Main Street. Main Street is also classified as I-94 Business Route, as well as a truck route, meaning it is maintained and controlled by NDDOT and that with its current classification, trucks cannot be prohibited from using it. It has two through lanes in each direction with a two-way left turn lane. There are 40 access points in the East Main Street segment, which is less than one-mile long. Studies have found that each additional driveway along a corridor can increase crash potential by two percent and reduce traffic flow by 0.25 miles per hour. The Main Street and 6th Avenue NE intersection had 40 crashes over five years, nearly half of which were northbound. There are multiple ADA violations related to sidewalk widths and sideslopes and no bicycle facilities.

Improvement Strategies

Two different strategies were evaluated for this segment. The improvement strategies for East Main Street focused on improving vehicular safety and multimodal mobility and safety.

- 5-Lane with Shared Use Path option would maintain the five-lane section, but would convert the south sidewalk into a wider 10-foot shared use path by removing the rarely used on-street parking. It would relocate roadway lighting outside of sidewalks. Access management would be incorporated through removal of redundant access points, consolidation of adjacent access points, and relocation of access points to sidestreets where possible.
- 4-Lane with Median option would replace the two-way left turn lane with a raised median and turn lanes at key intersections to reduce conflict points at the many access points by converting to right-in/right-out only, relocate roadway lighting to the median, and improving the condition of the pedestrian environment by providing a pedestrian refuge island.

The 5-Lane Section with Shared Use Path had the highest technical score and Steering Committee support and the second highest public support. It has an estimated cost of $500,000.

Table 5: East Main Street Cross-Section Alternatives Rankings

Alternative*	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
5-Lane Section with Wider Sidewalks and Access Management				
Do Nothing				
4-Lane Section With Median and Access Management				

*4-Lane Section With Wider Sidewalks (No Median) alternative was discarded

At 6th Avenue NE, a phased improvement plan was also developed that would begin with signal phasing improvements for the northbound and southbound approaches. As necessary, lane reconfiguration and widening under the railroad bridge would follow to mitigate future deficiencies. The first phase of this improvement plan has an estimated cost of $6,000.

Implementation

Funding for the East Main Street improvements will likely come from the Urban and Regional Roads programs. These programs provide funds to maintain operations and conditions of regionally significant roadways, including Main Street and 6th Avenue NE/ND 1806. These funds are competitively programmed through the Long Range Transportation Plan (LRTP) and the Transportation Improvement Program (TIP). Mandan will need to determine the priority of the East Main Street improvements relative to the other projects identified and programmed in the LRTP and TIP in Mandan and work with the MPO to evaluate how these improvements compare metro-wide.

Figure 16: Access Management Plan for East Main Street

Figure 17: Rendering of East Main Street 5-Lane with Shared Use Path

EAST 1ST STREET

East 1st Street has one travel lane in each direction with parallel parking on both sides of the roadway. It carries between 6,600 and 7,700 vehicles per day currently, growing to between 7,400 and 8,400 vehicles per day by 2040. These volumes are comparable to West Main Street. This segment serves two purposes: provide direct property access to residential areas and Custer Elementary School and serve as a reliever route for drivers looking to avoid congestion on Main Street. The challenge is these two vastly different competing needs results in the corridor failing to do either. Furthermore, there are no bicycle facilities, despite having been identified as the desired bicycle corridor in the last LRTP and Pedestrian and Bicycle Plan.

Figure 18: Existing Pedestrian Beacon at 1st Street and 6th Avenue NE

Improvement Strategies

Two different strategies were evaluated for this segment:

- Through Corridor option focuses on improving traffic flow, which would relieve pressure from Main Street. It removes parking to incorporate a two-way left turn lane and shared bicycle/vehicle lanes through "sharrows" pavement markings. Sharrows are not generally designed for corridors with this level of volume and have the potential to provide little benefit to bicyclists.
- Quiet Corridor option provides an improved multimodal corridor by focusing on reducing corridor speeds and deterring cut-through traffic. It would remove one parking lane and reallocate the space to provide bike lanes on both sides of the road. Multiple traffic calming techniques would be employed to reduce vehicle speeds include radar speed display signs, narrow lanes and either a raised intersection or roundabout at 6th Avenue NE.

The Steering Committee and public preferred to make no changes to this segment. The general consensus was that the needs along East 1st Street paled in comparison to the other segments and improvements are not imminently necessary.

Table 6: East 1st Street Cross-Section Alternatives Rankings

Alternative	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
Do Nothing				
Through Corridor				
Quiet Corridor				

Traffic control changes at the 1st Street and 6th Avenue NE intersection were also evaluated. While the technical scoring pointed to a roundabout at this intersection, the Steering Committee and public preferred to make no changes to this intersection.

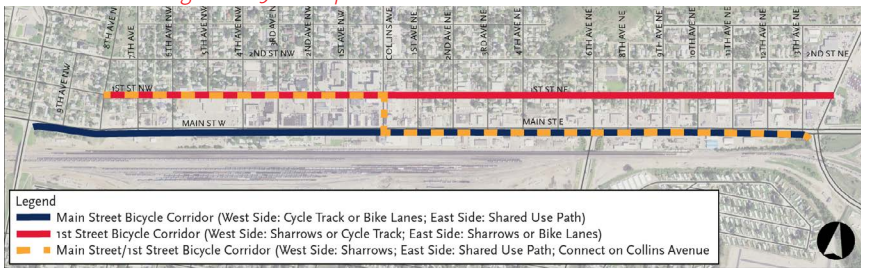
FUTURE BICYCLE CORRIDOR

Surrounding the core of Mandan are multi-use trails: the Old Red Trail, the Missouri River Nature Trail, Sunset Park Trail, etc. The last LRTP and the recently completed Bicycle and Pedestrian Plan identified the 1st Street corridor as an east-west connection from the Old Red Trail to other north-south existing and planned trails. However neither report evaluated in detail the cross-section width of 1st Street that would result in parking impacts nor was it clear at the time that a shared use path would be planned for East Main Street and West Main Street may be reconfigured.

This study evaluated bike corridors on both 1st Street and Main Street, but no one solution arose through the study process. There are multiple solutions, all with advantages and disadvantages, which are discussed below.

- 1st Street Bicycle Corridor. On the west side of 1st Street, the prioritized alternative included shared bicycle/vehicular lanes; on the east side, the second highest ranked alternative included shared bicycle/vehicular lanes.
- Main Street Bicycle Corridor. On the west side of Main Street, the second highest scoring alternative included the two-way cycle track on the south side; on the east side, the prioritized alternative included a shared use path on the south side.
- Main Street/1st Street Bicycle Corridor. Bicycle facilities were incorporated into the prioritized West 1st Street improvements and the East Main Street improvements. As currently prioritized, bicyclists could travel East-West if facilities were provided on a controlled sidestreet such as Collins Avenue of 1st Street NE.
- Phased Implementation. The West Main Street improvement is the highest priority in the entire subarea. As this project is implemented and new development occurs, the demand and acceptance of bicycle facilities may well evolve. A phased implementation could follow this strategy:
  - Implement the West Main Street improvement with temporary bulb-outs on the south side of West Main. Reassess bicycle demand and parking utilization on the south side of Main Street after the Railyard development is complete.
  - Determine priorities on West Main Street. At this point, the city can make permanent the bulb-outs and parking on the south side and shift the bicycle corridor to 1st Street, or they can transition to a two-way bicycle facility on the south side of Main Street.

Figure 19: Bicycle Corridor Alternatives



There is no obvious solution for the bicycle corridor designation. Each segment comes with its own unique challenges for implementation and acceptance and impacts on other elements of the downtown transportation network. Furthermore, the Steering Committee had no unanimous support for any bike strategy, with 40 percent supporting a Main Street approach, 40 percent for a 1st Street approach, and 20 percent for a phased approach.

Table 7: Advantages and Disadvantages of Bicycle Corridors

Solutions	Advantages	Disadvantages
1st Street Bicycle Corridor	» Consistent with other regional plans, including the LRTP and Bicycle and Pedestrian Plan » Lower traffic volumes and speeds than Main Street	» Shared or unprotected bike lanes are unlikely to attract novice riders that may frequent downtown events, but would support bike movements by more skilled and confident riders. » Require parking removal on East 1st Street would be impactful to homeowners
Main Street Bicycle Corridor	» Connect the most popular origins and destinations (Bismarck, downtown), with the most aesthetically interesting path (parks, front facing buildings, etc.) » Provides dedicated and separated bicycle facilities that would be attractive to all types from novice to advanced	» Main Street has more traffic than 1st Street » Bike facilities on West Main Street would come at the expense of a lane of parking. While the parking analysis for this project does not anticipate the parking lane to be widely used, several nearby businesses have been in support of the parking lane.
Main Street/1st Street Bicycle Corridor	» Allows for highest scoring alternatives from this report to be implemented	» Discontinuity of facilities is unlikely to be attractive to most types of bicyclists. Families are unlikely to want to use the shared lanes on 1st Street, while experienced cyclists are unlikely to use the shared use path on Main Street.
Phased Improvement Plan	» Allows for flexibility in planning where and how to support bike facilities still using the alternatives developed for this study	» The identified bicycle corridor will not be clear until Main Street has been reconfigured and analyzed

SUBAREA-WIDE IMPROVEMENTS

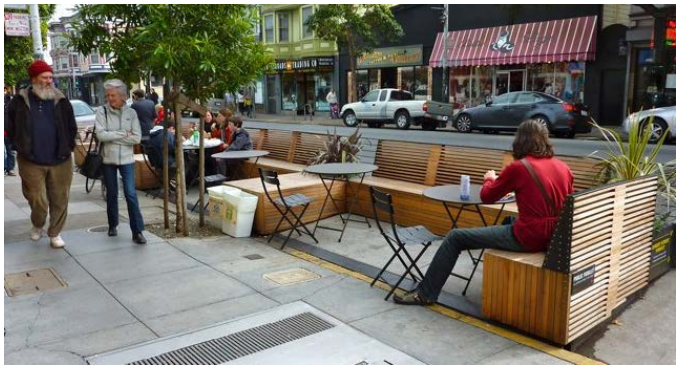
Numerous subarea-wide improvements were presented to the Steering Committee on the topics of sidestreets, sidewalk improvements, parking policies, multimodal improvements, and intelligent transportation systems. The most popular alternatives for these improvements are discussed below.

Side Street improvements

Options were developed to improve walking and biking infrastructure and experiences and to provide opportunities for downtown development. These are options that can be implemented as needed, with other roadway improvements, or when developments occur.

- Bike Corrals offer a secure place to store bikes and can be located on-street (in a parking space) or off-street.
- Alleyway Concepts provide opportunities for businesses and multimodal traffic.
- Parklets would transform one parallel parking space or two to three angle parking spaces to extend sidewalk space and provide a community gathering place.
- Close 2nd Avenue NW, 2nd Avenue NE, and 4th Avenue NW could be closed to increase developable space or enhance the amenities and public space associated with redevelopment of downtown.

Figure 20: Parklet Example



Sidewalk Improvement Strategies

The Steering Committee fully supported the completion of an ADA Transition Plan and had high support for a sidewalk capital improvement plan. The Transition Plan would identify ADA deficiencies and develop strategies to address them. The capital improvement plan could provide revenue to address ADA deficiencies and ensure large scale deficiencies do not occur again.

Figure 21: Example Rendering of Mandan Alleyway with Rodeo Theme

Parking Policies

The most supported parking policies were shared parking between adjacent properties and the implementation of landscaping to buffer parking lots from pedestrian space. There was also support for policies to place parking lots to the side or behind buildings, instead of in front. Some support was expressed for a parking structure, however analysis completed for this study did not identify a need through 2040, even with redevelopment. Other parking policy solutions got less than 50 percent support from the Steering Committee.

Multimodal Improvements

The Steering Committee mostly supports both improved regional bicycle connections and improved transit access for downtown Mandan.

Intelligent Transportation Systems

Signal interconnect on Main Street was the most supported ITS improvement and is currently programmed for 2018 construction. Other ITS solutions include dynamic speed display signs. Other ITS solutions got less than 50 percent support from the Steering Committee.

NEXT STEPS

Aesthetics

Aesthetic improvements bring life to functional transportation and public space improvements. They help create a positive first impression and can attract and stimulate private investment. This downtown study began identifying opportunities for aesthetic improvements, including alleyway improvements and streetscape enhancements. However, due to the limited scope designated for aesthetics as part of this study, additional planning effort will be necessary to fully develop a cohesive aesthetics plan for downtown. Renderings of a streetscape aesthetics are shown in Figure 22.

Priorities

The West Main Street segment provides the highest benefits to downtown and should be pursued first, followed by West 1st Street improvements. The estimated benefits to downtown is shown in Table 8.

Funding

The Bismarck-Mandan MPO TIP and the North Dakota STIP have already incorporated new projects for 2018 through 2021. However, once solicitation begins for new projects for the 2019-2022 TIP, especially the Urban Grant program, the City of Mandan will need to understand the priority and opportunity for projects already identified within the community and those within this study.

For many projects, funding them exclusively through local funds will be challenging. Mandan should request the Bismarck-Mandan MPO add key elements of this study to their cost-constrained element of the Envision 2040 LRTP. This will likely require removing or replacing other projects. This will make projects eligible for future TIP/STIP cycles for consideration for Urban and Regional funds.

For projects that are more specific to downtown operations and maintenance (aesthetic elements, improvements tied to development, etc.), the City of Mandan should begin exploring local funding options.

Project Development

It is important to remember that the highest-ranking alternatives in this report are not the final decisions. Once projects are incorporated into the TIP and STIP, an environmental document will be the next step for any construction project that uses Federal funding.

For the rest of the projects identified, the environmental document could elect to evaluate the top one or two ranked build alternatives identified in this study to prevent unnecessary time and money spent re-evaluating, facilitating a faster project delivery schedule, which is important for the Urban Grant program solicitation process.

Table 8: Estimated Benefits for All Improvements (By Segment)

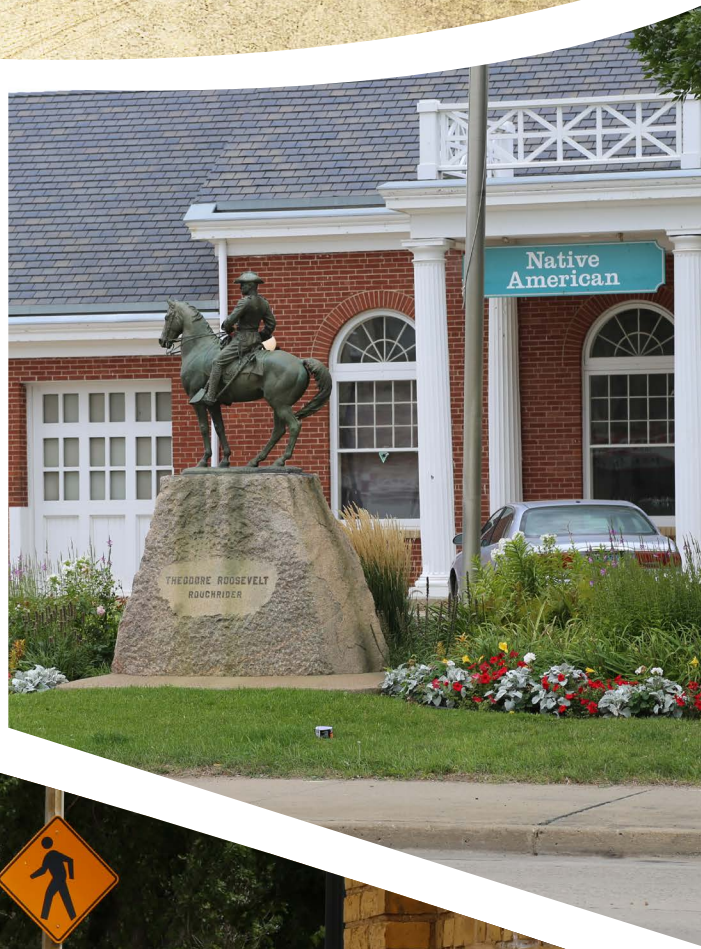
Segment	Location	Highest Ranked Alternative	Technical Score - By Improvement		Technical Score - Average of All Improvements		Percent Improvement	Cost for All Improvements [1]
			Highest Ranked	Do Nothing	Highest Ranked	Do Nothing		
West Main Street	Overall Cross-Section	3 Lane Section: Parking Option	4.9	3.7	4.8	3.7	30%	$820,000
	10th Ave NW Intersection	Maintain Signal and Add Detection/Interconnect	+	+				
	4th Ave NW Intersection	Add Flashing Pedestrian Beacon	4.7	3.7				
	1st Ave NW Intersection	Maintain Signal and Add Detection/Interconnect	+	+				
East Main Street	Ovreall Cross-Section	5-Lane Section with Wider Sidewalks	5.4	5	5.4	5	8%	$506,000
	6th Ave NE Intersection	Phased Improvement Plan	+	+				
West 1st Street	Ovreall Cross-Section	Shared Lanes and Reverse Angle Parking	5.6	4.8	5.5	4.35	26%	$730,000
	Corridor Traffic Control	Roundabout Corridor	5.4	3.9				
East 1st Street	Overall Cross-Section	Do Nothing	+	+	+	+	+	+

+No basis for comparison for do-nothing alternatives. Maintaining signals and adding detection/interconnect is assumed to be the same as a do-nothing condition at applicable locations.

1 – Assumes a new signal will be constructed (included in cost estimate - assumed $200,000 per signal)

Figure 22: Example Streetscape Enhancements on Main Street at 3rd Avenue NW

EXISTING AND FUTURE CONDITIONS ANALYSIS



INTRODUCTION

Downtown Mandan has a uniqueness that embodies the entire city. It is historic, with several buildings on the National Register of historic Places. It is quaint, with several niche and specialty shops you will only find in Mandan. And it is lively, with many special events. As a critical element of the community, Mandan is ready to fully embrace a new vision and framework for its downtown. There are many opportunities for growth, development and redevelopment in the built environment and safety and multimodal and safety improvements in the transportation network.

Study Area

The Downtown Mandan Subarea Study includes Main Street/Business I-94 from 10th Avenue NW to 13th Avenue NE; 1st Street from 8th Avenue NW to 13th Ave NE; 2nd Street from 6th Avenue NW to 13th Avenue NE; and 3rd Street from 1st Avenue NW to Collins Avenue. Figure 23 shows the study area.

Main Street, throughout the study area, serves as the backbone of Downtown Mandan. It is a state highway and designated truck route. Freight-intensive industrial businesses, daily commuters, pedestrians and bicyclists all use the roadway. East of 2nd Avenue NE, Main Street is primarily suburban in nature; with development, land use, access, parking generation and traffic generation different than Main Street west of 2nd Avenue NE.

Like Main Street, 1st Street serves a different function east and west of 2nd Avenue NE. East of 2nd Avenue NE, 1st Street is used by downtown regional traffic, pedestrians and bicycles; whereas west of 2nd Avenue NE, 1st Streets is more of a residential corridor along with regional traffic bypassing Main Street.

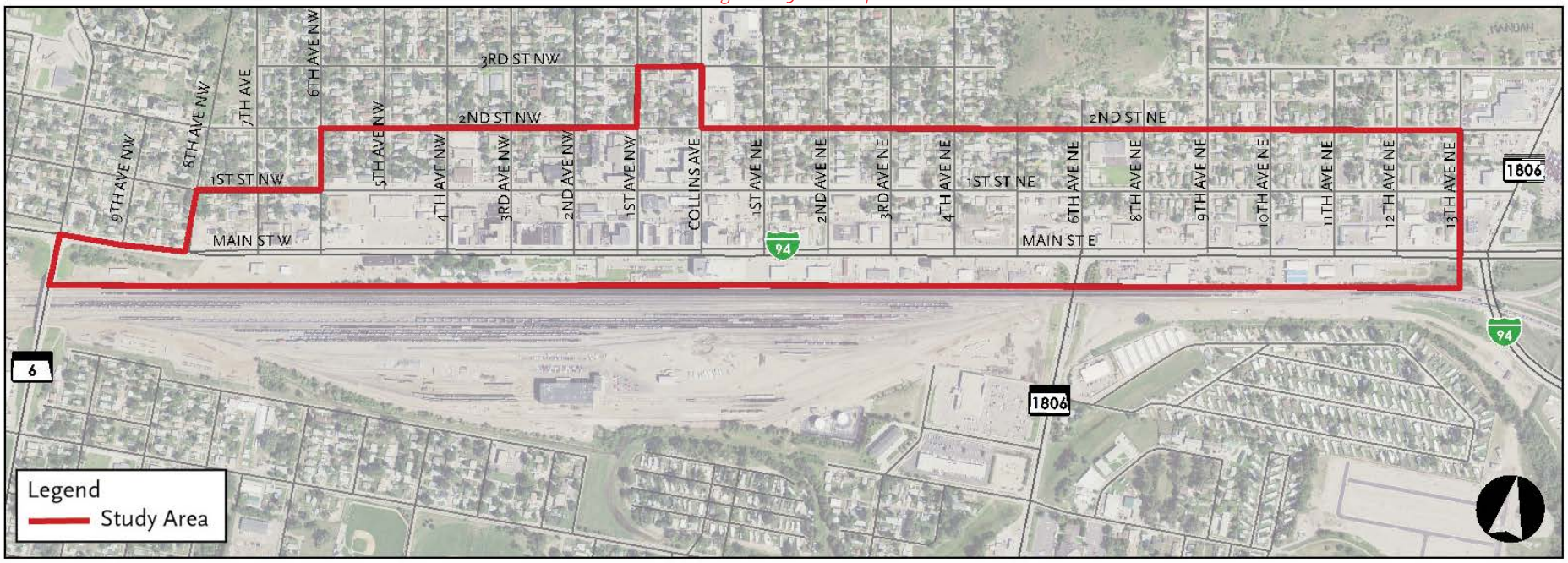
2nd Street, within the study area, is primarily a residential roadway with limited commercial development.

TRANSPORTATION SYSTEM ASSESSMENT

Approach

Typical corridor studies complete traffic operations analysis for A.M. and P.M. peak hours. This is a mono-modal approach that encourages designing to the highest volume of vehicle traffic instead of providing adequate facilities for all modes, including pedestrian, bicycle and transit and other needs like parking and aesthetics. Using a balanced scorecard approach, vehicular level of service will be combined with bicycle, pedestrian and transit level of service to provide an overall transportation level of service. This approach helps promote an active, safe and comfortable environment for all roadway uses.

Figure 23: Study Area



Typical Sections

There are a variety of typical sections throughout the study area. Figure 24 shows typical sections for functionally classified roadways in the study area. As illustrated, there are varying degrees of pedestrian, vehicle and parking accommodations.

Figure 24: Typical Sections in Study Area

Vehicular Traffic Environment

Functional Classification

Roadways must balance access and mobility. The function of the roadway is dependent on classification; an interstate prioritizes mobility and has very strict access controls, permitting high speeds while a local road prioritizes access over mobility. Roadways that also have a functional classification are directly tied to the Federal-Aid Highway System and are eligible for federal transportation funding.

Within the study area, there are many functionally classified roadways intended to provide more mobility than accessibility, as shown in Figure 26.

- Principal Arterial: Main Street, 10th Avenue SW/ND 6, 6th Avenue NW and 6th Avenue SE/ND 1806
- Minor Arterial: 1st Street NW/NE and Collins Avenue
- Collector: 2nd Street NW/NE, 5th Avenue NW, 4th Avenue NW, 3rd Avenue NW, 2nd Avenue NW, 1st Avenue NW, 3rd Avenue NE, 9th Avenue NE

Throughout the downtown study area, Main Street is also classified as I-94 Business Route as well as a Truck Route, meaning that it is maintained and controlled by NDDOT and that with its current classification trucks cannot be prohibited from using it.

Figure 25: Functional Classification Characteristics

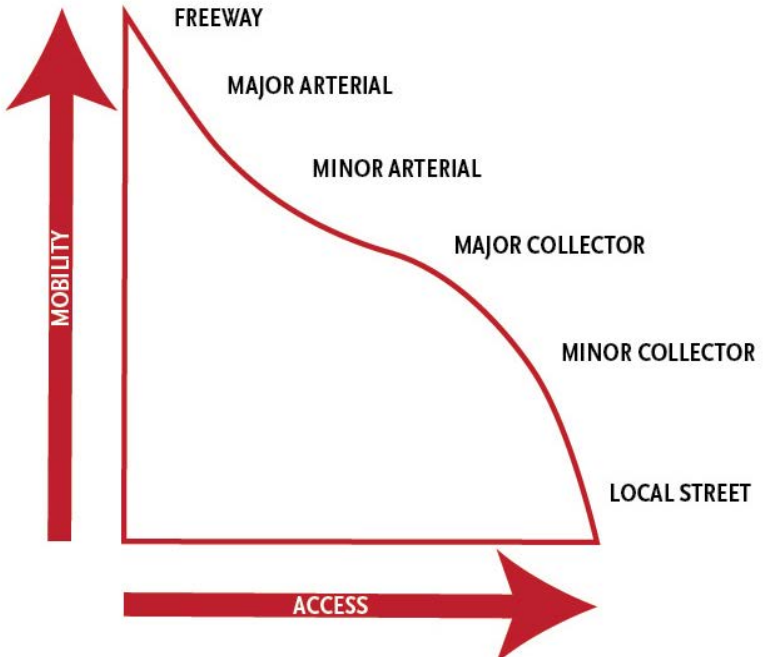


Figure 26: Functional Classification in Downtown Mandan

Pavement Condition

Studies have found timely pavement rehabilitation has the potential to be six to 14 times more cost effective than rebuilding a deteriorated road. Another study found that rough roads add an average of $515 to the annual cost of owning a car due to damaged tires, suspensions, reduced fuel efficiency and accelerated vehicle depreciation.

In 2012, Mandan completed a Pavement Condition Index Survey. Within the downtown study area, Main Street was found to have adequate pavement conditions, along with Collins Avenue and 1st Street east of Collins Avenue. Most of the north-south avenues as well as most of 2nd Street in the study area were found to have unsatisfactory pavement conditions. Figure 27 shows the 2012 pavement conditions in downtown Mandan.

Data Collection

Intersections were identified for further analysis based on intersecting ADT volumes. NDDOT and KLJ collected the following data used in analysis for this Downtown Mandan Subarea Study:

- NDDOT collected 12-hour turning movement counts at five Main Street intersections on December 21st and 22nd, 2015.
- NDDOT collected 12-hour turning movements at Main Street and Memorial Highway/ND Highway 1806 on March 7th, 2016
- KLJ collected peak hour turning movements at five 1st Street intersections and two Main Street intersections between January 10th and 17th, 2017.
- KLJ collected daily vehicle counts, classifications and speeds at four Main Street locations and two 1st Street locations between January 10th through January 17th, 2017.

Figure 28 shows the data collections location.

Traffic Distributions

As part of the data collection and processing efforts, directional distributions were compiled to understand how and when traffic moves through the study area. Peaking patterns and distributions were collected on Main Street, 1st Street, Collins Avenue and 6th Avenue NW, shown in Figure 29.

- Main Street and 1st Street sees the largest directional distribution difference with 58 to 66 percent of the A.M. peak hour traffic heading eastbound and 55 to 60 percent of the P.M. peak hour traffic heading westbound. This is significant because many downtown businesses are closed during the P.M. peak hour.
- On Main Street and 1st Street, there are peaking patterns during the A.M., Noon and P.M. peak hours.
- Collins Avenue between Main Street and 1st Street has a 59 percent southbound and 41 percent northbound directional split, a difference of almost 1,000 vehicles per day. This indicates that motorists are taking alternative routes to go northbound.
- On 6th Avenue NW the 3 P.M. hour is the highest hour of the day, likely attributed to Mandan High School, located a few blocks north along 6th Avenue NW.

Overall, traffic patterns throughout downtown Mandan reflect typical traffic patterns for commercial arterial and commuter corridors, A.M. and P.M. peaks along with a gradual increase in traffic throughout the course of a day, with some areas even exhibiting a midday peak in traffic. The one aspect where downtown Mandan differs from the traditional downtown is that it has a sharp and steady decrease in traffic after the P.M. peak hour. Most commercial corridors, particularly in downtowns, see a much higher distribution of traffic in the evenings corresponding to shopping, dining and nightlife.

Speed

Research has shown that speeds a driver chooses to travel are a function primarily of roadway design, context and congestion, not necessarily the posted speed limit. This is born out in the data, shown in Figure 30, which shows the posted speed limit, the average speed of vehicles and the 85th percentile speeds by direction of travel.

- Speeding is common along Main Street with speeds commonly 10 miles per hour over the limit with most locations experiencing 80 percent or more vehicles violating the speed limit. The only area exempt from this trend is between 3rd Avenue NW and 2nd Avenue NW where signals and poor signal timing create friction.
- On 1st Street in the downtown core there is angle parking which increases friction along the corridor; the average speed is lower than the posted speed limit (25 miles per hour) and the 85th percentile is the speed limit. This segment also sees speed violations less than 10 percent of total traffic.

Figure 27: Pavement Conditions in Downtown Mandan

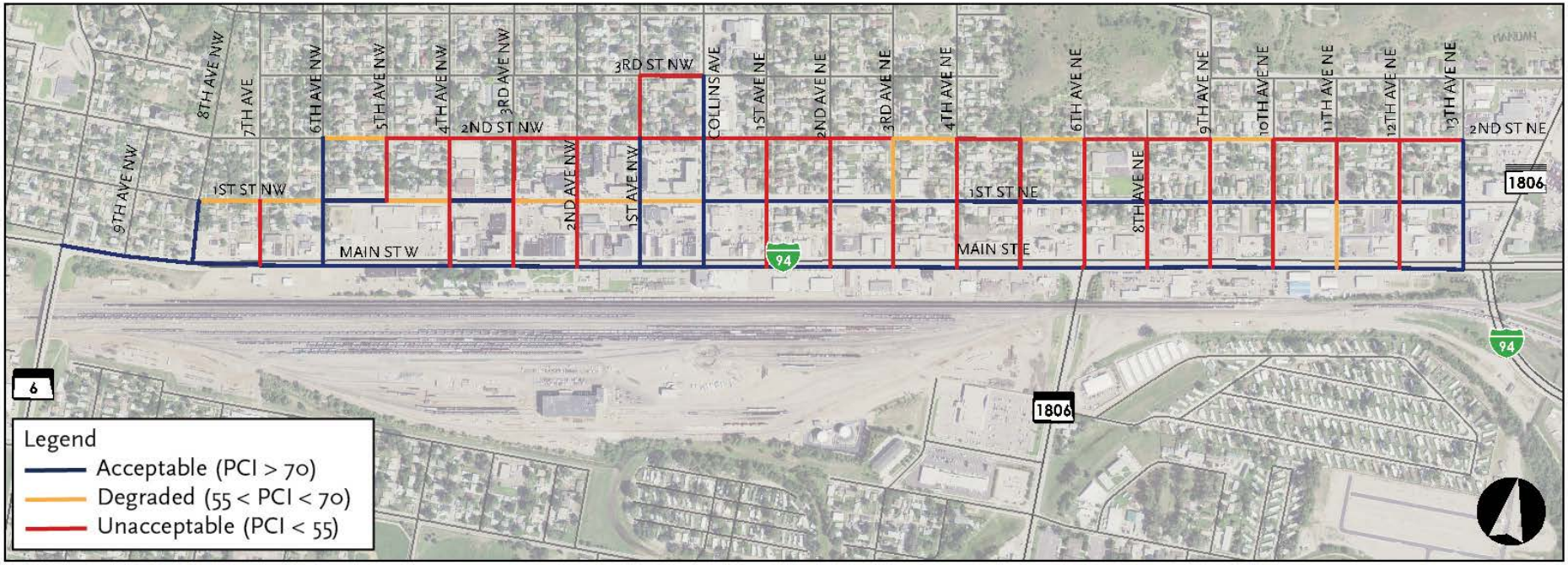


Figure 28: Data Collection Locations

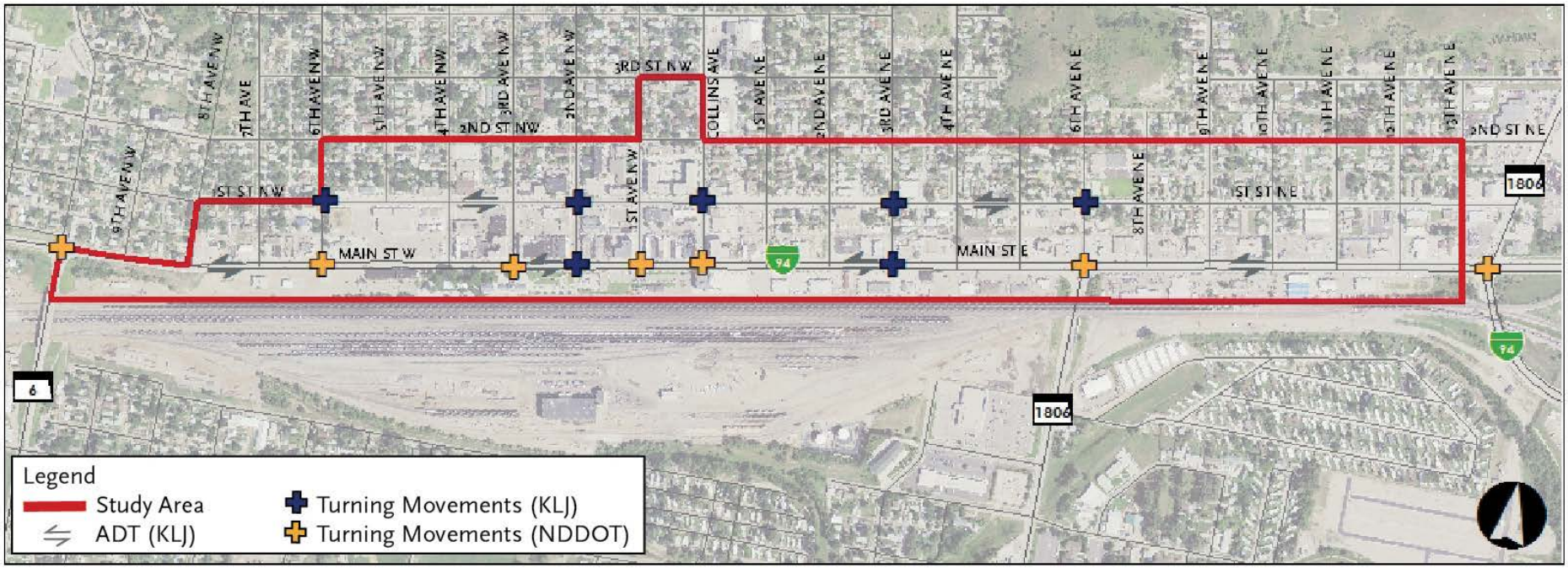
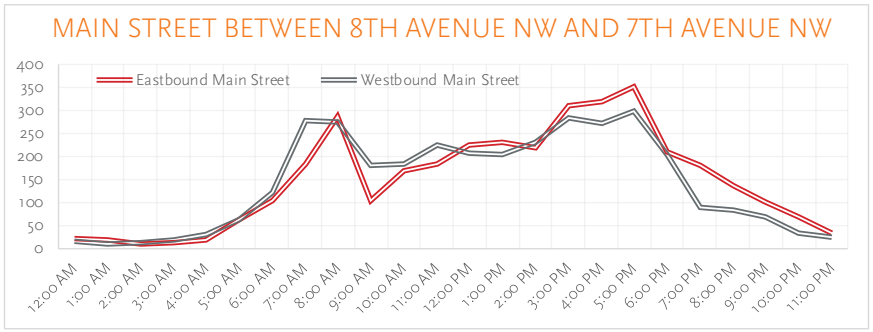
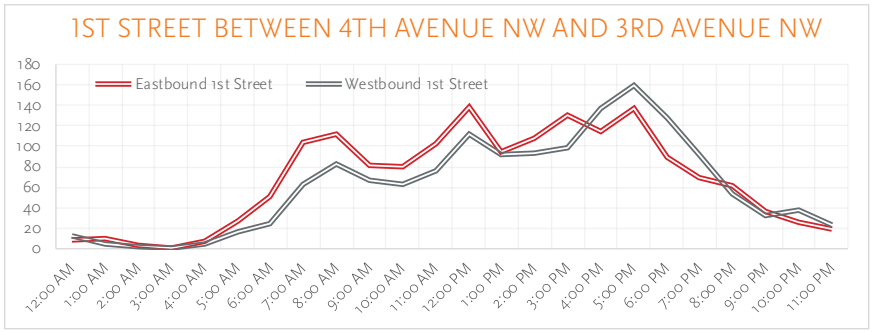
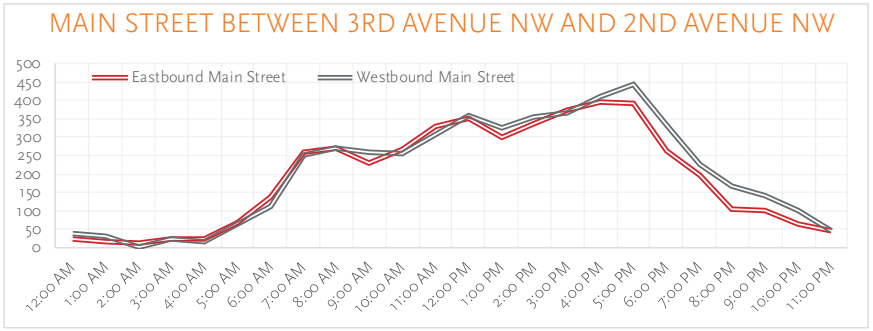
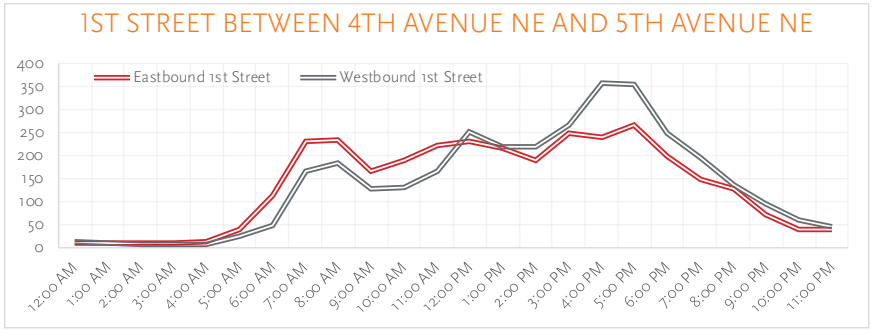


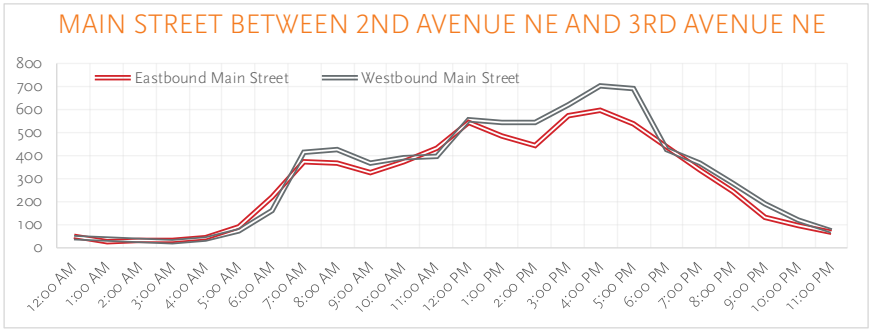
Figure 29: Directional Distributions Across the Study Area

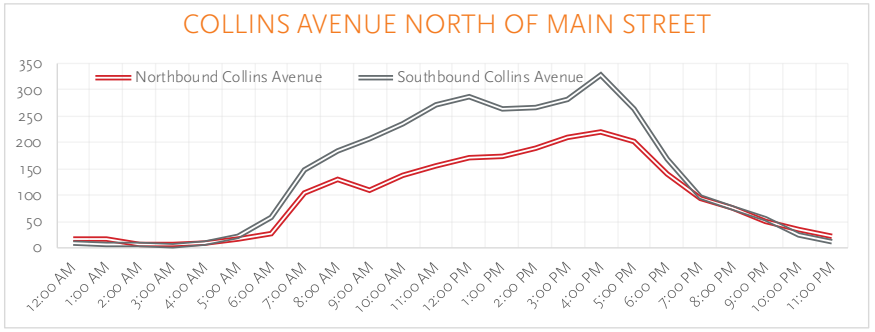


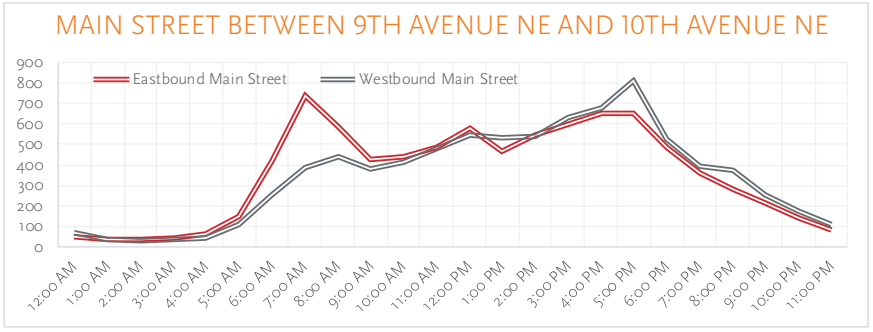












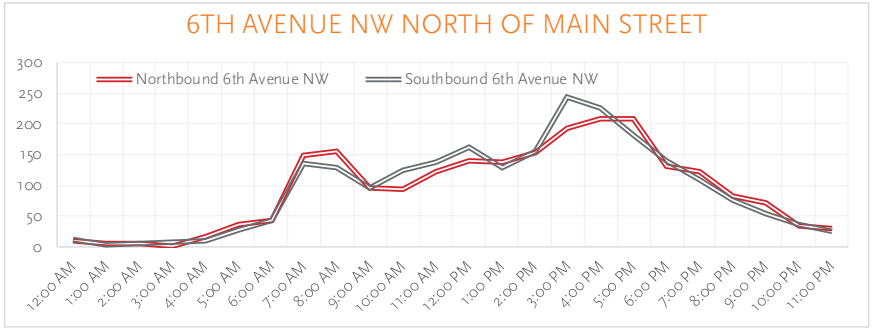
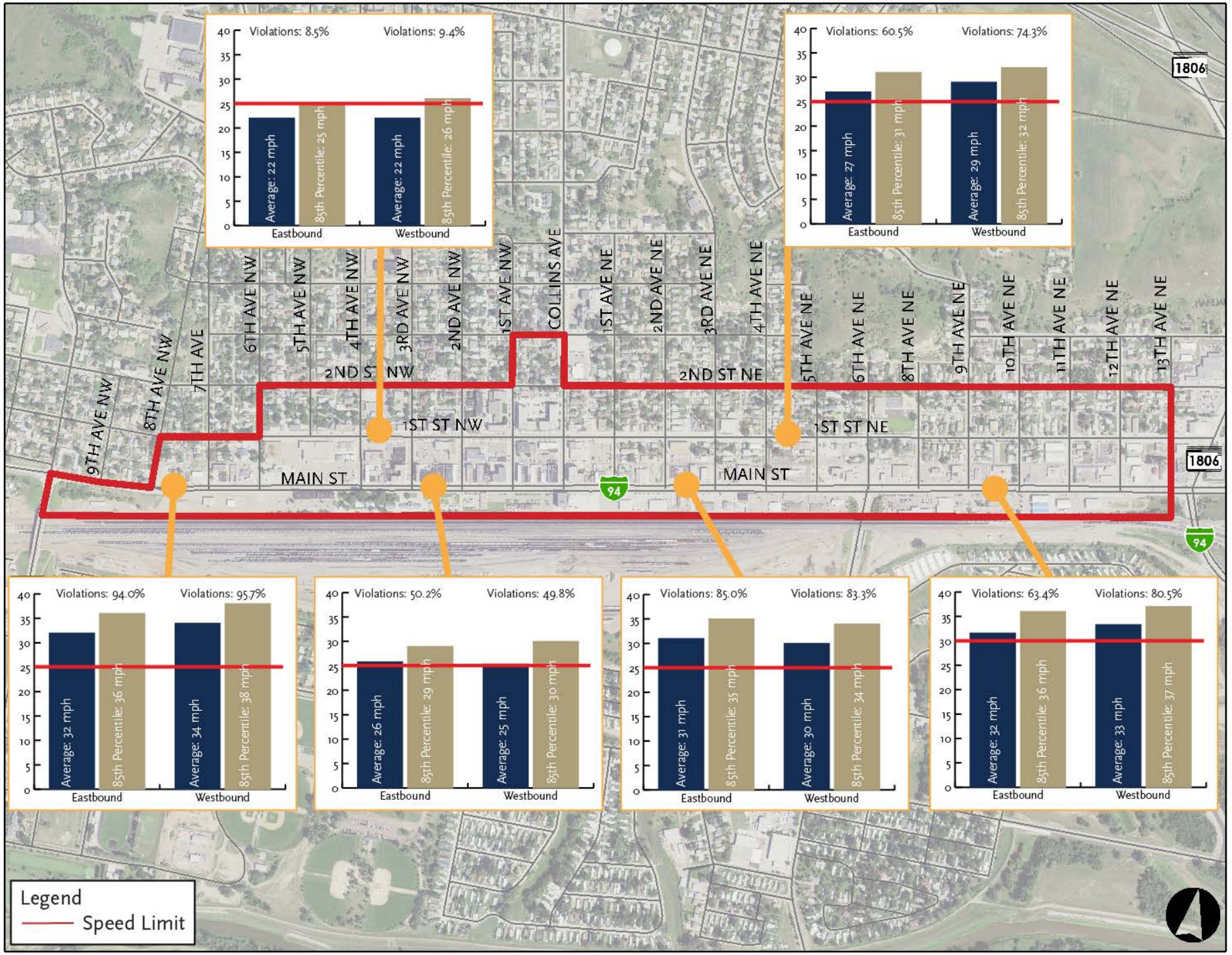


Figure 30: Speeds



Existing Traffic Volumes

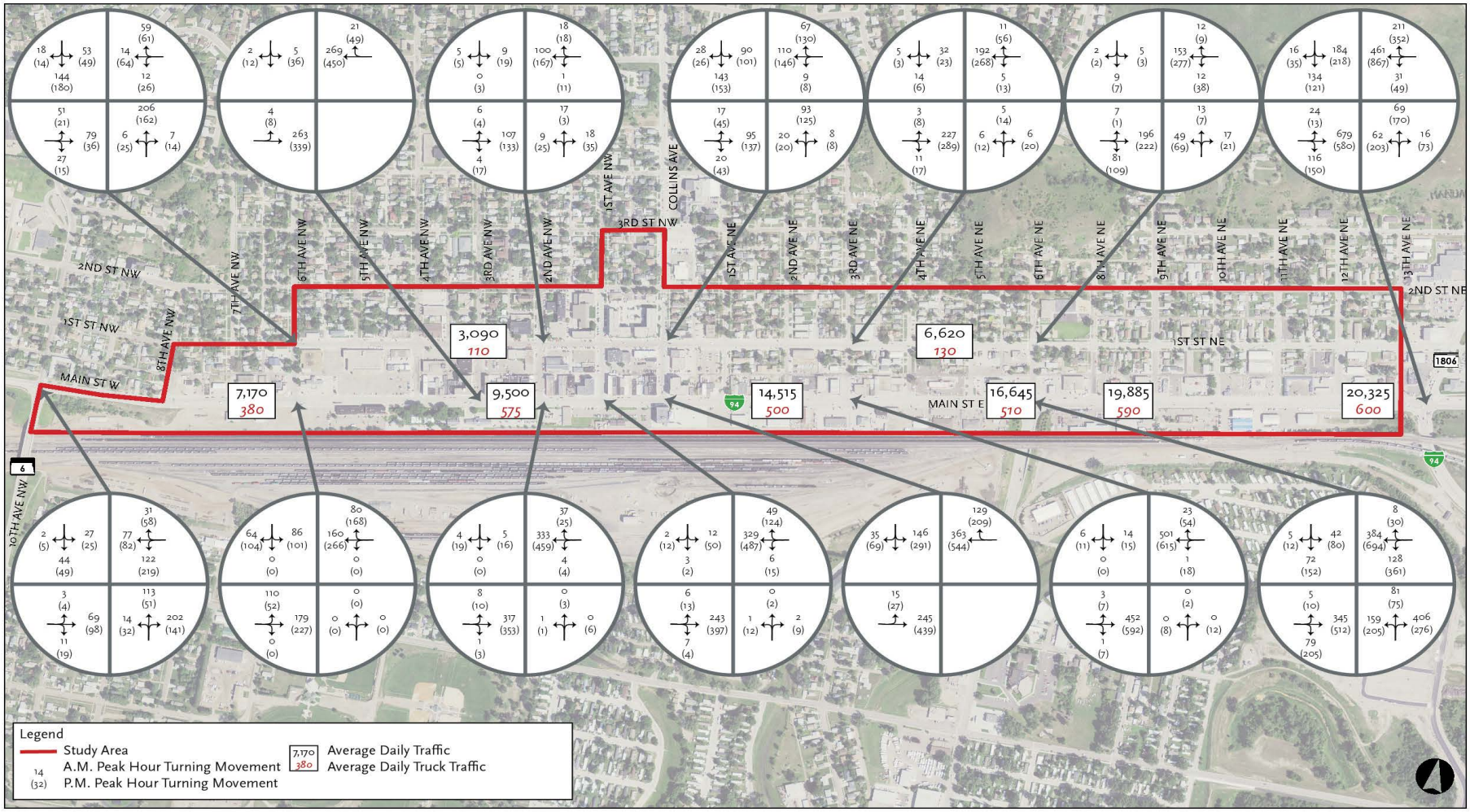
From the east to the west side of the study area, traffic on Main Street nearly triples from 7,065 vehicles per day east of 10th Avenue NW/ND 6 to 20,325 vehicles per day west of Memorial Highway/ND 1806. Similar changes occur on 1st Street where traffic nearly quadruples from 2,015 vehicles per day west of 6th Avenue NW to 8,025 east of 13th Avenue NE. Figure 31 shows the existing turning movements collected for this study as well as select average daily traffic volumes.

Truck Traffic

Main Street, Business 94, is a designated truck route throughout the study area. On average, Main Street truck traffic ranges from four percent east of Collins Avenue to six percent west of Collins Avenue. Typical urban corridors experience two percent truck traffic. Previous planning efforts have indicated up to two-thirds of truck traffic may begin to decline as industrial uses, specifically the aggregate pits, relocate to more desirable locations

High truck traffic can conflict with the ability to provide a multimodal corridor conducive for a successful downtown. High truck traffic may be perceived as a safety issue for pedestrians to cross the roadway. This makes the significant number of parking spaces on the south side of Main Street west of Collins Avenue undesirable to some. Truck traffic can also have a negative effect on the aesthetics of a downtown; trucks, aggregate trucks in particular, are often loud, dirty and unappealing to the eye.

Figure 31: Existing Turning Movements

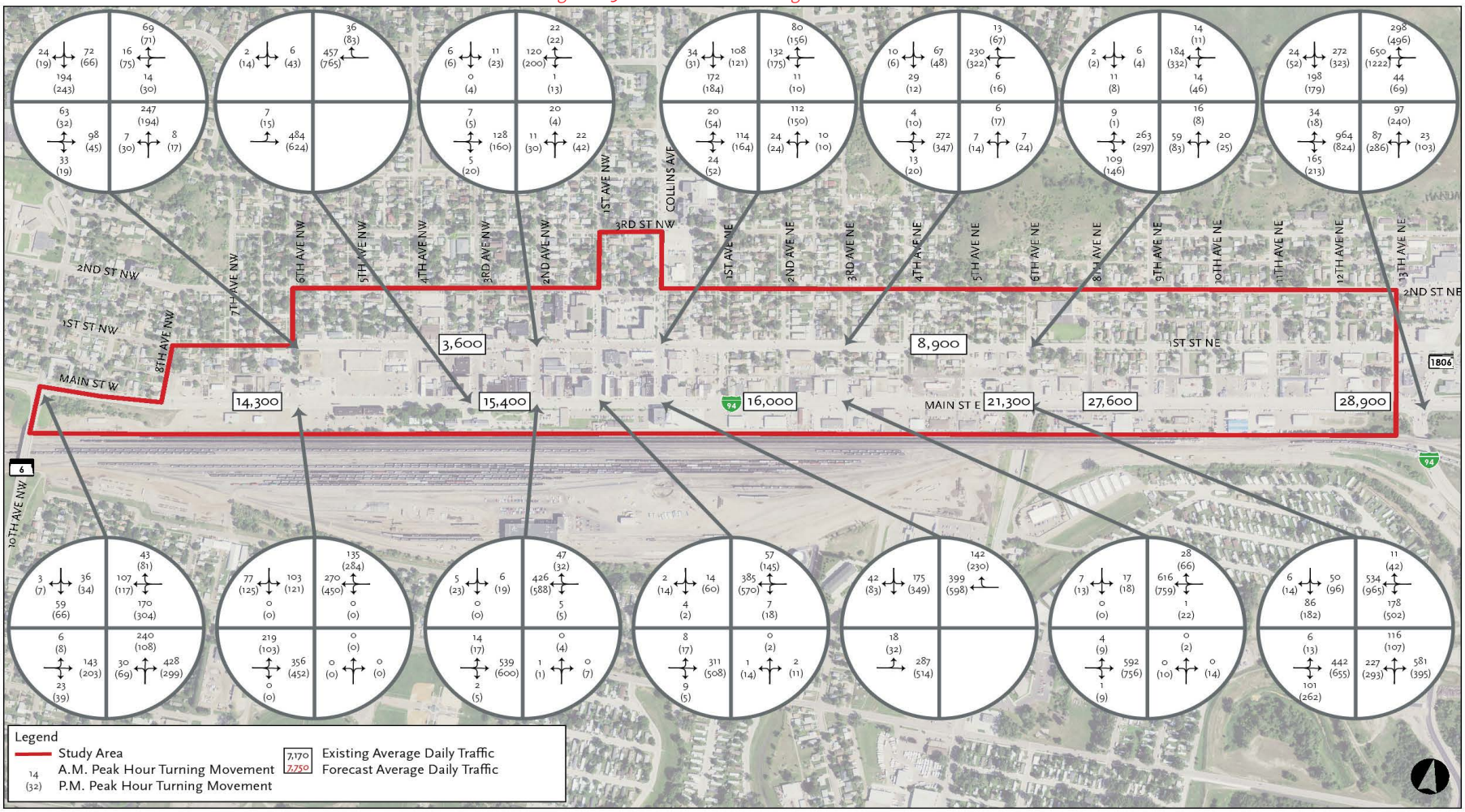


Future Traffic Volumes & Turning Movements

As Mandan continues to grow in all directions and the downtown area continues to develop and redevelop, vehicular traffic on Main Street specifically and other corridors throughout the study area will continue to increase. Traffic forecasts for future conditions are developed every five years for the Bismarck-Mandan MPO for the purposes of developing the Long Range Transportation Plan (LRTP). The process uses demographic forecasts of households and jobs to update, calibrate and validate the travel demand model. The metro-wide level of analysis conducted for the LRTP is not designed to incorporate the intricate details required for a corridor or subarea study. Thus, refinements to the model were considered where future traffic volumes were considered unrealistic. For example, 6th Avenue NW north of Main Street has an existing ADT of 4,350 whereas the LRTP has a 2040 forecast of only 3,900, resulting in a decrease of 450 vehicles, more than 10 percent of the existing traffic. Throughout the study area, projected traffic volumes on most side streets were deemed too low based on current traffic volumes; as such, an annual growth rate of one percent rate was applied to the current traffic volumes to project refined 2040 traffic volumes. 2040 volumes were further refined in the Transportation Alternatives Analysis.

Future peak hour turning movements were estimated for study intersections using projected ADT and collected turning movements. The study team used an approach that follows NCHRP 765: Analytical Travel Forecasting Approaches for Project Level Planning and Design methodology. This involves using directional and hourly distributions and iteratively adjusting until volumes are balanced. This was manually adjusted where appropriate, based on engineering judgment. Figure 32 shows the future projected average daily traffic (ADT) and turning movements.

Figure 32: Future Turning Movements



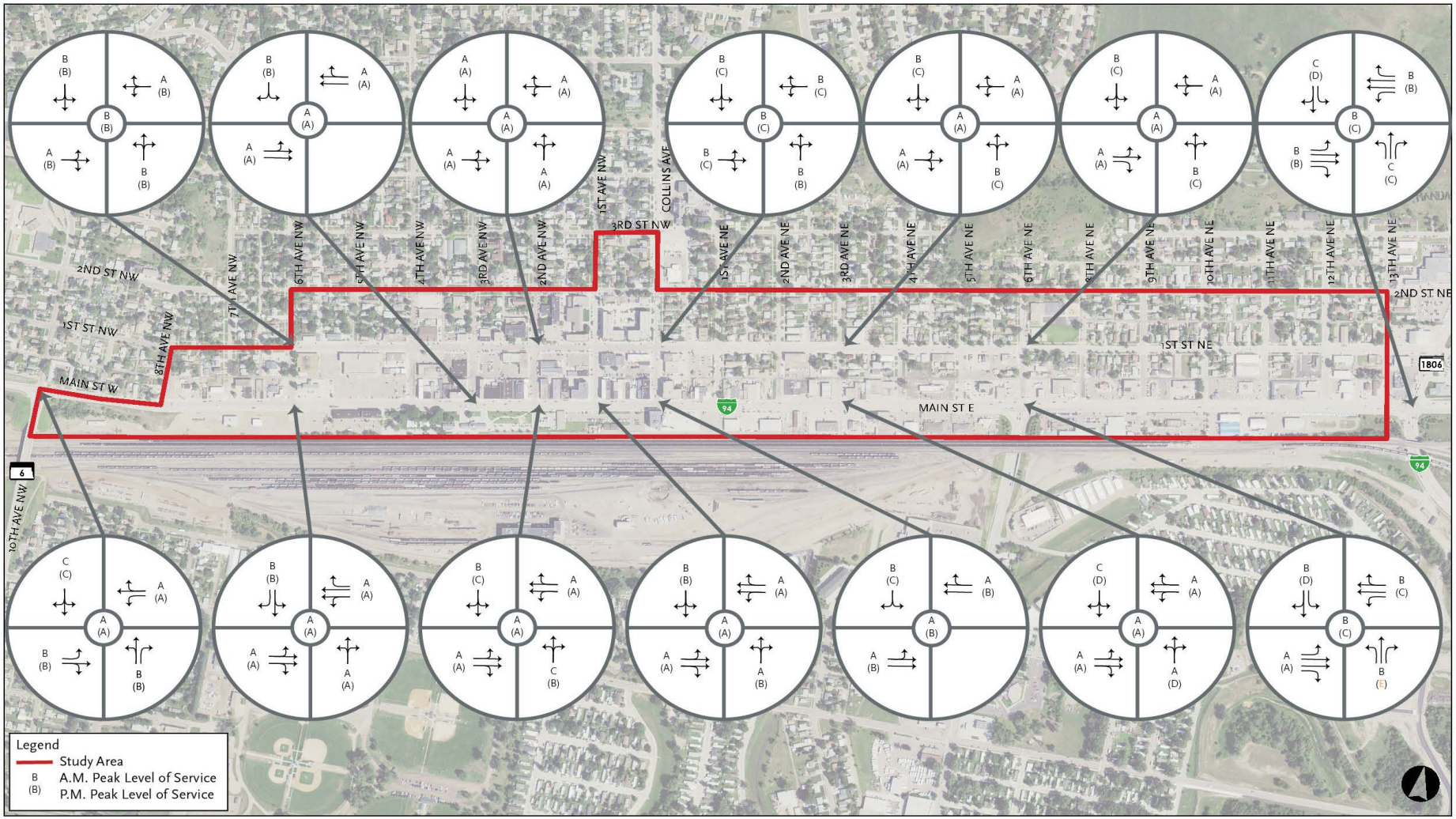
Traffic Operations

Vehicular traffic operations was analyzed at the 13 study intersections. Intersection capacity analysis was evaluated in terms of delay and level of service (LOS). LOS is a term used to describe the operational performance of transportation infrastructure elements; it assigns a grade value that corresponds to specific traffic characteristics within a given system (Table 9). At intersections, LOS is a function of average vehicle delay, whereas LOS for a roadway section is defined by the average travel speed. LOS "A" represents free flow traffic whereas LOS "F" represents gridlock. LOS "E" or worse is considered deficient, in accordance with the NDDOT Traffic Operations Manual published in June 2015. Capacity analysis was conducted using Synchro, which applies deterministic equations published in the Highway Capacity Manual (HCM), an industry and NDDOT standard.

Table 9: HCM Level of Service Thresholds

Control Delay (Sec/Veh)		Volume < Capacity	Volume > Capacity
Unsignalized	Signalized		
≤ 10	≤ 10	A	F
10 - 15	10 - 20	B	F
15 - 25	20 - 35	C	F
25 - 35	35 - 55	D	F
35 - 50	55 - 80	E	F
>50	>80	F	F

Figure 33: Existing Intersection Levels of Service



Existing Levels of Service

Throughout the corridor, all study intersections operate at LOS "C" or better. Only the Main Street and 6th Avenue NE/ND 1806 has deficient approach levels of service that occurs on the northbound approach during the P.M. peak hour. All other approach levels of service are LOS "D" or better. Figure 33 shows the existing intersection and approach levels of service; Figure 35 shows the roadway and overall intersection levels of service.

2040 Levels of Service

By 2040, two study intersections fall to deficient levels of service during the P.M. peak: 1st Street and Collins Avenue and 6th Avenue NE and Main Street.

Additionally five intersections have deficient approach levels of service during the P.M. peak hour:

- 1st Street and Collins Avenue: southbound and westbound approaches
- 1st Street and 3rd Avenue NE: southbound approach
- Main Street and 3rd Avenue NE: northbound and southbound approaches
- Main Street and 6th Avenue NE: northbound and westbound approaches
- Main Street and Memorial Highway/ND 1806 (not in study area): northbound and southbound approaches. The northbound approach at this intersection is deficient during the A.M. peak hour as well.

Figure 34 shows the 2040 projected intersection and approach levels of service; Figure 36 shows the roadway and overall intersection levels of service. Future levels of service are subject to change based on volume refinements in the Transportation Alternatives Analysis.

Figure 34: Future Intersection Levels of Service

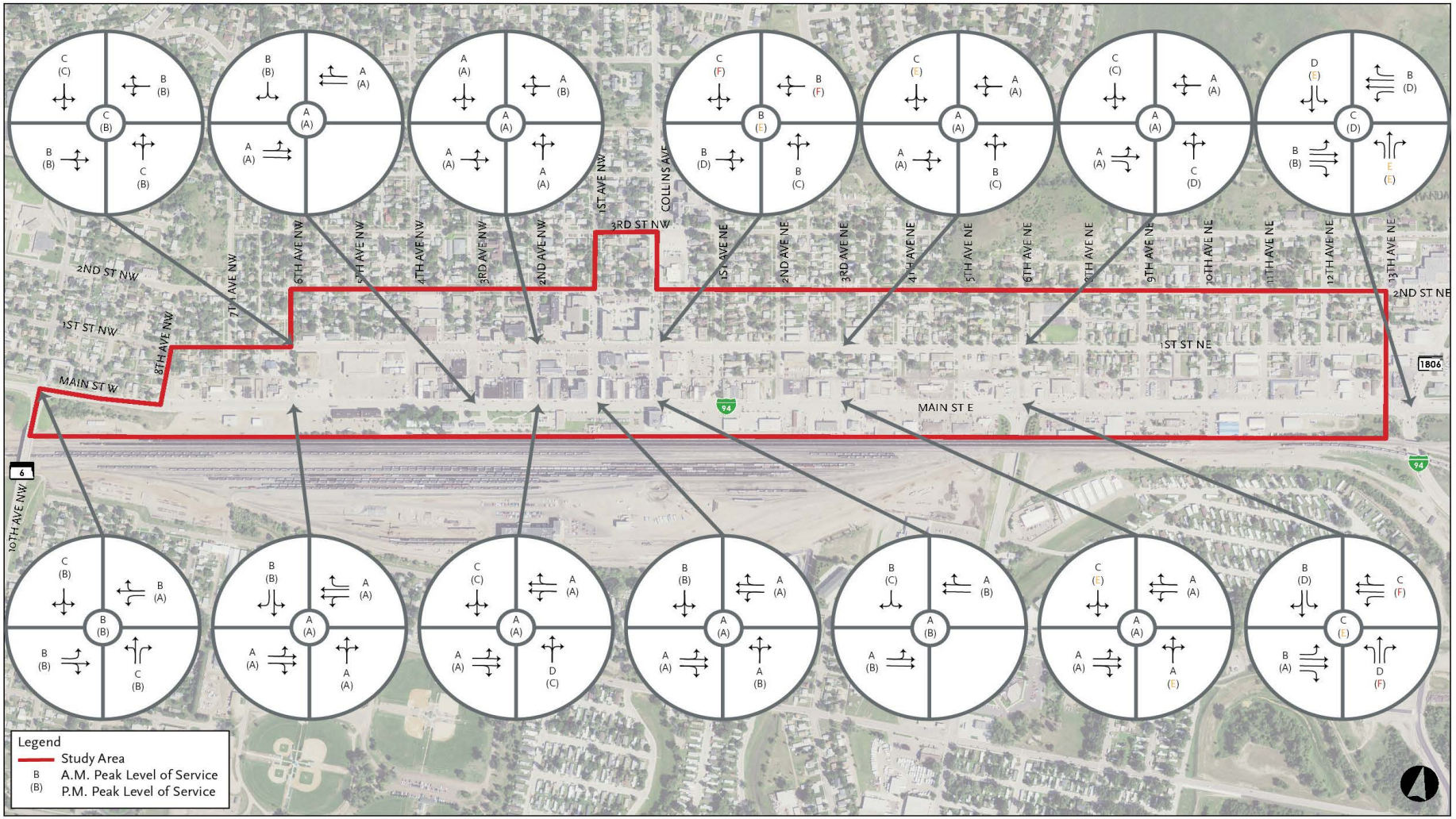


Figure 35: Existing Vehicular Levels of Service

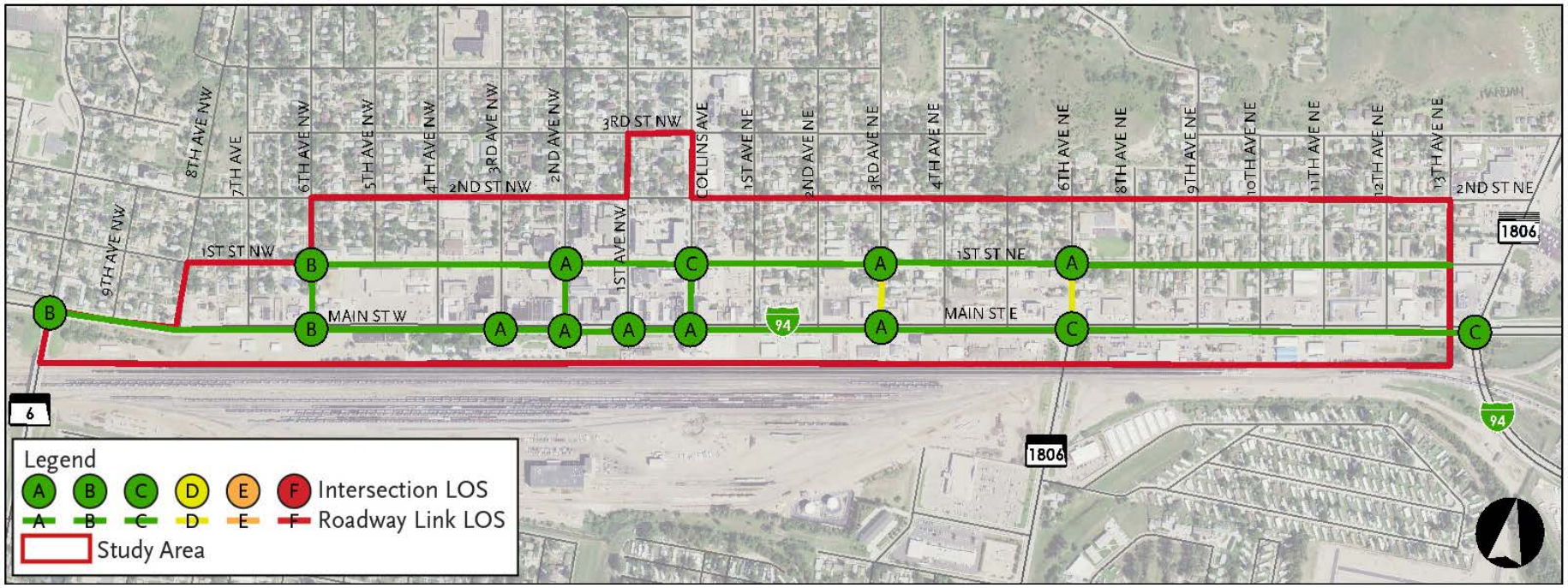
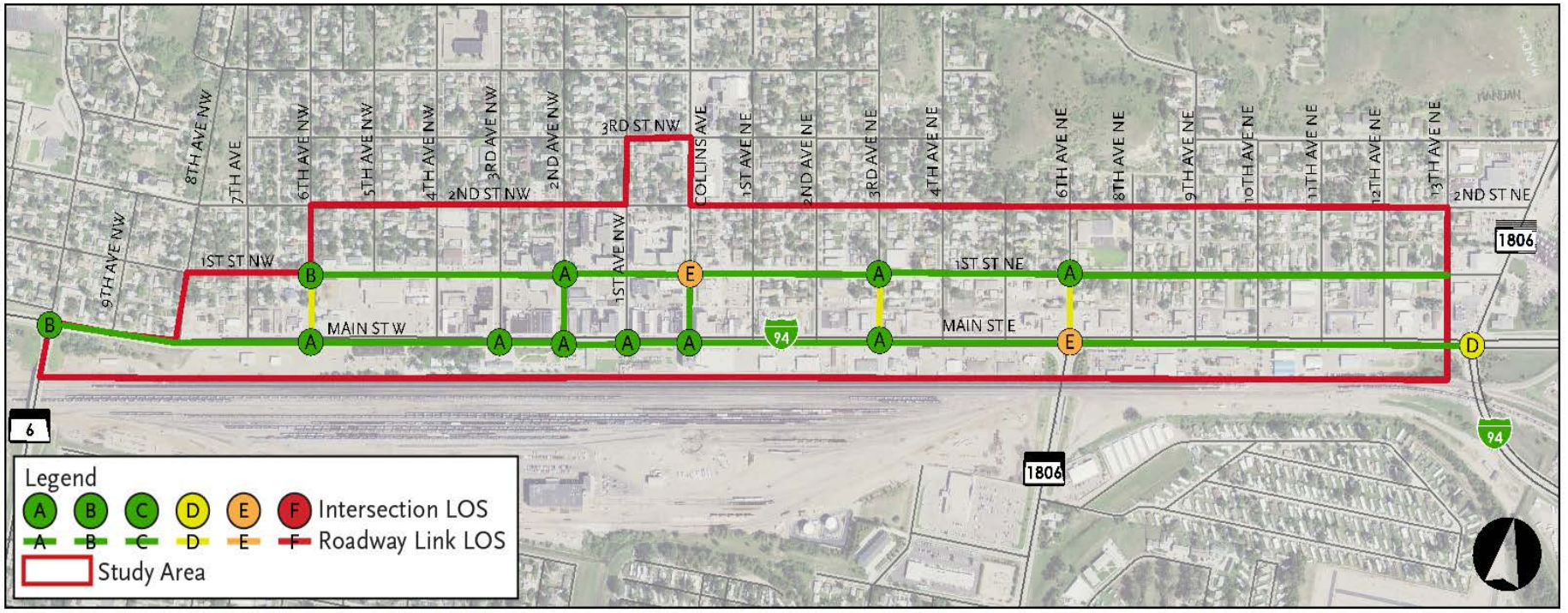


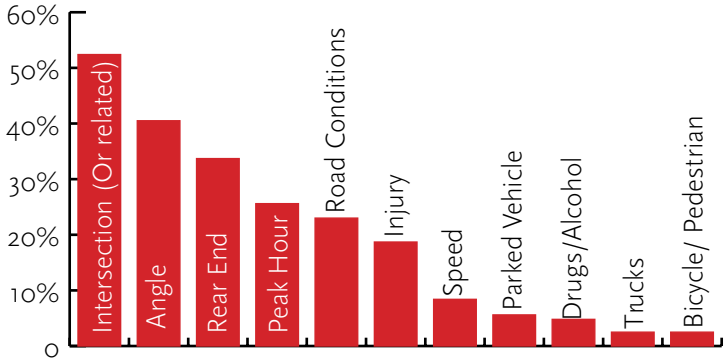
Figure 36: 2040 Projected Vehicular Levels of Service



Crash History

Safety is of utmost importance when evaluating the transportation network, especially in multimodal areas like a downtown; reviewing historic crash information is vital to identifying deficiencies. Five years of crash records (January 1, 2012 through December 31, 2016) obtained from NDDOT shows an average of 79 crashes per year in the study area. This includes 74 crashes resulting in injury (possible injury, non-incapacitating injury and incapacitating injury); there were no fatalities. The National Safety Council (NSC) estimates the economic impact of crashes based on wage and productivity losses, medical and administrative expenses, motor vehicle damage and employer costs due to injuries. Based on this data, the total costs associated with crashes in the study area was $862,400 annually. Crash trends in the study area are shown in Figure 37.

Figure 37: Crash Trends



- 52.4 percent of all crashes in the study area occurred at accesses and intersections. Poor traffic flow, unwarranted traffic control and/or densely spaced access points can contribute to this trend.
- 33.7 percent of all crashes are rear end type crashes. Of these rear end crashes, 55.6 percent occurred during the A.M. or P.M. peak hours, which is disproportionate to the percent of vehicle traffic that occurs during the peak hours.
- Crashes during the A.M. and P.M. peak hours were 22.5 percent of crashes. Including the midday peak hour, peak hour crashes were 36.5 percent of crashes.
- Speed was a contributing factor in 8.4 percent of all crashes, but a contributing factor in nearly half of all weather related (i.e. Road Conditions) crashes.
- Alcohol was involved in 4.8 percent of crashes. Of these crashes, 68.4 percent occurred on a Friday or Saturday night.
- Crashes with parked motor vehicles occurred 23 times (5.8 percent), 75 percent of which were vehicles in parallel parking. However, the type of parking on a roadway segment has a significant effect on segment crash rates: 7.4 crashes per million entering vehicles (MEV) for angle parking; 2.9 crashes per MEV for parallel parking; and 1.7 crashes per MEV for no adjacent parking.
- Crashes involving trucks were just 2.5 percent of all crashes (10 crashes). Six of these were sideswipe crashes and none resulted in injuries.
- There were six bicycle or pedestrian crashes in the study area. Five occurred on Main Street and all resulted in injuries. As pedestrian and bicycle volumes increase in the study area, the crash trend may increase.

No other crash trends were identified.

Crash Hotspots

To identify overrepresented crash locations within the study area, a two-phase approach was adopted. First, crash frequency was studied to identify locations with the highest number of crashes. This is the most straightforward approach to determining locations susceptible to crashes. Figure 38 shows crash frequency.

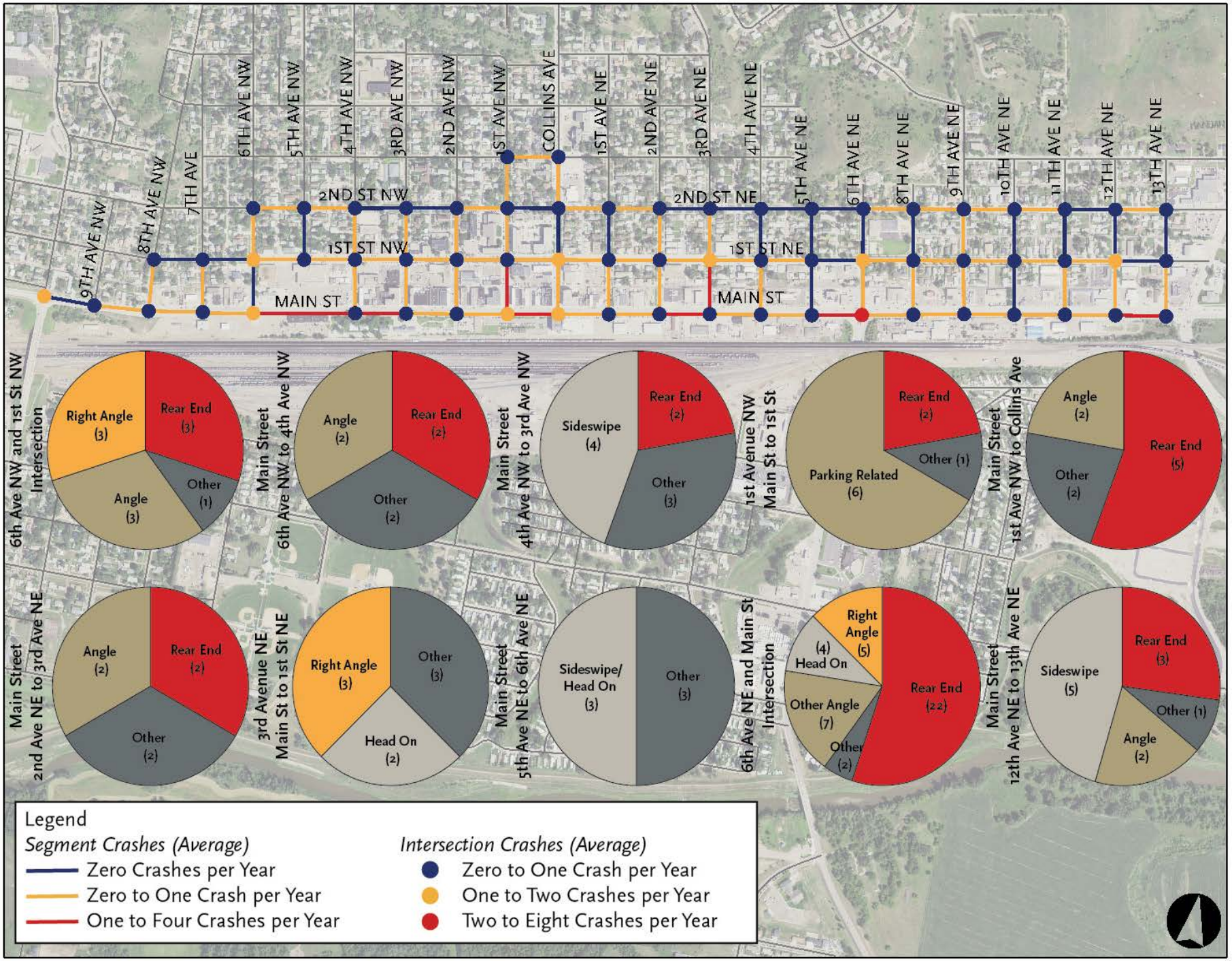
Crash frequency, however, ignores the rate at which crashes occur. Typically, intersections with a high number of crashes also carry high traffic volumes. Many times a low volume intersection may have fewer overall crashes, but on a per car basis have a much higher susceptibility to crashes. Therefore, it is beneficial to identify which locations in the study area experience a statistically high crash rate. To identify statistically significant crash rates, the critical crash rate (CCR) method was used. This method was developed by the Minnesota Department of Transportation and is included in the NDDOT Design Manual. The CCR incorporates traffic volumes and crash rates for a particular location and compares this rate against crash rates for similar intersections and roadway segments within the downtown study area. According to the CCR methodology, intersections with crash rates over the critical rate are considered overrepresented and in need of review. At these locations, there is a high probability that conditions at the site are contributing to the higher crash rate. The following locations were identified:

- 1st Street and 6th Avenue NW
- Main Street and 6th Avenue NE
- Main Street from 4th Avenue NW to 3rd Avenue NW
- 1st Avenue NW from Main Street to 1st Street

These and other crash hotspots and their crash type distributions are included in Figure 38. A summary of identified trends is provided below.

- At the 1st Street and 6th Avenue NW intersection, there were ten crashes. Nine of these crashes were southbound. Of these southbound crashes, six were angle crashes. This suggests that drivers are not complying with the all-way stop control.
- Forty crashes occurred at Main Street and 6th Avenue NE. Of these, 10 of these were eastbound rear end crashes (25 percent); half of these crashes occurred

Figure 38: Crashes in Study Area



during the A.M. or P.M. peak hours. Eighteen were northbound, including seven angle crashes and six rear end crashes. Sight distance is an issue at this location and may require more stringent turn control, like protected left-turn phases or advanced warning beacons.

- Eleven of fifteen crashes (73.3 percent) on Main Street from 6th Avenue NW to 3rd Avenue NW were westbound. Five of these were sideswipe crashes. This trend indicates the parallel parking along this segment of Main Street may be contributing to an increased crash potential.
- Eight of nine crashes on Main Street from 1st Avenue NW to Collins Avenue are westbound, including four of the five rear end crashes. The traffic control signal at 1st Avenue NW is currently unwarranted, which could contribute to the rear end crash potential. This crash trend will be mitigated with fiber interconnect, coordination and improved signal timing.
- Nine crashes occurred on 1st Avenue NW from Main Street to 1st Street NW. Six were rear end, rear to side or rear to rear, likely associated with the angle parking.
- Of the six crashes that occurred on Main Street from 5th Avenue NE, three were east-west head on/sideswipe crashes that occurred during the peak hours. Even though medians are in place, the high volumes, channelized turns and access density increases friction on this roadway segment.

NDDOT Crash Trends

With the traffic operations study completed in October 2016, NDDOT found the following crash trends.

- Main Street and 2nd Avenue NW had limited sight distance due to vehicles parking too close to the intersection, resulting in southbound to eastbound left-turning angle crashes.
- The unwarranted traffic control signal at Main Street and 1st Avenue NW experienced a red light running trend.
- Two pedestrian crashes occurred at Collins Avenue and Main Street where a driver attempted to make a southbound to eastbound left-turn on green and hit a pedestrian in the crosswalk. The study recommended a leading pedestrian interval for pedestrians crossing Main Street.
- The northbound angle crash trends may be mitigated with left-turn phasing.

Access Management

Access management is the process of balancing the competing needs of traffic movement and land access. Accesses introduce conflict and friction into the traffic stream. Allowing dense, uncontrolled access spacing results in safety, operational and aesthetic deficiencies for all users:

- According to NCHRP Report 420: Impact of Access Management Techniques, every unsignalized driveway increases the corridor crash rate by approximately two percent.
- Research included in the Highway Capacity Manual found that roadway speeds were reduced an average of 2.5 miles per hours for every ten accesses per mile.

In the Downtown Mandan study area, there were 447 accesses inventoried. There are currently no ordinances or guidelines for accesses within downtown Mandan. Table 10 provides a summary of the accesses within the study area.

Table 10: Access Summary

Access Type	Number	Percent of All Accesses
Alley	65	14.5%
Commercial Driveway	114	25.5%
Residential Driveway	204	45.6%
Roadway	64	14.3%
Total	447	100.0%

Accesses were assigned points based on the roadway classification they are located on and the type of land use they connect. The points are representative of the risk. Commercial driveways and principal arterials see much higher traffic and thus the potential for crashes is greater. For example, a commercial access on Main Street would receive a score of six points, while a single family residential driveway on a local roadway would receive zero points.

- 3 Points: Principal Arterial
- 2 Points: Minor Arterial
- 1 Point: Collector Roadway
- 0 Points: Local Roadway
- 3 Points: Commercial Access
- 2 Points: Alley
- 1 Point: Multi-Family Residential
- 0 Points: Single Family Residential

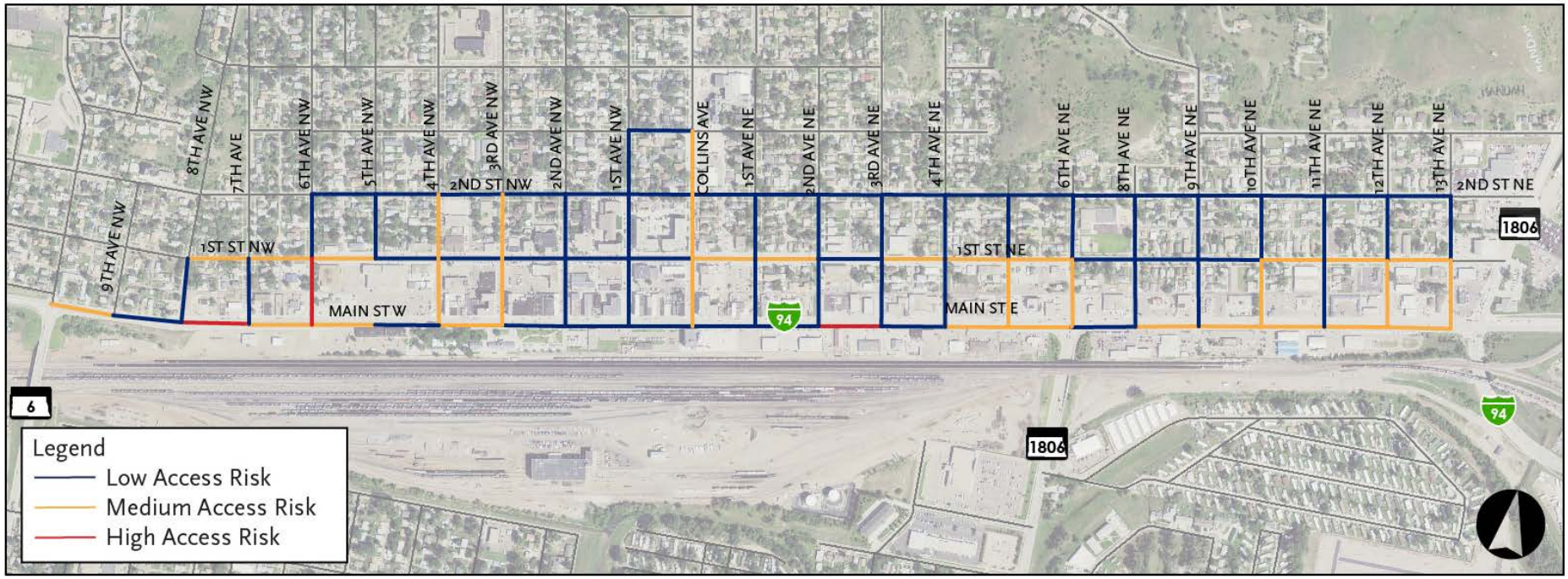
The points were aggregated to the roadway segment to identify the most significant needs for access management, most of which are on Main Street, shown in Figure 39.

» There were three high risk segments, including two on Main Street and one on 6th Avenue NW.

- The M&H Gas Station has four accesses on Main Street between 2nd Avenue NE and 3rd Avenue NE along with three accesses to the alleyway north of the property and accesses on both 2nd Avenue NE and 3rd Avenue NE. The redundant accesses on all sides of the M&H property can likely be consolidated without impeding accessibility to the property.
- Small properties and business uses (towing, used car sales and warehousing) that benefit from dedicated entrances and exits will make mitigating access risk difficult at the Main Street segment between 8th Avenue NW to 7th Avenue NW.
- The commercial uses on 6th Avenue NW between Main Street and 1st Street increase the access risk. Many of the locations have consolidated access already and are unlikely to give up additional access to their properties.

Figure 40: Example Access Issues at Main Street

Figure 39: Access Management Needs



Traffic Control

Appropriate traffic control is essential for efficient traffic operations and crash mitigation. Selecting the appropriate traffic control device requires consideration of traffic patterns, volumes, roadway geometry and lane configurations. The Manual for Uniform Traffic Control Devices (MUTCD) provides guidance and standards on the installation of traffic control methods, including traffic control signals, two-way stop control (TWSC) and all-way stop control (AWSC). The guidance and standards consider vehicular volume, pedestrian volume and crash frequency thresholds for multiple roadway contexts.

Warrant analysis was completed for the fourteen study intersections and the results are presented in Table 11. Meeting or not meeting warrants does not explicitly trigger traffic control construction or removal. Rather, this is blended with engineering judgment to make a determination. This will be a key consideration during scenario analysis and alternatives development later during this study.

The following is a summary of traffic control in the study area:

- There are six study intersections, all on Main Street, with traffic control signals. Only three of these intersections meet warrants under current traffic conditions.
  - The traffic operations study completed by NDDOT found the Main Street and 10th Avenue NW and Main Street and 1st Street NW did not meet current or future (2035) signal warrants. NDDOT has recommended the removal of both of these traffic signals.
- There are three study intersections, all on 1st Street, with all-way stop control. 1st Street NW at 6th Avenue NW and 1st Street N at Collins Avenue meet all-way stop control vehicular volume warrants, currently. The 1st Street NW at 2nd Avenue NW intersection does not meet all-way stop control vehicular volume warrants under current or future conditions. This is due to the low volumes on 2nd Avenue NW, which sees around 100 cars during the peak hour; the minimum volume on minor approaches to meet the AWSC warrant is 200 vehicles in the eighth hour.
- No study intersections meet, or are close to meeting, warrants based on pedestrian volumes.

Table 11: Summary of Traffic Control Warrants at Study Intersections

Location	Current Control	Meets Signal Warrants Under Current Conditions	Meets Signal Warrants Under 2040 Conditions	Summary
Main Street and 10th Avenue NW	Signal		√	NDDOT found intersection does not meet any warrant by 2035 & recommended removal. Expected to meet signal warrants by 2040.
Main Street and 6th Avenue NW	Signal		√	NDDOT found intersection meets warrants by 2035.
Main Street and 3rd Avenue NW	Signal	√	√	Meets signal warrants currently. NDDOT recommended to maintain signal & improve timings & pedestrian recall.
Main Street and 2nd Avenue NW	TWSC			Will not meet signal warrant by 2040, but does meet TWSC warrant currently.
Main Street and 1st Avenue NW	Signal			NDDOT found intersection does not meet any warrant by 2035 & recommended removal. Will not meet by 2040.
Main Street and Collins Avenue	Signal	√	√	Meets signal warrants currently. NDDOT recommended to maintain signal & improve timings & pedestrian recall.
Main Street and 3rd Avenue NE	TWSC			Will not meet signal warrant by 2040, but does meet TWSC warrant currently.
Main Street and 6th Avenue NE	Signal	√	√	NDDOT recommended to maintain signal &improve timings and pedestrian recall. Install Flashing Yellow Arrows for the east approach.
1st Street NW and 6th Avenue NW	AWSC			Will not meet signal warrant by 2040, but does meet AWSC warrant currently.
1st Street NW and 2nd Avenue NW	AWSC			Will not meet signal warrant or AWSC warrant by 2040.
1st Street N and Collins Avenue	AWSC		√	Meets AWSC warrant currently. Will meet signal warrant by 2040.
1st Street NE and 3rd Avenue NE	TWSC			Meets TWSC warrant currently. Will not meet AWSC or signal warrant by 2040.
1st Street NE and 6th Avenue NE	TWSC		√	Meets TWSC warrant currently. Will not meet AWSC or signal warrant by 2040.

Pedestrian, Bicycle & Transit Environment

In urban areas, especially downtowns, alternative modes of transportation are important components of the transportation system. The following sections will focus on walking, biking and transit.

Complete Streets

Enhancing the ability of people to walk or bike involves providing adequate infrastructure and linking urban design, streetscapes and land use to encourage walking and biking. Designing roadways to accommodate all types of users is commonly termed "complete streets". This type of roadway design offers many benefits:

- Streets designed with sidewalks, raised medians, traffic-calming measures and treatments for travelers with disabilities improves pedestrian safety. Research has shown that sidewalks alone reduce vehicle-pedestrian crashes by 88 percent.
- Multiple studies have found a direct correlation between the availability of walking and biking options and obesity rates. The Centers for Disease Control and Prevention recently named adoption of complete streets policies as a recommended strategy to prevent obesity.
- Complete streets offer inexpensive transportation alternatives to roadways. A recent study found that most families spend far more on transportation than food.
- Research has found that people who live in walkable communities are more likely to be socially engaged and trusting than residents living in less walkable communities.

Walkability

Walkability refers to the attractiveness of an area for pedestrians. Factors that may impact walkability include pedestrian generators and land use diversity; sidewalk presence, quality and width; and the built and natural environment.

Pedestrian Activity

Pedestrian data (Figure 42) collected indicates moderate pedestrian activity along 1st Street in the downtown core area with fewer pedestrians in other parts of the study area. It is important to note that the pedestrian data was collected during mid-January, where the daily high temperature never exceeded 10 degrees Fahrenheit, which is not conducive for pedestrian activity. Furthermore, only peak hour data was collected and additional activity may occur outside the vehicular peak hours.

Pedestrian & Bicycle Generators

Pedestrian and bicycle generators are types of land uses or attractions that people are inclined to walk or bike to access such as a school, park, coffee shop or restaurant.

Figure 41: Locations of Pedestrian and Bicycle Generators

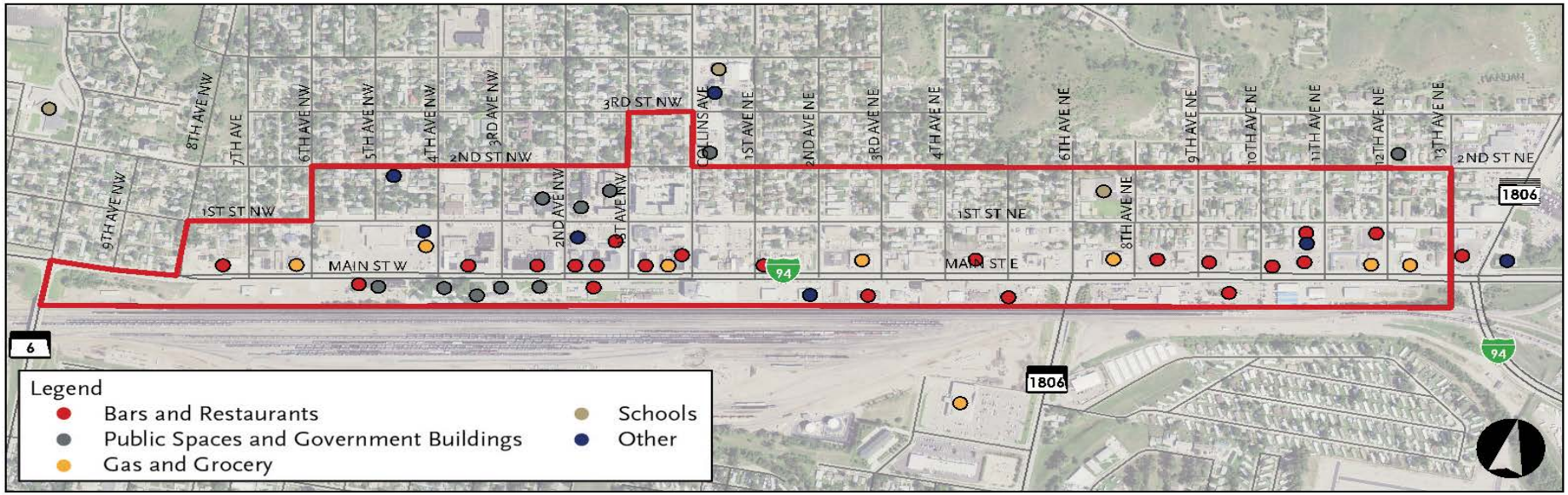


Figure 42: Pedestrian and Bicycle Counts

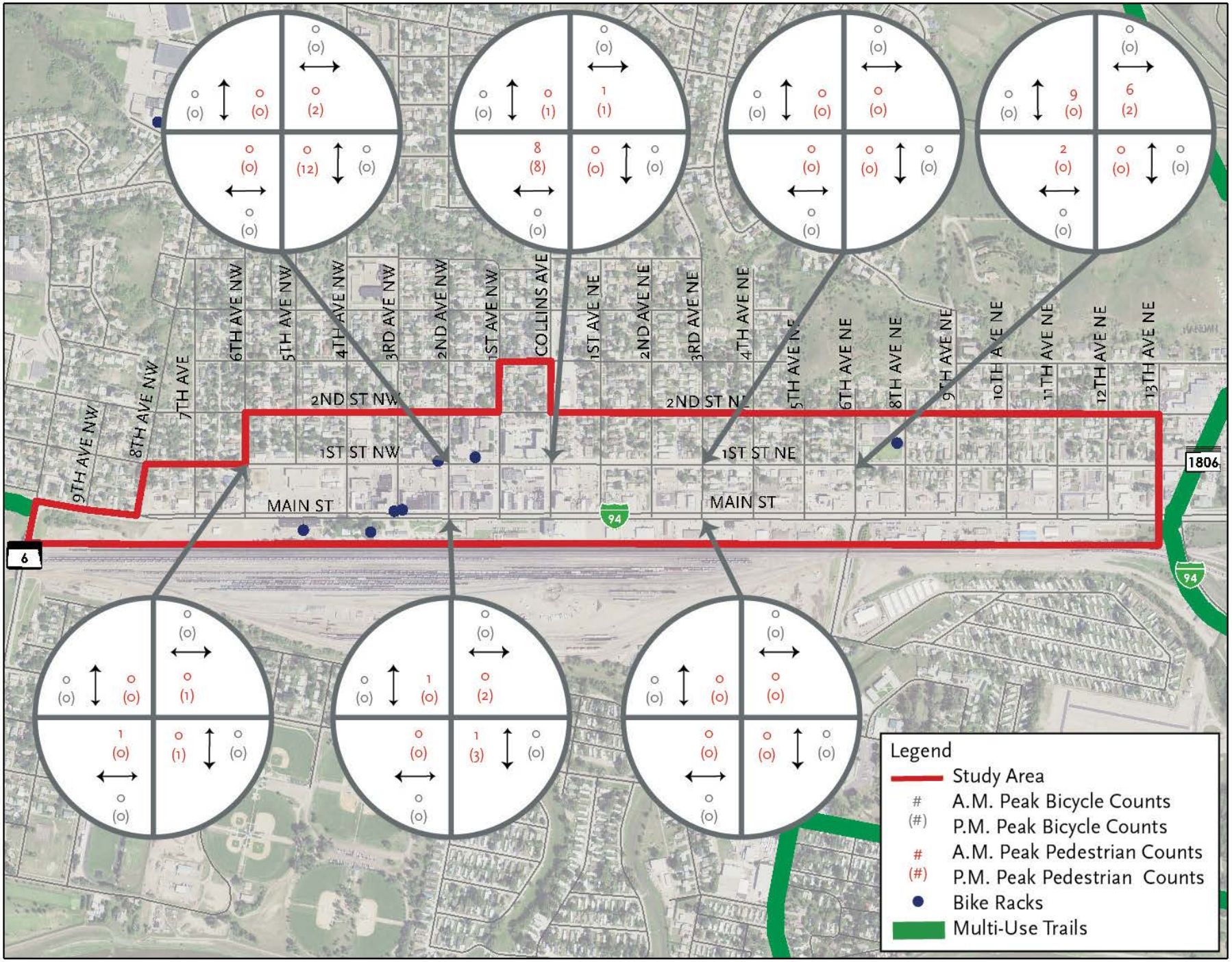
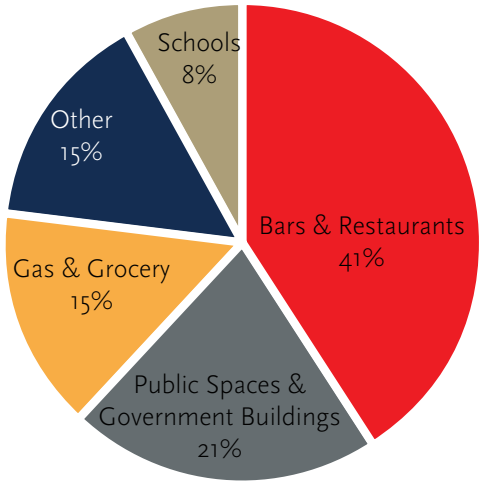


Figure 43: Pedestrian and Bicycle Generators by Type



More than fifty generators were identified in and around the downtown Mandan study area. Almost half of the identified generators are bars and restaurants (41 percent), followed by public spaces and government buildings (21 percent).

Providing safe and efficient access to these generators can improve connectivity and encourage people to walk or bike to them. Most of Mandan's residential development is connected to the downtown area with sidewalks.

Sidewalk Presence

The City of Mandan requires all properties to construct sidewalks before occupancy, unless an agreement or plan specifies otherwise. This is reflected throughout the downtown subarea, which are provided on both sides of all roadways in the study area. Most sidewalks on Main Street and 1st Street are approximately eight-feet wide. However, along 2nd Street and most north-south roadways in the study area, most sidewalks are approximately six-feet wide.

Americans with Disabilities Act Compliance

The Americans with Disabilities Act (ADA) provides design standards for pedestrian paths and curb ramps in the 2010 ADA Standards for Accessible Design. The basic requirements address width and condition, surfaces, curb ramps and flares, location and placement of pedestrian push buttons and slopes for pedestrian paths and curb ramps. Beyond the federal law that requires ADA compliance, meeting with standards improves accessibility and comfort for all users. A full evaluation of ADA compliance is outside the scope of this study. During the field review the following items were noticed:

- Detectable warning panels indicate to a pedestrian with visual impairments that a potential conflict area is approaching. Detectable warning panels are inconsistently provided in the study area.
- Narrow sidewalks, missing curb ramps and steep slopes could prevent a pedestrian in a wheelchair from traveling a sidewalk safely and easily.
  - Most sidewalks in the study area are six or eight feet wide, but when signs, signal standards, light posts or street furniture are placed in the sidewalk it reduces the width and makes the sidewalk impassable.
  - In the more residential areas of the study area, curb ramps are absent at intersections.
- Broken or obstructed sidewalks are dangerous to pedestrians with visual impairments and can make traversing the sidewalk difficult for pedestrians in wheelchairs.

ADA requirements were used as a proxy for sidewalk quality in the study area.

Figure 44: ADA Non-Compliance Examples


No Ramp at 2nd Street & 2nd Avenue NE


Narrow Sidewalk at 2nd Street & 8th Avenue NE


No Detectable Warning Panel, Obstructions & Broken Concrete at 1st Street & 3rd Avenue NW

Effective Width

Research presented in the Highway Capacity Manual (HCM) found that pedestrians generally keep 18 inches between themselves and adjacent walls, curbs and other obstructions, resulting in sidewalks that have less usable space than their design space, also known as effective width. Effective width is determined by deducting 18 inches next to walls and curbs and 12 inches next to all other obstructions.

Several corridors throughout the study area have no boulevards between the sidewalk and roadway, along with light and sign posts placed within the sidewalk. This leaves many locations with an effective width less than the actual width. Several locations throughout the study area have effective widths just one to two feet. These areas are inaccessible to people in wheelchairs and unpleasant for other users. Three examples are listed below and shown in Figure 45:

- Main Street at 2nd Avenue NW has a light pole within the eight foot sidewalk.
- A light pole and utility box are near each other along 1st Street NW near 1st Avenue NW.
- A guardrail and the potential for overhanging vehicles exist on the west side of Collins Avenue between Main Street and 1st Street.

In the more residential areas of the study area, blocks north of 1st Street between Collins Avenue and 13th Avenue NE, most areas have grassy boulevards between the sidewalk and roadway. Sign and light poles are typically placed within the boulevard. The effective width within this portion is comparable to the actual sidewalk width.

Crossing Locations

There are six signalized intersections along the Main Street corridor in the study area ranging from less than one-tenth mile apart to nearly a half-mile apart. All six signals include pedestrian phases, with Main Street at 10th Avenue NW and Main Street at 6th Avenue NE require pedestrian actuation.

While a pedestrian can cross the roadway at any intersection, marked and traffic controlled intersections are more desirable and increase safety. Marked crosswalks alone do not improve pedestrian safety and should be used with other safety strategies, like refuge islands, curb extensions and appropriate signage. Improved pedestrian crossings are available in the downtown core where pedestrian activity is expected to be higher:

- Main Street has eight painted intersections, including six between 5th Avenue NW and Collins Avenue. Six of these are controlled intersections, with distances up to a half-mile. Research has shown pedestrians are unlikely to walk longer distances to use a protected crossing and will choose a more convenient crossing, even if it is less safe. Alternative control like rectangular rapid flashing beacons may be appropriate.
- 1st Street has colored pavement in the crosswalks between 5th Avenue NW and Collins Avenue as well as near Custer Elementary. When lit, the colored pavement can bring additional attention to the crosswalks, but is difficult to see at night.
- Collins Avenue has marked crosswalks at 3rd Street, 2nd Street, 1st Street and Main Street. The Main Street crossing is controlled with a traffic signal; the 1st Street and 2nd Street crossings have all-way stop control. At 3rd Street, there is two-way stop control on 3rd Street, with flashing beacons to alert drivers to pedestrians crossing Collins Avenue.

Strategies for safe pedestrian crossings will be evaluated in subsequent chapters.

Figure 45: Effective Width Examples

Built and Natural Environment

The built and natural environment can have many positive effects on the transportation network, particularly to encourage walking and bicycling. Desirable streetscapes typically include street furniture, greenery, lighting, wayfinding, etc. Expansive concrete, unlit areas, cluttered sidewalks, trash etc. contribute to the perception of an unappealing and potentially unsafe environment.

1st Street in the downtown core has wide sidewalks, buffered by on-street parking, street furniture, greening and colored pavement and in most places is a very inviting place to walk. However, at certain locations, light poles are placed in the middle of sidewalks, constricting effective width; additionally, multiple light pole structures are used and lack of banners and other branded wayfinding cause 1st Street to lose its sense of place.

Main Street has a very different set of aesthetics. Sidewalks on the north side of Main Street in the downtown core area, from 4th Avenue NW to 2nd Avenue NE are wide, buffered from the roadway with on-street parallel parking, but street furniture, light poles and signs impact the effective width of the sidewalk. In this same area, sidewalks on the south side of Main Street are not buffered from the roadway, but most signs and light poles are not within the sidewalks.

Figure 46: Environment in Study Area

Pedestrian Quality of Service

A variety of metrics can be used to reflect the pedestrian quality of service and walkability in the study area.

Walk Score

Walk Score measures the walkability of an address based on the walking routes to nearby amenities, based on distance to amenities, population density and the built and natural environment.

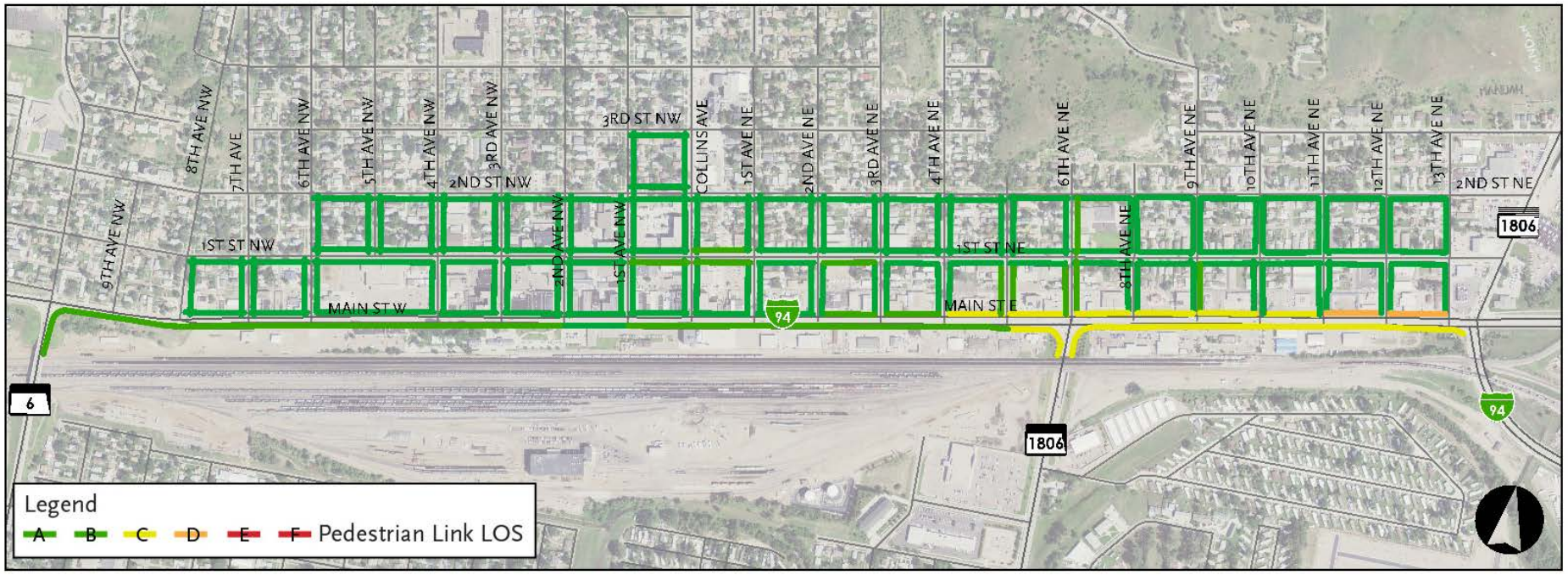
Using the intersection of Main Street and Collins Avenue, downtown Mandan has a walk score of 73. This score is very walkable, where most errands can be accomplished on foot. Moving the point to 6th Avenue NE or 6th Avenue NW, the walk score drops to 69 and 67 respectively, representing a somewhat walkable area where some errands can be accomplished on foot.

Pedestrian Level of Service

NCHRP 616: Multimodal Level of Service Analysis for Urban Streets provides a formula to calculate a pedestrian level of service for an area that is reflective of the perspective of pedestrians sharing the environment with vehicles. This formula incorporates the existence of sidewalks, separation from motorized vehicles, vehicle volumes and speeds. Elements of his methodology were incorporated into the 6th Edition of the Highway Capacity Manual (HCM). However, this methodology was found to be preferable over the HCM methodology because of its focus on the user perception. The specific pedestrian facilities' level of service is shown in Figure 47. Overall, the downtown study area has an average level of service "A".

Even though this methodology points to LOS "A" for pedestrians, there are still issues to resolve: crossing Main Street safely, aesthetics, lighting, ADA accessibility and pavement maintenance. These elements are not well accounted for in the NCHRP 616 methodology.

Figure 47: Pedestrian Level of Service



Bicycle Facilities & Amenities

Downtown Mandan connects two multi-use trails on either side of the study area. Within a commercial area bicyclists are prohibited from using the sidewalk according to Mandan ordinances. The bicycle data collected for this study did not indicate any bicycle activity in the study area (Figure 42), however, during the field review bicyclists were seen riding on the sidewalk. Of note, bicycle data was collected in mid-January, where the daily high temperate never exceeded 10 degrees Fahrenheit. Additionally, the extent of the data collected and processed was limited to A.M. and P.M. peak hours and that additional activity may occur outside these peak hours.

Bicycle Facilities

Currently there are no dedicated on-street or off-street bicycle facilities. The LRTP identified a short-term/mid-term striping project between 2024 and 2032 to provide on-street bicycle facilities along 1st Street, which could connect with other regional trails.

The 1st Street corridor could be challenging for bicyclists due to the angled parking throughout the downtown core and the degrading pavement conditions. Alternatively, the Main Street corridor has high volumes, high speeds, heavy truck traffic and parallel parking which would be equally unappealing to bicyclists.

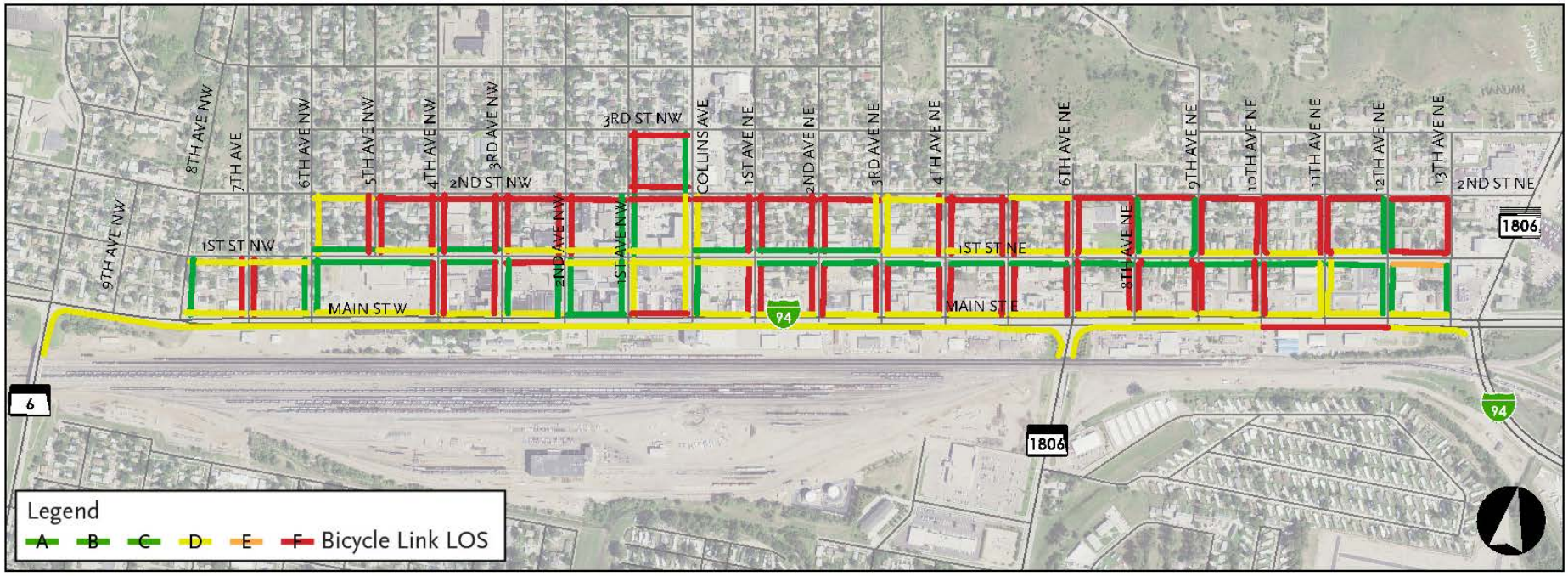
Current ordinances prohibit bicyclists from riding on sidewalks and the current effective widths of most sidewalks would be uncomfortable for bicyclists and pedestrians.

During later stages of this study, bicycle facility alternatives will be evaluated.

Bicycle LOS

NCHRP 616: Multimodal Level of Service Analysis for Urban Streets also provides a formula to calculate the bicycle level of service for an area that is reflective of the perspective of bicyclists sharing the environment with vehicles. This formula incorporates the travel lane width, vehicle volumes, speeds, heavy truck traffic and pavement condition. Elements of his methodology were incorporated into the 6th Edition of the Highway Capacity Manual (HCM). However, this methodology was found to be preferable over the HCM methodology because of its focus on the user perception. The specific bicycle facilities' level of service is shown in Figure 48. Overall, the downtown study area has an average level of service "F".

Figure 48: Bicycle Level of Service



Transit

Effective April 1, 2017, The Bismarck-Mandan Capital Area Transit (CAT) will make major service changes, including streamlining from 12 routes to six routes with one-hour headways running Monday through Friday from 6:30 A.M. to 7:00 P.M. and Saturday from 8:00 A.M. to 7:00 P.M. These service changes will include a fare increase. The revised routes for Mandan, as shown in Figure 49, will still include two routes, however shortened and less duplicative. M-1, New Purple Route, runs from Bismarck west on I-94 onto 1st Street, north on Collins and then south on Sunset Drive/6th Avenue NW. M-2, New Brown Route, begins at Dan's Supermarket south of the study area and runs west on Memorial Highway to Bismarck. Both M-1 and M2 run on one hour headways. These transit service changes reduce headways, but still only run in one direction, requiring a passenger to ride the entire loop or walk further to get on the bus at another part of the route.

Transit Supportive Densities

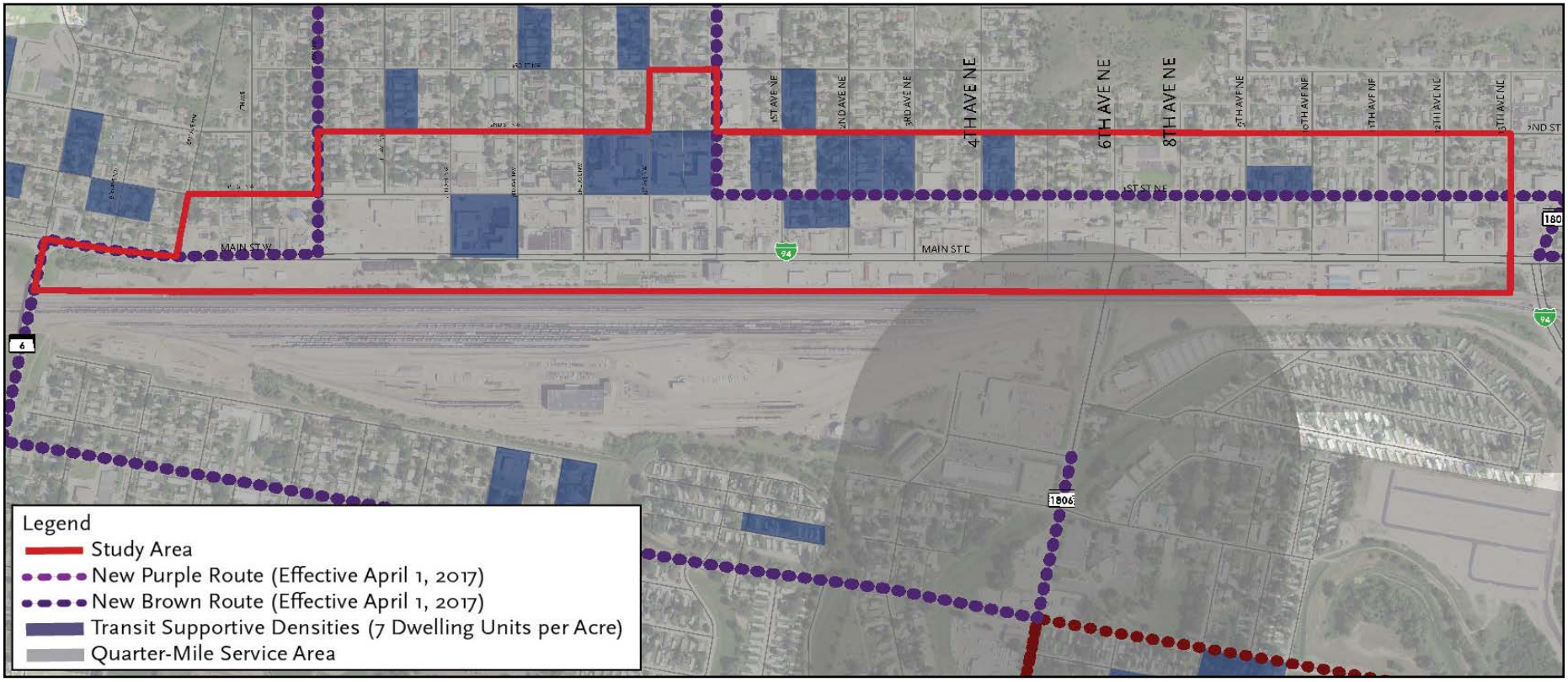
Research points to a direct correlation between transit demand and residential and employment density, measured in units per acre. Specifically, a minimum of seven dwelling units per acre or 25 jobs per acre is required to fully support a fixed-route hourly transit system. However, in places like Mandan, where auto-ownership rates are very high and congestion is reasonable, transit predominantly serves a social service function. As congestion begins to build metro-wide, transit will increasingly offer an alternative to the single occupancy vehicle, while also spurring pedestrian and bicycle activity.

Using 2010 Census data, dwelling units per acre at the block level was used to identify transit supportive densities in the subarea. Employment data was not used because it is not available at a small enough geography. There are some transit supportive densities within the study area, all of which are located within one-quarter mile of the current and revised routes. Given the age of the data set, it is likely with additional residential development that has occurred there are even more transit supportive densities in the study area.

Transit Level of Service

Given the limited service hours, frequency and stops in the study hour, combined with the pedestrian facilities, transit level of service in the study area is "F" based on the HCM Standards and analysis.

Figure 49: Transit Service



Parking Environment

The right balance must be struck between not providing enough parking, which would deter individuals from patronizing existing and future businesses, and providing too much parking, which has negative environmental impacts through increased impervious surface, financial impacts by using space for parking instead of taxable developments and the perception that downtown is a low activity center.

The parking analysis completed focused on the core of Downtown Mandan, a subsection of the overall Downtown Mandan study area. The City of Mandan last conducted a downtown parking study in 2009. The nature of the parking analysis completed for this study matched that of the 2009 downtown parking study. This replication allowed the study team to properly compare the changes over the past eight years.

Parking Supply

The City of Mandan's downtown parking ordinance does not require developers to provide parking; the city is to be responsible for providing parking. This matches a trend across the country where the purpose, function and need of parking spaces and dedicated parking lots have evolved to support a more bikeable and walkable environment.

The parking available for the downtown core business district is summarized in Table 12. There are a total of 2,484 parking spots available with 50.5 percent of the spaces managed and controlled by the City of Mandan. Figure 50 shows the location and type of parking within the downtown parking study area.

For this parking study, any parking location that was signed as reserved or privately owned was listed as private parking whereas parking that is available to the general public is classified as public parking. For parking locations not clearly marked (i.e. residential streets), the number of parking spaces available were estimated. The City of Mandan has implemented specific locations that are classified as 90-minute parking.

Table 12: Parking Availability

Parking Type	Number of Available Spaces
90-Minute On-Street Parking	551
Unmarked On-Street Parking	408
Public Off-Street Parking	294
Private Off-Street Parking	1,231
Total Parking Spaces	2,484

Parking Demand

Two types of parking studies were conducted within the downtown parking study area to determine parking demand. A turnover and occupancy study was conducted for a typical weekday (Tuesday, January 10th from 9 A.M. to 9 P.M.); and an occupancy study was conducted for a typical weekend (Saturday, January 14th from 9 A.M. to 5 P.M.). The turnover and occupancy studies' counts were completed in three hour windows, similar to the 2009 parking study for proper comparison.

Occupancy Study

Parking occupancy is reflective of the activity in an area. Low parking occupancy suggests no activity, while fully occupied occupancy is a deterrent to many visitors. Industry standards suggests 85 percent is the optimal occupancy rate. It ensures that parking is available for most users without "cruising".

Parking occupancy data was collected by physically tallying each vehicle in each potential parking location within the downtown parking study area.

Weekday Occupancy Study

The following occupancy trends were observed for the weekday occupancy study:

- The peak weekday parking occupancy for downtown Mandan occurred between 12 noon and 3 P.M. The parking occupancy for this peak was just 35.4 percent (Table 13).
- Demand for private off-street parking facilities accounts for 50.9 percent of parking demand throughout the day.
- Parking occupancies remain fairly consistent between typical workday hours (9 A.M. to 6 P.M.), averaging between 30 and 35 percent occupancy.
- After typical business hours,the total usages drops to 17 percent. This low occupancy is not typical of active downtowns.

Figure 51, Figure 52, Figure 53 and Figure 54 shows occupancy for each of the four weekday study periods.

Table 13: Weekday Parking Occupancy

	Unmarked On-Street (560 Spaces)	90-Minute On-Street (399)	Public Off-Street (294)	Private Off-Street (1,231)	Total (2,484)
9 A.M. to 12 Noon	33%	30%	35%	34%	33%
12 Noon to 3 P.M.	34%	40%	35%	34%	35%
3 P.M. to 6 P.M.	22%	31%	21%	30%	27%
6 P.M. to 9 P.M.	15%	23%	7%	18%	17%

Weekend Occupancy Study

The following occupancy trends were observed for the weekend occupancy study:

- The peak weekend parking occupancy for downtown Mandan occurred between 1 P.M. and 3 P.M. The parking occupancy for this peak was just 21 percent.
- Parking occupancy varied by less than 100 vehicles throughout the day, with the peak period of 1 P.M. to 3 P.M. having 519 vehicles and the lowest period of 9 A.M. to 11 A.M. having 427 vehicles. This is a four percent fluctuation of parking demand throughout the weekend day.

Figure 55, Figure 56, Figure 57 and Figure 58 shows occupancy for each of the four study periods.

Table 14: Weekend Parking Occupancy

	Unmarked On-Street (560 Spaces)	90-Minute On-Street (399)	Public Off-Street (294)	Private Off-Street (1,231)	Total (2,484)
9 A.M. to 11 A.M.	14%	22%	13%	18%	17%
11 A.M. to 1 P.M.	16%	25%	22%	21%	21%
1 P.M. to 3 P.M.	16%	36%	20%	19%	21%
3 P.M. to 5 P.M.	14%	31%	20%	16%	18%

Turnover Study

Parking turnover is an indicator of how a specific parking space or lot is utilized throughout the day. Parking locations that experience high turnover often see a significant influx of vehicles throughout the day, like a restaurant or shopping center, whereas parking locations that experience low turnover often see generally lower vehicular activity, like apartments.

Turnover and time limitations are important to control parking utilization. No time limits, and employees and residents will use valuable commercial spaces with negative impacts to businesses. Too short of a time limit and patrons do not have enough time to visit multiple businesses.

The parking turnover study was conducted by utilizing a license plate survey, which records each individual license plate in each parking location during each time period. A time comparison analysis is then conducted to determine the proportion of new and existing vehicles between each time period.

Weekday Turnover Study

The following turnover trends were observed for the weekday turnover study:

- The morning turnover (45 percent) was considerably lower than the afternoon (64 percent) and evening turnover (67 percent).
- On-Street parking experiences higher turnover than off-street parking.
- High turnover in private off-street parking lots correspond with very minimal parking activity in the evening.

Table 15: Weekend Parking Occupancy

9 A.M. to 3 P.M.	
Type	% Turnover
Unmarked On-Street	48%
90-Minute On-Street	71%
Public Off-Street	41%
Private Off-Street	36%
Total	45%
12 Noon to 6 P.M.	
Type	% Turnover
Unmarked On-Street	73%
90-Minute On-Street	93%
Public Off-Street	74%
Private Off-Street	48%
Total	64%
3 P.M. to 9 P.M.	
Type	% Turnover
Unmarked On-Street	67%
90-Minute On-Street	86%
Public Off-Street	86%
Private Off-Street	58%
Total	67%

Parking Violations

During the weekday turnover study, 64 parking violations were observed in the 90-minute on-street parking zones, as shown in Table 16. The following parking violation trends were observed:

- 35 parking violations (55 percent) occurred between 9 A.M. and 12 Noon.
- Nearly 60 percent of parking locations occurred in close proximity at four locations.
  - North side of 1st Street NW between 1st Avenue NW and Collins Avenue
  - East side of 1st Avenue NW between 1st Street NW and 2nd Street NW
  - East side of 2nd Avenue NW between 1st Street NW and 2nd Street NW
  - West side of 2nd Avenue NW between 1st Street NW and 2nd Street NW

These violations appear to be attributed to increased activity at the Morton County Courthouse and the easing of 90-minute restrictions.

Table 16: Parking Violations

Time Periods	Number of Parked Vehicles in 90 Minute Parking	Number of Violations	% Violations
9 A.M. to 12 Noon	119	35	29%
12 Noon to 3 P.M.	161	12	7%
3 P.M. to 6 P.M.	125	17	14%
Total	405	64	16%

Parking Availability Index

For outdoor and uncovered conditions, as typical throughout downtown Mandan, research has found 400-feet to walk is considered a LOS "A", 800-feet a LOS "B", 1,200-feet a LOS "C" and 1,400 for LOS "D". This study assumed a LOS "B" would be acceptable for downtown Mandan, which is often a shorter distance than many big box parking lot distances and equates to an average walking distance of one block. As more activity and sites of interest are developed in downtown Mandan, patrons may be willing to walk longer distances.

For example, the Main Street free parking lots at 1st Avenue NW and 2nd Avenue NW could be expected to serve the Main Street blocks between Collins Avenue and 3rd Avenue NW but could not reasonably be expected to serve the City of Mandan and Morton County activities north of 1st Street NW.

Through the parking analysis it was found that for each downtown parking study area block, over 50 percent of the parking spaces within one block were found to be available. The four blocks between Main Street and 2nd Street NW and 3rd Avenue NW and 1st Avenue NW were found to have the least amount of parking available.

A parking availability index has been created for each downtown parking study area block that details how many total public parking spaces, Figure 59, and total parking spaces, Figure 60, are available within one block.

2009 Parking Study Comparison

A lot has changed for downtown Mandan since the 2009 parking study was conducted. The major parking generators of the grocery store and drug store on the western edge of downtown are no longer in business. In recent years, several new multi-family residential and commercial complexes have been constructed along Collins Avenue. The following trends were observed when comparing the 2009 parking study to the 2017 parking study:

- The total number of parking spaces available has increased by 4.1 percent.
- On an average weekday, 698 vehicles were parked within the downtown study area, an increase of 27 percent compared to the 2009 parking study.
- On an average weekend day, even with the closure of the grocery store, the average private off-street parking demand increased by 57 vehicles (32.9 percent). This can largely be attributed to the increase in apartments along Collins Avenue and the development of commercial uses on the south side of Main Street east of Collins Avenue.
- Like 2009, time enforced (90-minute/2-hour) on-street parking violations still remain a predominant issue. In 2009, approximately 30 percent of vehicles parked in a timed on-street parking space stayed in that space for more than two hours. This parking violation level has dipped to 16 percent throughout the day for the 2017 parking study. However, parking violations are still prevalent in the morning where 35 violations were found.

Table 17: Average Weekday Parking Demand

Average	Unmarked On-Street	90-Minute On-Street	Public Off-Street	Private Off-Street	Total
2009	81	125	91	243	540
2017	146	125	72	356	698
Difference	+65	0	-19	+112	+158

Table 18: Average Weekend Parking Demand

Average	Unmarked On-Street	90-Minute On-Street	Public Off-Street	Private Off-Street	Total
2009	11	156	53	172	392
2017	84	113	55	228	480
Difference	+73	-43	+2	+57	+88

Figure 50: Parking Supply

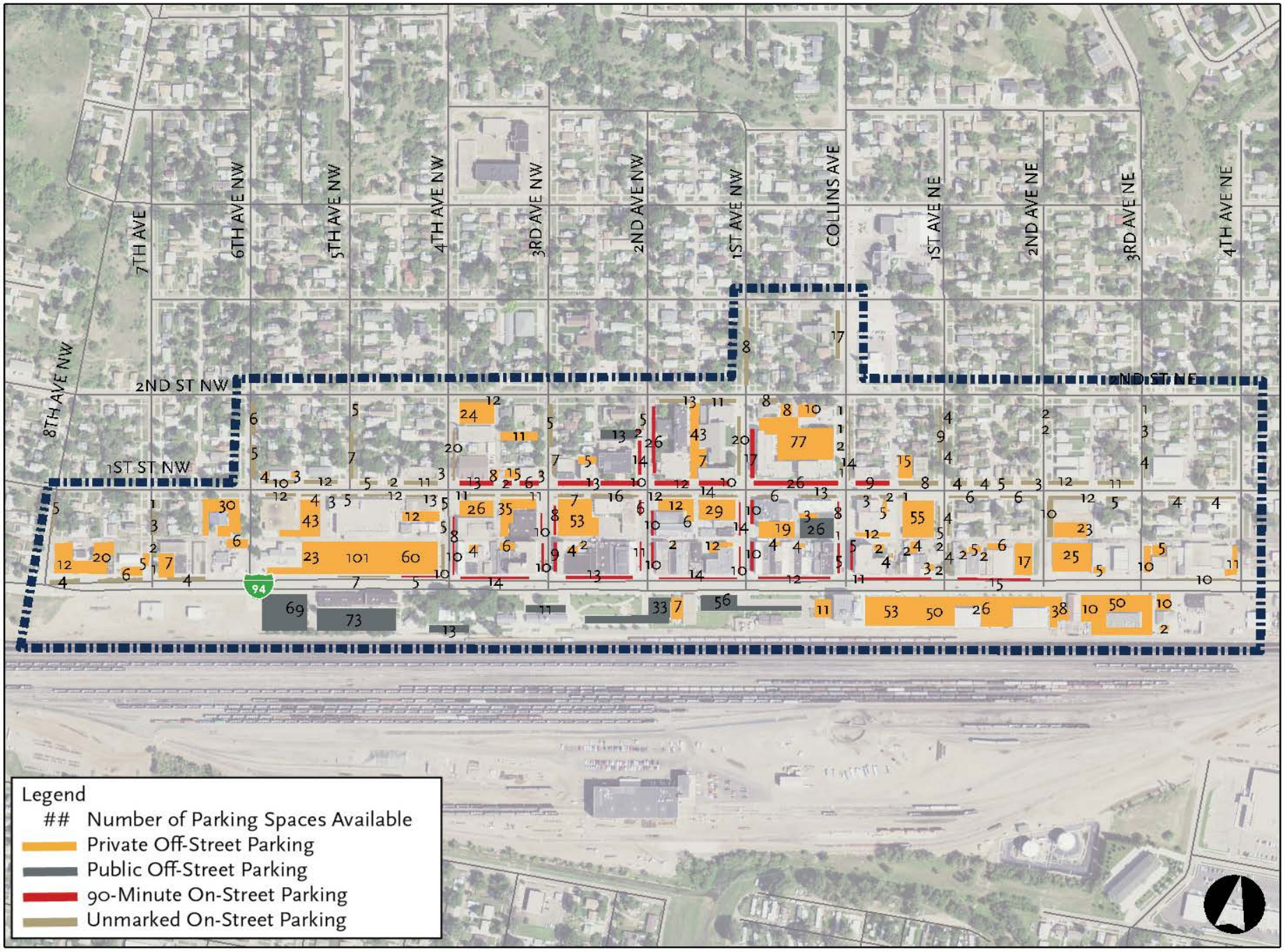


Figure 51: Weekday Occupancy 9 A.M. to 12 Noon

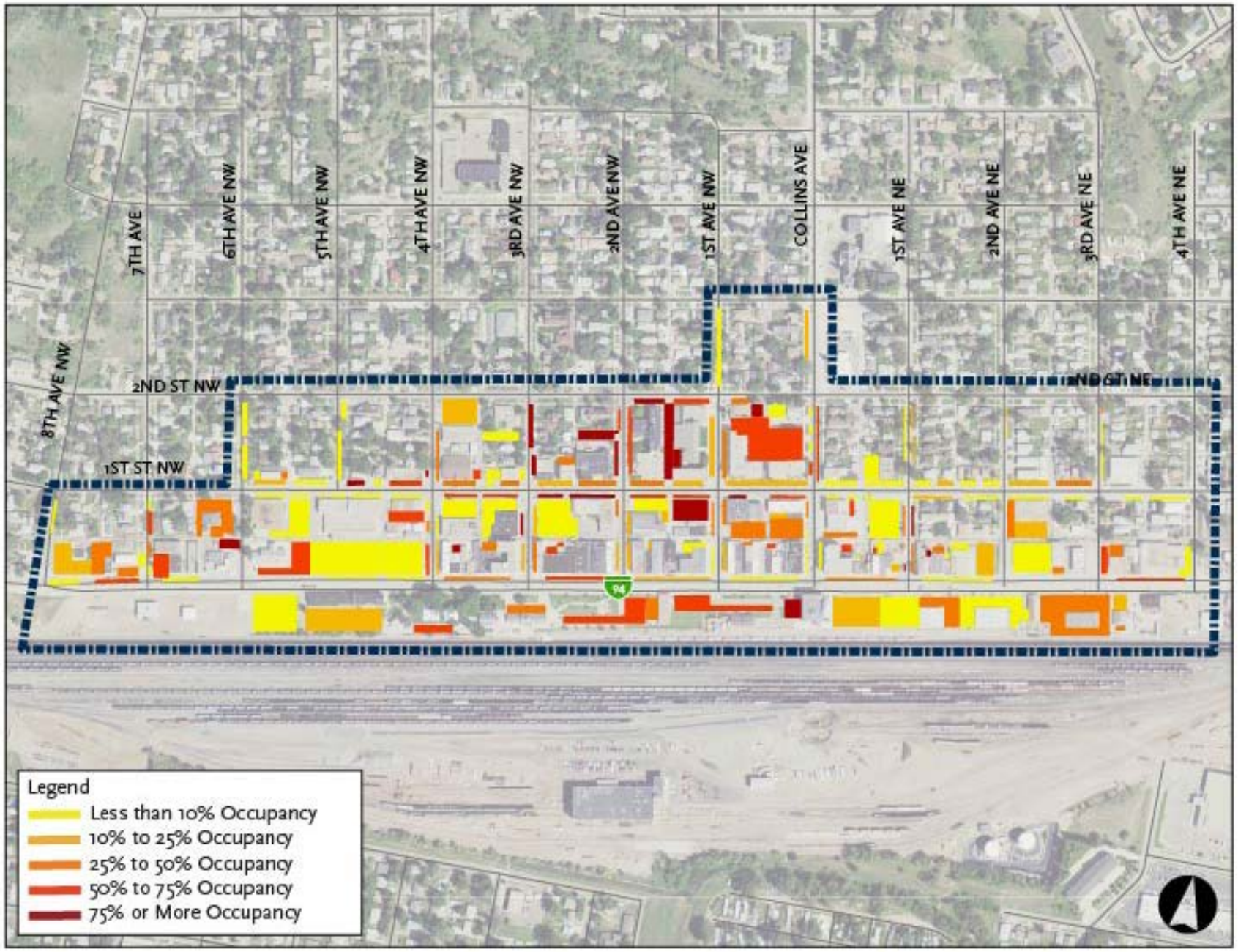


Figure 52: Weekday Occupancy 12 Noon to 3 P.M.

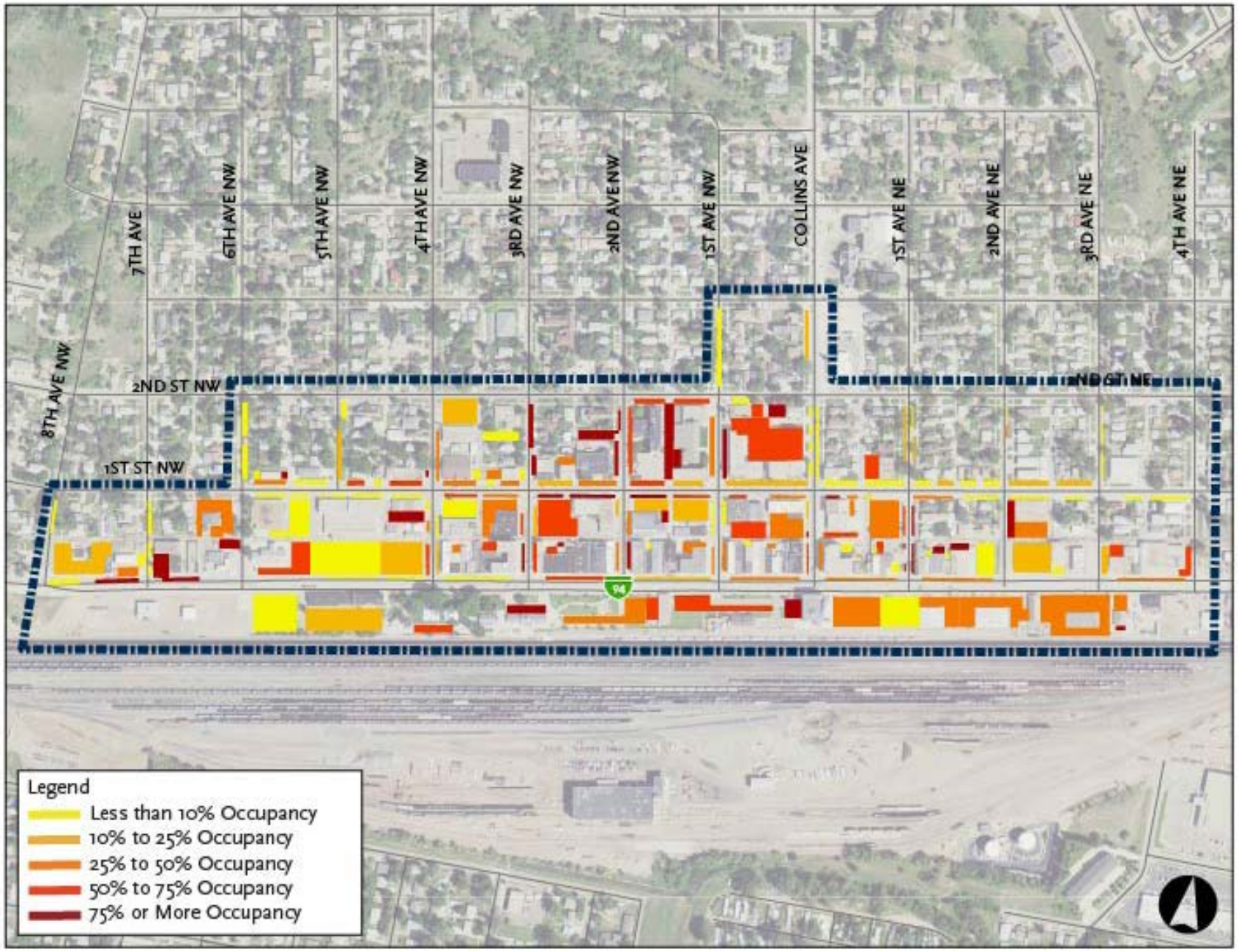


Figure 53: Weekday Occupancy 3 P.M. to 6 P.M.

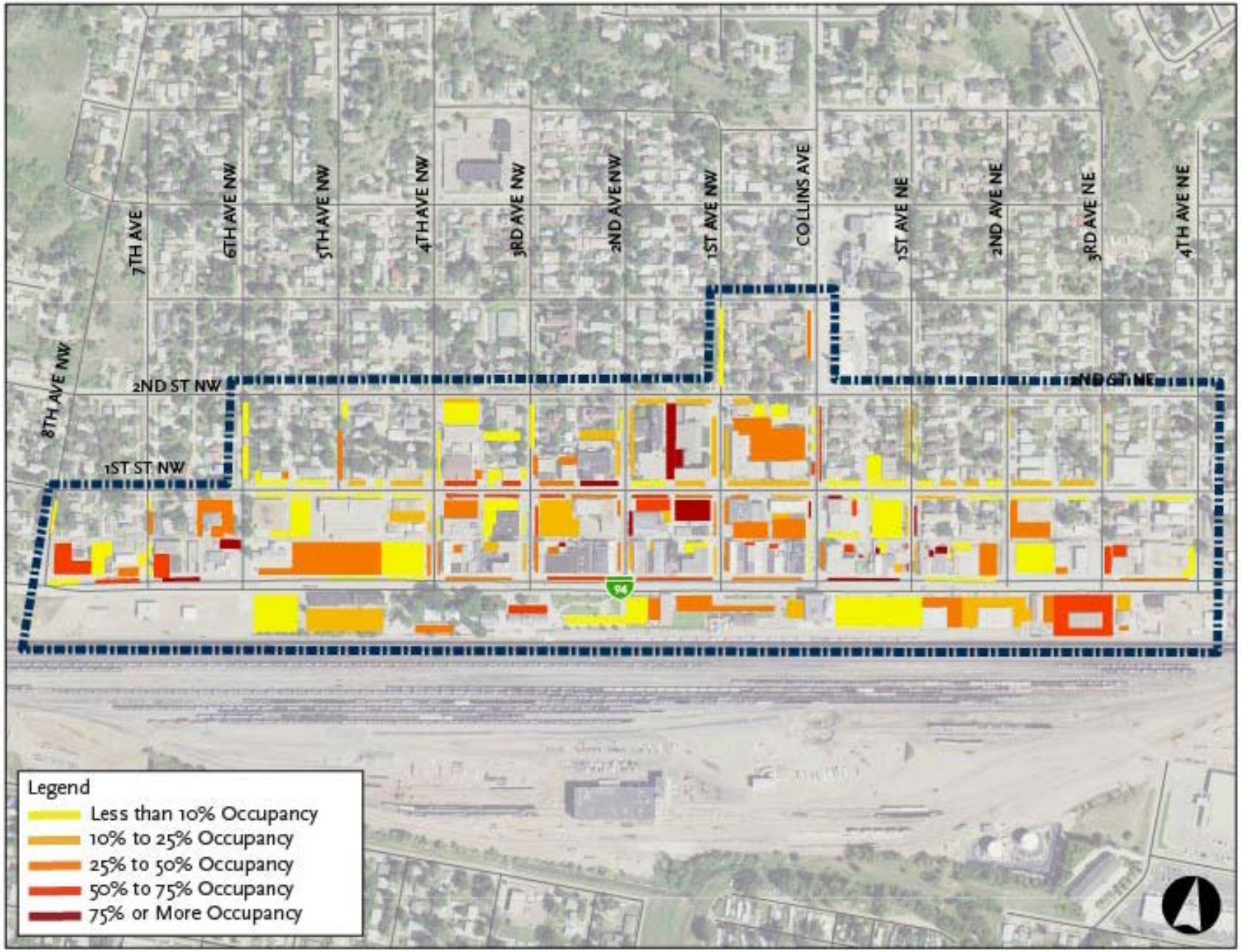


Figure 54: Weekday Occupancy 6 P.M. to 9 P.M.

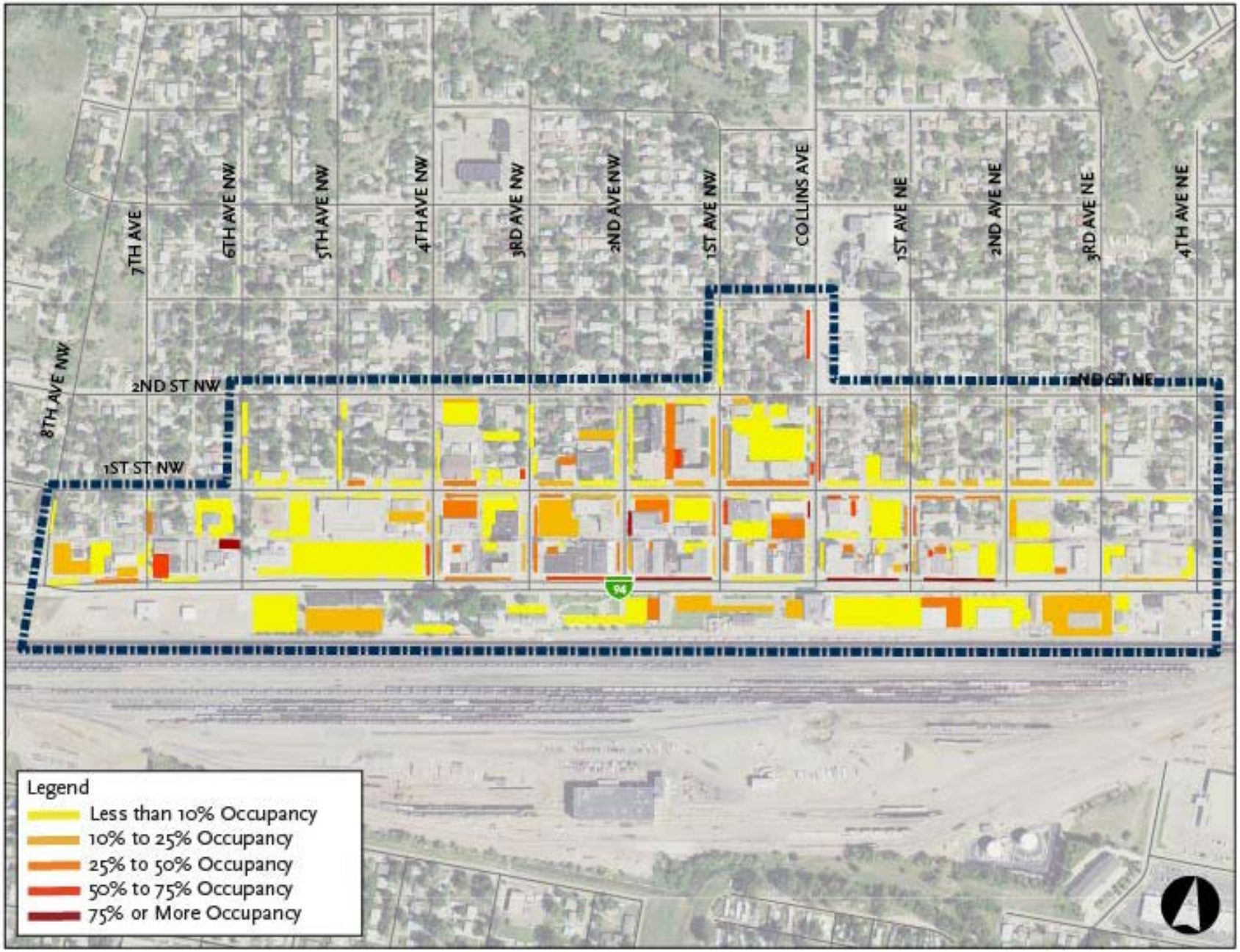


Figure 55: Weekend Occupancy 9 A.M. to 11 A.M.

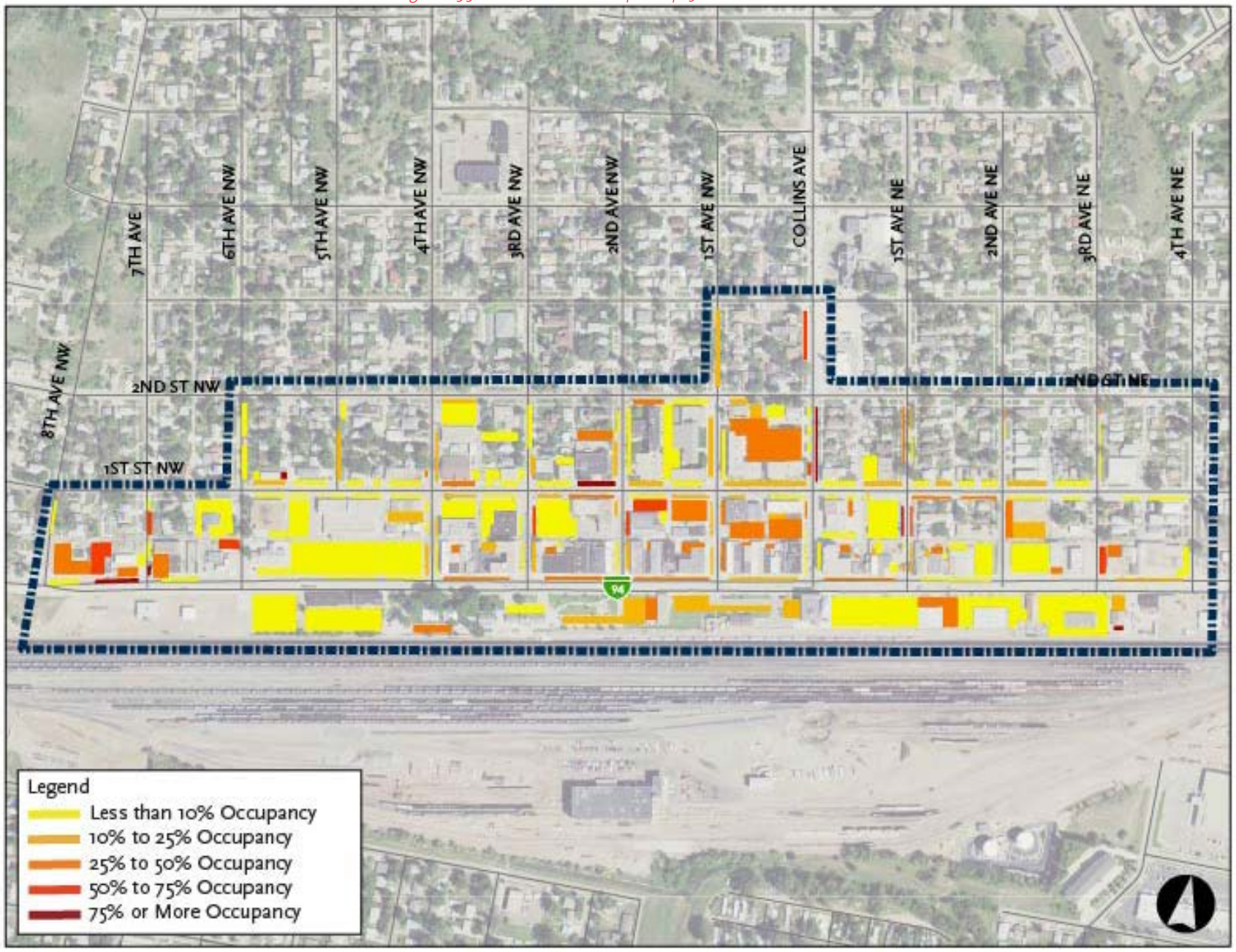


Figure 56: Weekend Occupancy 11 A.M. to 1 P.M.

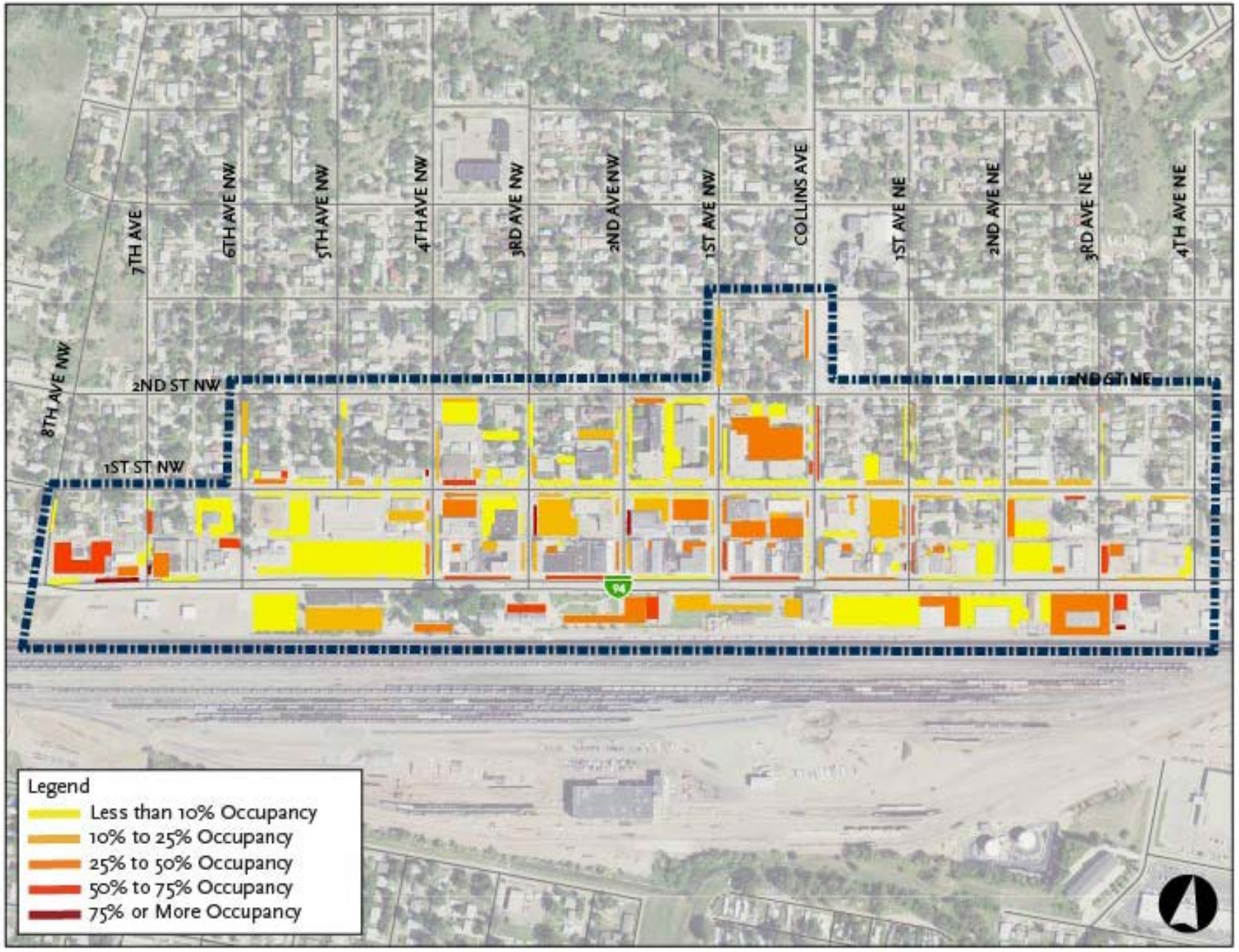


Figure 57: Weekend Occupancy 1 P.M. to 3 P.M.

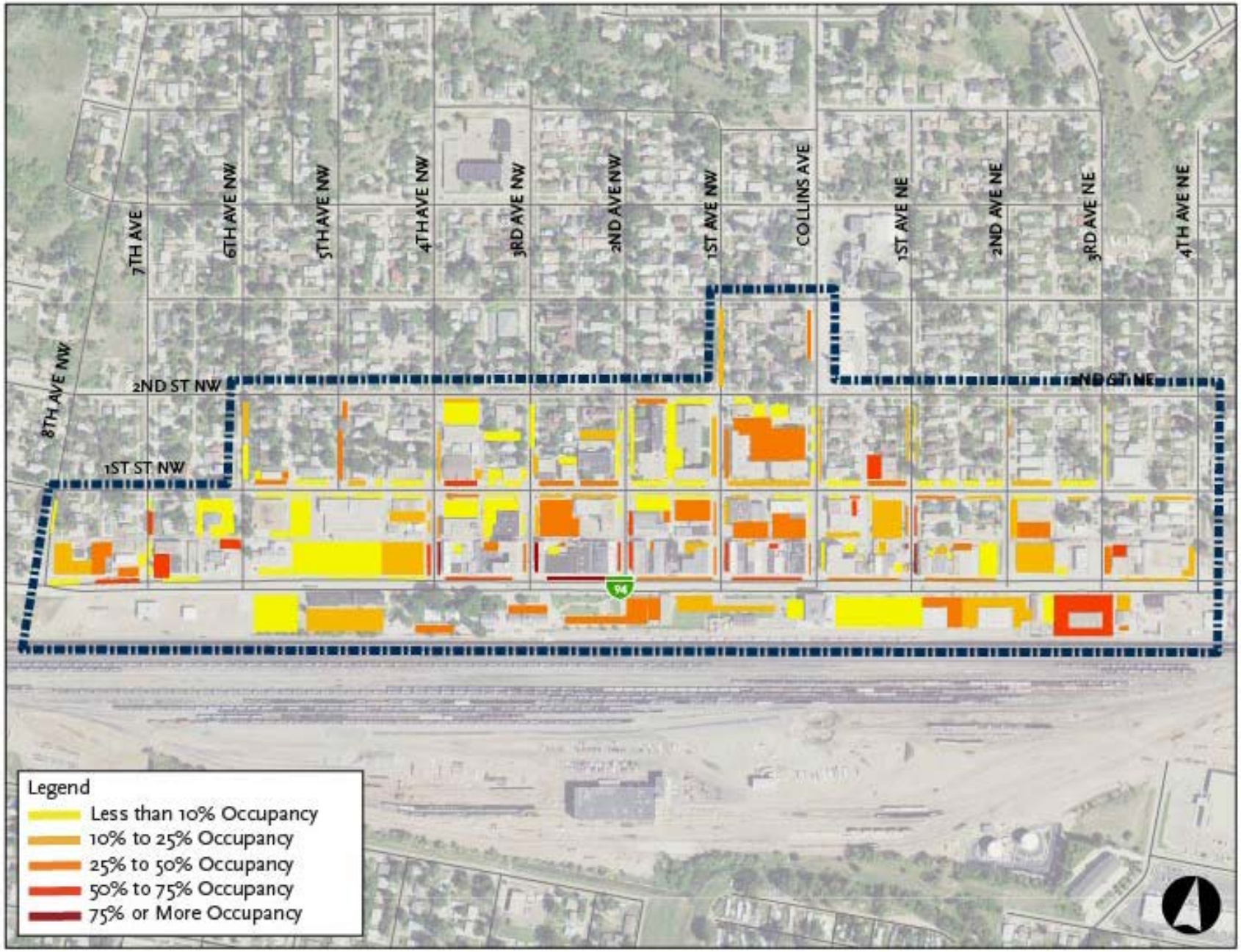


Figure 58: Weekend Occupancy 3 P.M. to 5 P.M.

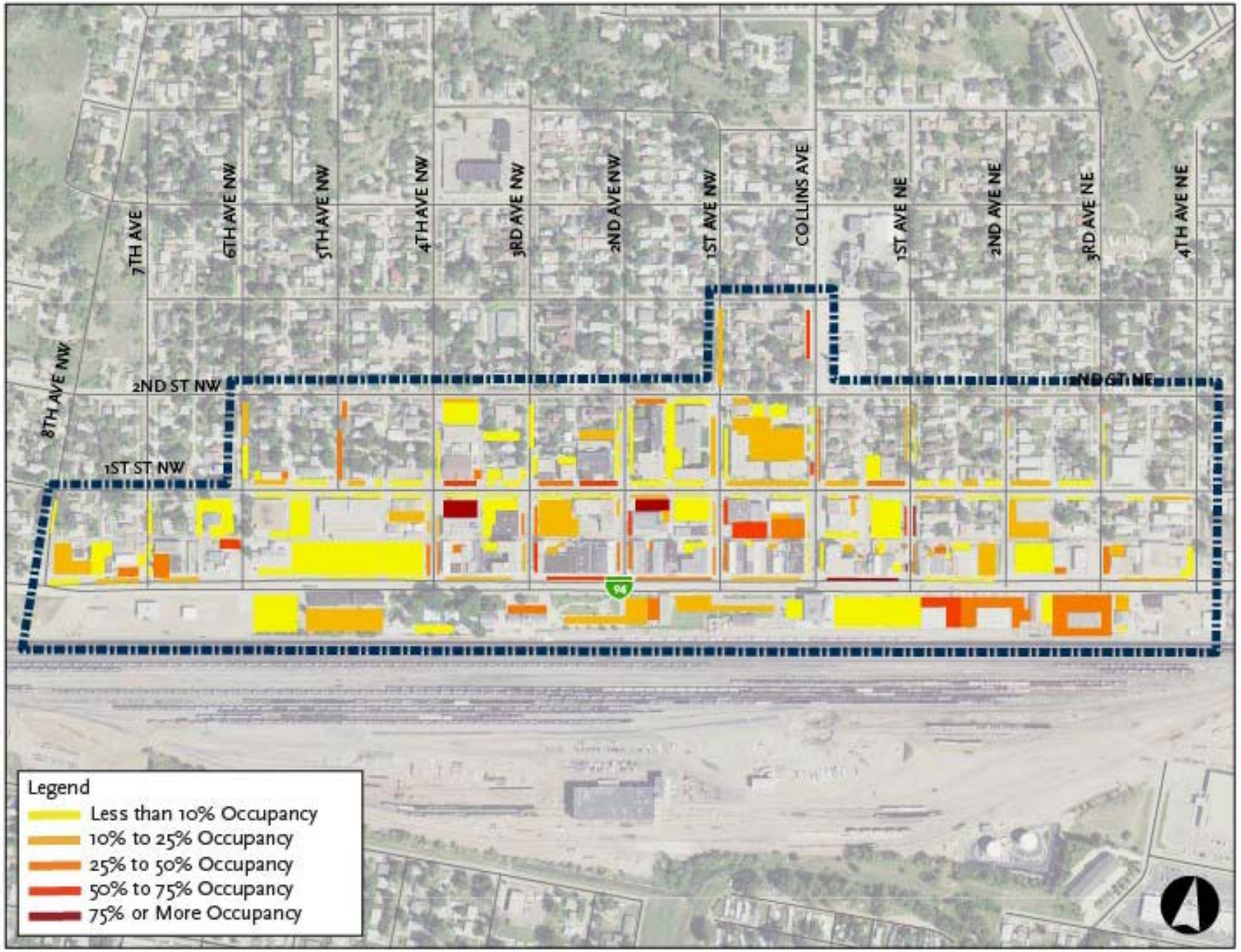


Figure 59: Public Parking Availability

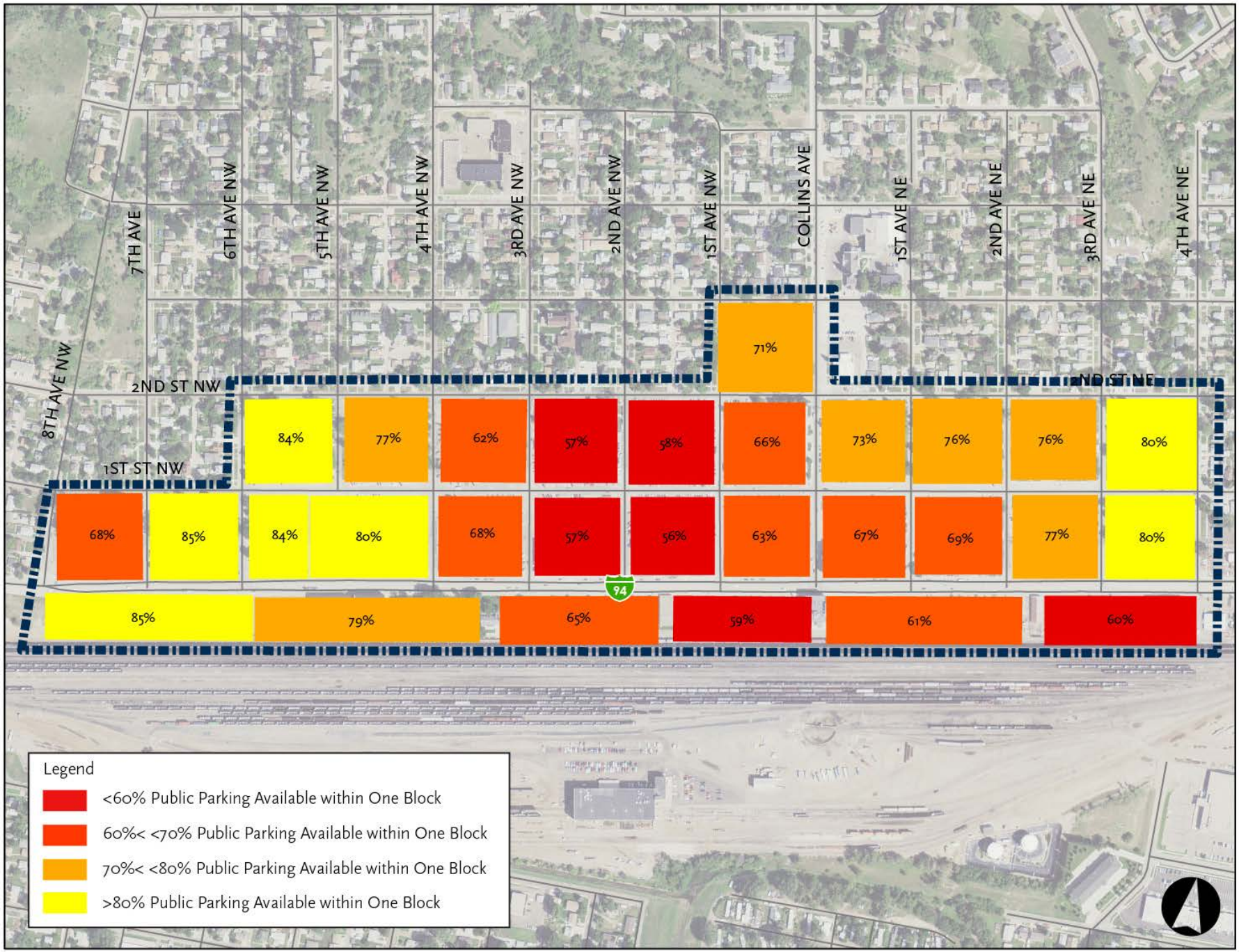
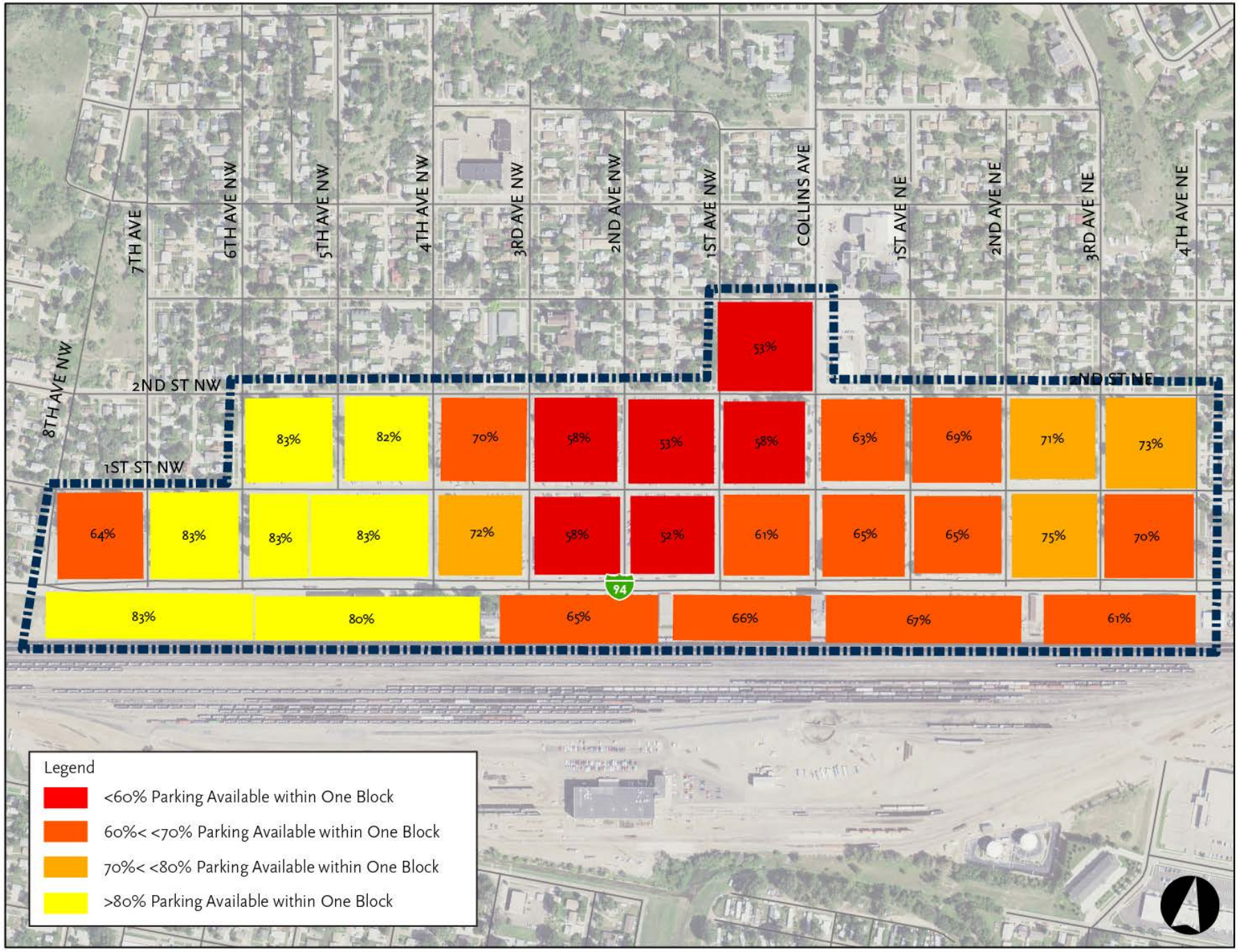


Figure 60: Total Parking Availability



LAND USE AND DEVELOPMENT ASSESSMENT

Downtown is vital to Mandan's image and cultural celebrations. This chapter investigates the structure and physical characteristics of Mandan's downtown and provides the basis for a strategic program to create a unique, united central district for downtown.

The assessment includes five parts:

- Existing Land Use Summary
- Subject to Change Analysis
- Programmatic and Incentives Analysis
- Public Space Assessment
- Policy and Ordinance Evaluation

Existing Land Use Summary

The downtown study area is bounded by the rail yard to the south and 2nd Street to the north, between 8th Avenue NW on the west and 13th Avenue NE on the east. Downtown evolved around Fort Abraham Lincoln and the railroad. Original development in Mandan occurred around transportation, first from steamboat then to rail, and today by interstate. Buildings and uses came and went over time, typically by fire and/or redevelopment. An established residential neighborhood surrounds downtown – characterized by one story single-family homes, typically with detached garages and alleys.

Today the downtown core contains a fairly equal mix of retail, service, office, civic, and upper-story residential uses within a wide range of building styles from historic to modern.

Interstate 94 crosses Mandan on the east, with the I-94 business loop being the main corridor through downtown (known as Memorial Highway and Main Street within city limits). The rail yard limits any new development to the south. Anyone in the downtown core who wants to reach amenities to the south, such as the softball complexes, must do so at 10th Avenue NW or 6th Avenue SE, a somewhat circuitous route even for vehicles.

Figure 61 shows the land use types in the downtown study area. Figure 62 through Figure 65 identify building uses by floor. Table 19 summarizes the uses in the study area. The district provides 1,408,950 square feet of gross floor area, excluding single-family uses, with about 932,861 square feet on street level and an additional 476,089 square feet of upper-story space.

Table 20 summarizes the uses of buildings fronting Main Street. Buildings along Main Street provide 609,891 square feet of gross floor area, with about 456,779 square feet on the street level and an additional 153,112 square feet of upper story space.

Figure 61: Land Use Types

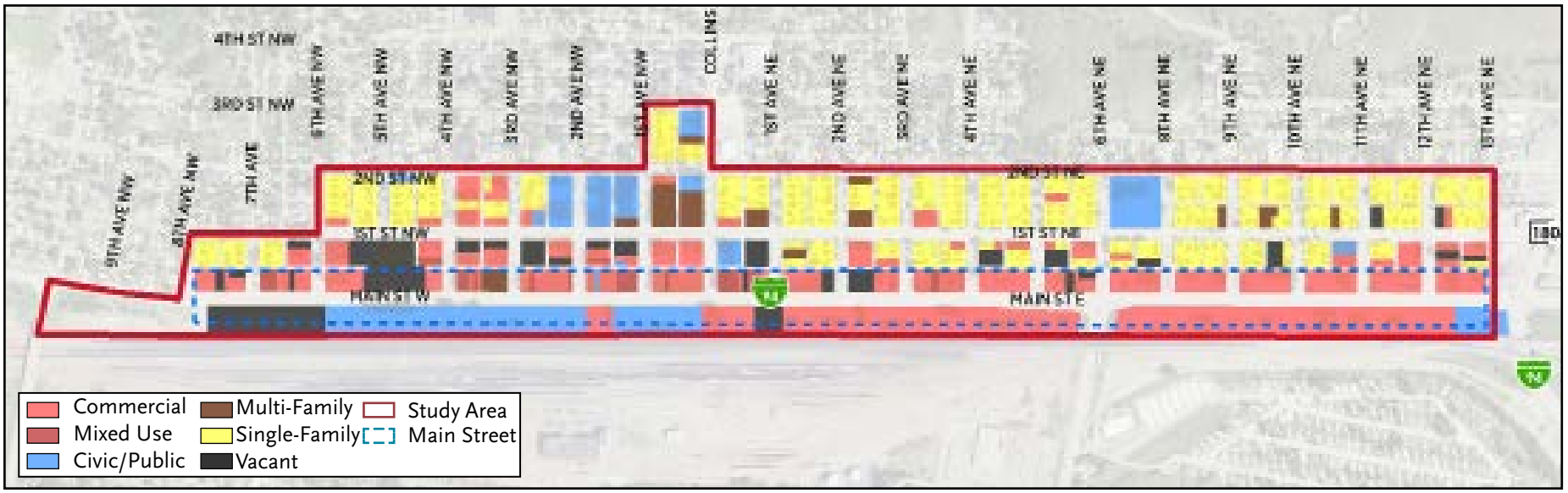


Table 19: Downtown District Building Use

Use	First Floor SF	% of First Floors	Upper Stories SF	% of Upper Floors	Total All Floors SF	% of Total District SF
Civic	131,840	14%	86,248	18%	218,088	15%
Entertainment/ Restaurant	87,978	9%	5,643	1%	93,621	7%
Storage	46,856	5%	3,127	1%	49,983	4%
Multi-Family	75,768	8%	258,978	54%	334,746	24%
Office	114,076	12%	29,601	6%	143,677	10%
Retail	192,529	21%	5,578	1%	198,107	14%
Service	182,566	20%	29,783	6%	212,349	15%
Vacant/ Unknown	101,248	11%	57,131	12%	158,379	11%
Total	932,861		476,089		1,408,950	

Single-family homes excluded from square footage

Source: RDG Planning and Design

Table 20: Main Street (8th Ave NW to 13th Ave NE) Building Use

Use	First Floor SF	% of First Floors	Upper Stories SF	% of Upper Floors	Total All Floors SF	% of Total District SF
Civic	12,881	3%	0	0%	12,881	6%
Entertainment/ Restaurant	59,723	13%	5,643	4%	65,366	70%
Storage	24,221	5%	0	0%	24,221	48%
Multi-Family	3,237	1%	75,895	50%	79,132	24%
Office	54,872	12%	20,841	14%	75,731	53%
Retail	159,100	35%	5,578	4%	164,678	83%
Service	116,563	26%	1,920	1%	118,482	56%
Vacant/ Unknown	26,181	6%	43,236	28%	69,417	44%
Total	456,779		153,112		609,891	43%

Single-family homes excluded from square footage

Source: RDG Planning and Design

Figure 62: First Floor Building Use

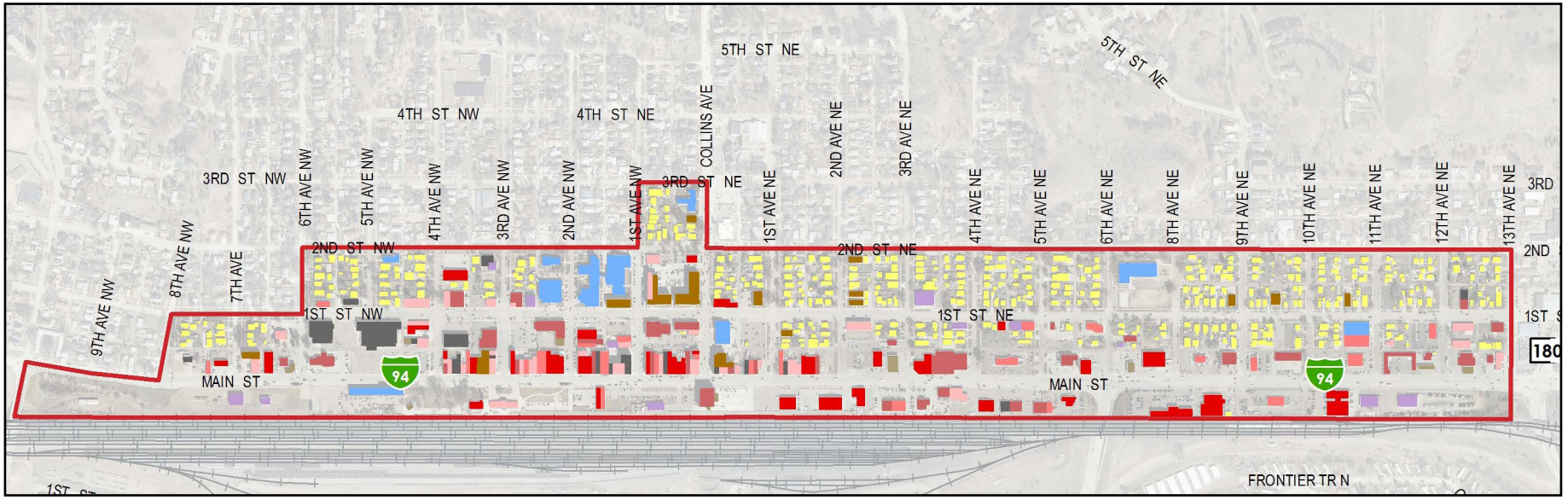


Figure 63: Second Floor Building Use

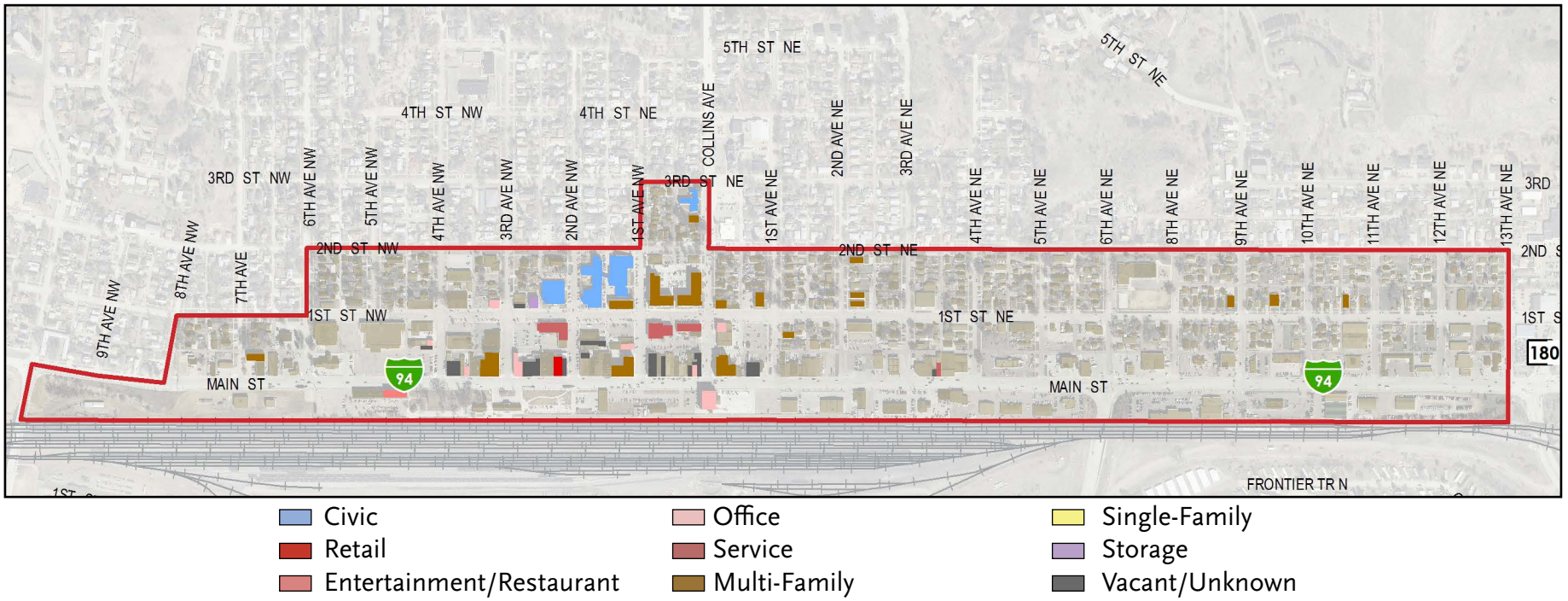


Figure 64: Third Floor Building Use

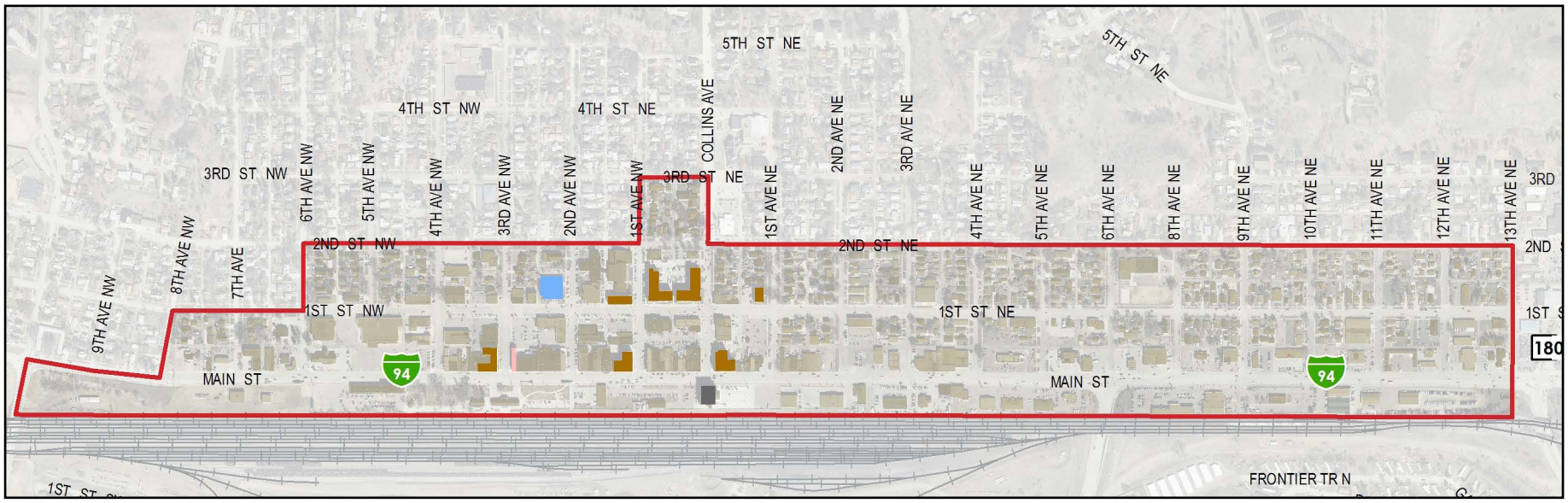
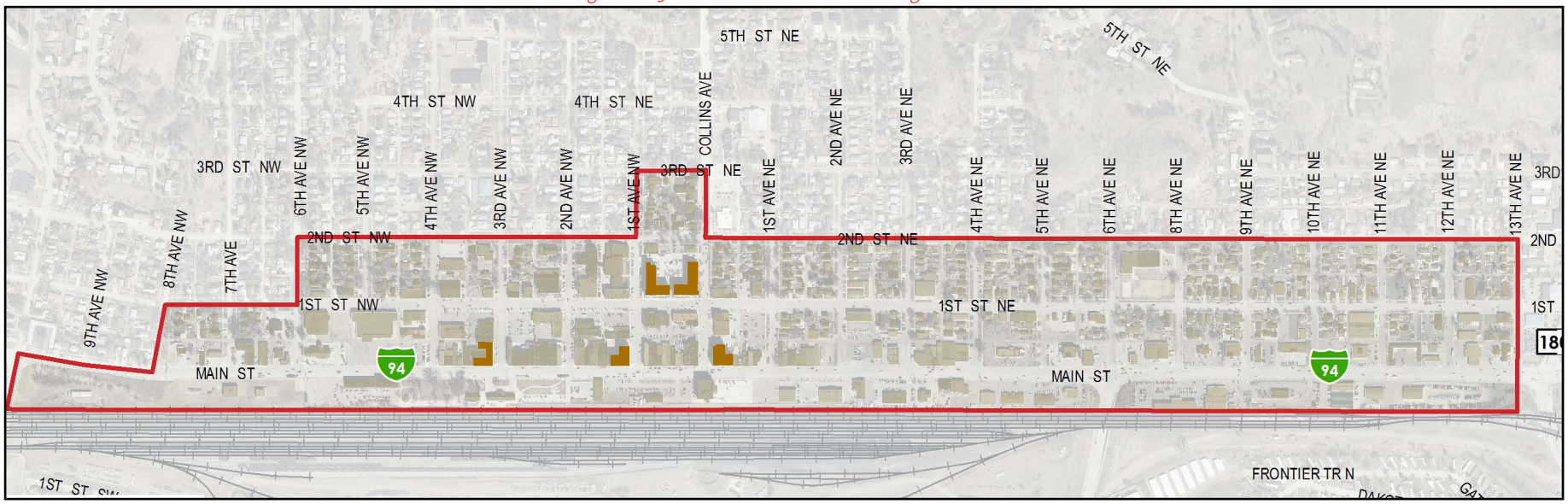


Figure 65: Fourth Floor Building Use



Civic
Retail
Entertainment/Restaurant
Office
Service
Multi-Family
Single-Family
Storage
Vacant/Unknown

In summary, the downtown district contains a diverse mix of land uses, displayed again in Figure 66 and Figure 67. Key findings include:

» **Commercial Main Street.** Retail stores and restaurants cluster along Main Street. Of all retail and restaurant space in the downtown district, 83 percent of retail and 70 percent of restaurant uses front on Main Street. Higher traffic volume and visibility on the street makes Main Street ideal for these uses.

» **Concentrated Vacancy.** The district has a vacancy rate of about 11 percent (10.8 percent street level; 12 percent upper level) and buildings fronting on Main Street a vacancy rate of about 11 percent (6 percent street level; 28 percent upper level). Vacancies across the district are mostly concentrated on the west end of the district. However, over half of the street level vacancy is accounted for by the former grocery store at 504 W. Main Street and former drug store at 511 1st Street NW. Excluding these properties reduces the street level vacancy in the district to 5.6 percent.

- Of the vacant space downtown, 57,131 square feet is on upper stories (36 percent of all vacant space). However, 75 percent of upper story vacancy is located along Main Street (43,236 square feet). The use of this space as apartments or offices could attract new business opportunities and increased pedestrian traffic.

» **Upper floor residential**. Upper story residential uses are about half of the upper floor space along Main Street and the district. Most residential square footage is concentrated on four properties with newer investments in market rate apartments.

- Market rate: Mandan Place (28 units), Collins Place (29 units)
- Affordable senior apartments: Library Square (91 units)
- Affordable apartments: The Lewis and Clark Hotel (45 units)

» **Average Building Conditions.** Most buildings are in good condition with few considered in poor condition, as determined from local assessment data. The average building was built in 1965. Figure 68 shows the condition of buildings.

Figure 66: Main Street Uses, 9th Avenue NW to 13th Avenue NE

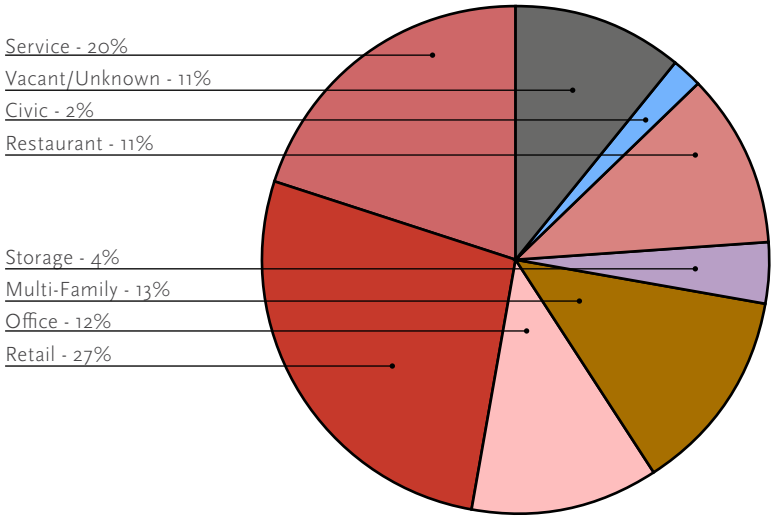


Figure 67: Downtown District Uses

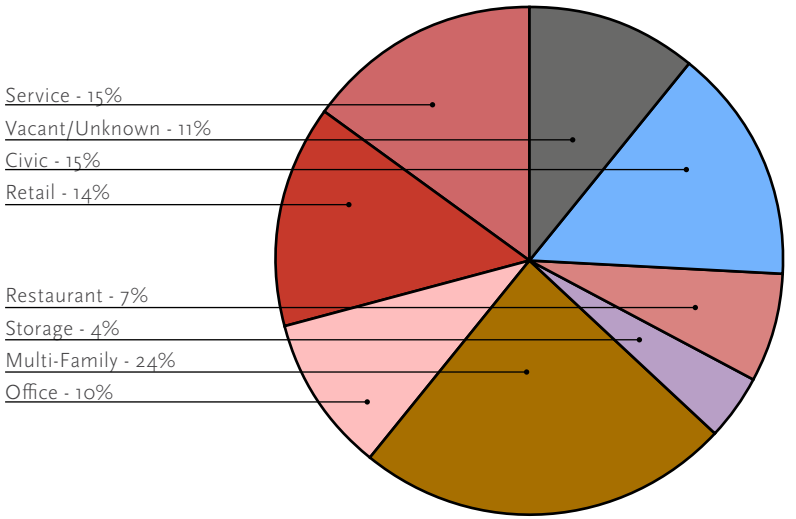
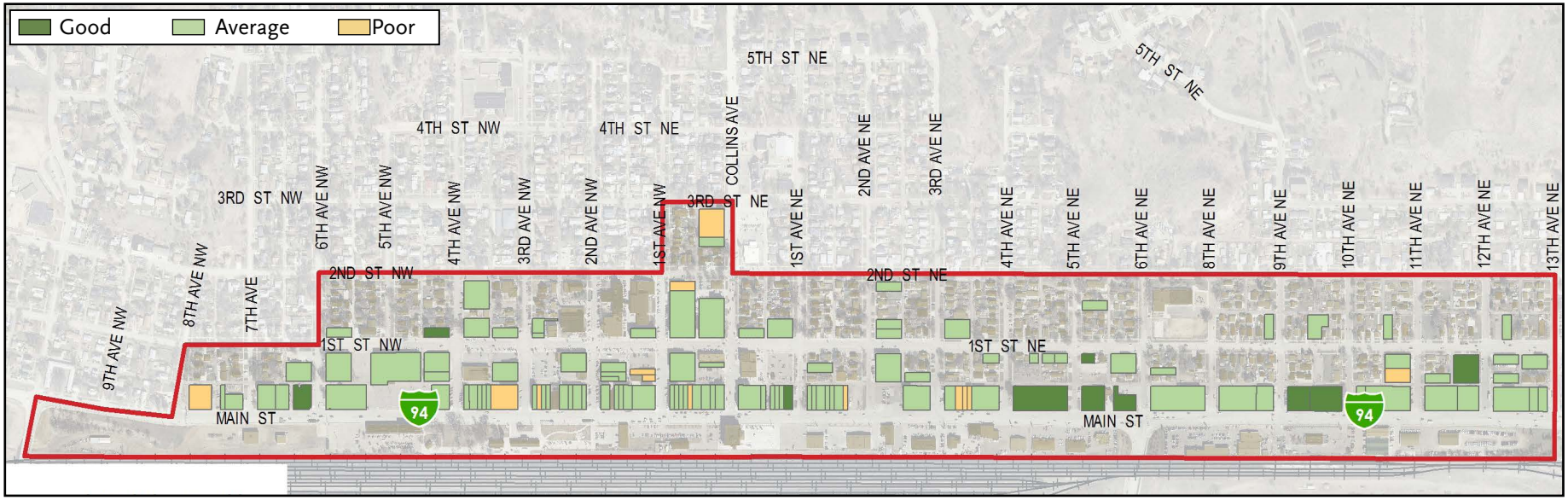


Figure 68: Commercial Building Condition



Subject to Change Analysis

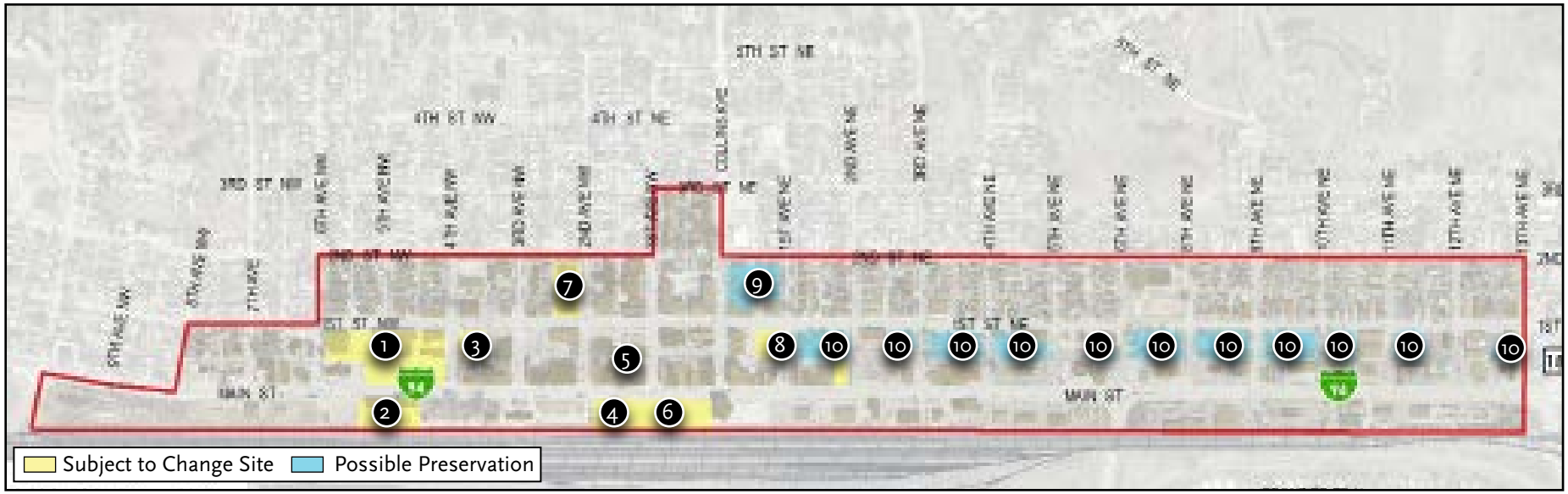
Figure 69 identifies buildings and properties discussed with the steering committee and considered candidate sites for reuse, redevelopment, or preservation. These sites will be further studied for potential new projects or rehabilitation. Criteria for considering properties that are subject to change include:

- **Are land uses compatible next to each other?** Higher-intensity uses generally attract more traffic. The scale and use of buildings of higher intensity uses often conflict with lower-intensity uses.
- **Do uses from one property influence the function or enjoyment of an adjacent property?** Landscaping or buffering may not be enough to separate uses, causing the need to design a solution that will fully mitigate the conflict.
- **Is the land underused?** Vacancy and inefficient design necessitate review. Also, the market may suggest that a site's location may be better suited for a new use.
- **Is the integrity of the building or land compromised?** Conditions related to slum, blight, or deterioration that endanger life needs to be resolved.

Candidate sites that are subject to change based on this criteria include:

1. **Former Central Market Block (500 Block W Main Street).** Central Market is closed and the city has commissioned Icon Architectural Group to explore opportunities for its reuse, as well as the reuse of the former Thrifty White Drug building at the corner of 6th Avenue and 1st Street West.
2. **Library (609 Main Street W).** The former Northern Pacific Railroad freight warehouse built in 1911 became the Mandan Public Library in 2006. The upper-story is occupied by a restaurant, Rice Bowl.
3. **Former Elks Lodge (4th Avenue NW).** The Elks Lodge relocated from downtown, leaving a vacant building on 4th Avenue. The building is a candidate for reuse or could be combined with the lot to the north for a redevelopment project.
4. **209-211 Main Street W Building.** Papa Murphy's and Hirsch Florist are two successful business that occupy 209-211 W Main Street. These businesses contribute to Mandan's economy and will continue for the foreseeable future. The 209-211 building rests between Heritage Park and remediation building. The building could be assembled with the adjacent property to create a larger redevelopment plan or possibly expand the park.
5. **Remediation Building (100 Block Main Street E Southside).** The remediation of the diesel spill is expected to finish in the near future, resulting in the Remediation Building being obsolete. The site is a candidate for redevelopment.
6. **Remediation Building (100 Block Main Street E Northside).** The remediation of the diesel spill is expected to finish in the near future, resulting in the Remediation Building being obsolete. The building tucked in the middle of the block is a candidate for redevelopment.
7. **City Hall and Mandan Church of Christ.** The City of Mandan prepared a facilities assessment report to explore scenarios for renovating and possibly building a new City Hall. One of the scenarios for reconstruction considers the land owned by the Mandan Church of Christ. This building could be used as a new site for city hall or as parking lot.
8. **Parking Lot (100 Block 1st Street East , Southside).** The site provides parking downtown and is a candidate for parking lot improvements.
9. **Residential Block 2 (200 Block between 1st Street E and 2nd Street E).** This block marks a transition between downtown and the residential neighborhood. Residential homes fronting Collins Avenue have limited resale market than typical residential homes in neighborhoods because of their presence on a road that experiences a significant amount of traffic to-and-from downtown.
10. **Residential Blocks (Half-block between 1st Street East and Main Street E).** These half-blocks are adjacent to higher intensity uses and located between two major streets – 1st Street and Main Street. The residential properties could be assembled for a redevelopment project that offers more compatibility to surrounding uses.

Figure 69: Subject to Change Sites



Programmatic & Incentives Analysis

Mandan has several business incentive programs. Table 22 and Table 23 summarizes the variety of assistance for which businesses could be eligible. However, most programs are not targeted at downtown and can be used by businesses locating anywhere in the city. Three incentive programs are targeted for use downtown, using tax incentives (abatements or credits) and forgivable loans as the primary incentive tool:

- **Renaissance Zone Program.** An eligible project must be with the designated Renaissance Zone (approved by the city and State), encompassing 28 blocks in and around the downtown core. Figure 70 shows the designated Renaissance Zone in Mandan.
- **Storefront Rehabilitation Program.** An eligible project must be located downtown or along Memorial Highway.
- **Federal and State Historic Tax Credit Program**. An eligible project must be located within the Mandan Commercial National Register Historic District.

Economic development researchers debate the effectiveness of tax incentives and benefits received by the community compared to the public costs incurred. Generally, incentives concentrated to specific areas of need are more effective in achieving urban revitalization goals than those applied to all commercial areas. For downtown Mandan, business incentives aim to maintain and achieve high quality buildings/sites, promote a diversity of businesses, and create a lively, activated environment to attract customers and visitors alike.

In total, Renaissance Zone projects have generated an estimated $445,568 in additional local property tax revenue through 2017 and potential annual sales tax revenue up to $273,553, with $299,019 in public funds (tax exemptions). Projects also contributed to adding 57 new units in downtown, although only in the past 5 years. The storefront rehabilitation program further improves the appearance of downtown, stimulating $1,555,780 in investment at a public cost of $357,479.

As shown in Table 21, total property values have increased more for properties receiving these incentives, as would be expected.

This section provides information on the cost and estimated tax benefits of these programs.

Renaissance Zone projects have generated an estimated $445,568 in local property tax revenue through 2017 and potential annual sales tax revenue up to $273,553, with $299,019 in tax exemptions.

Table 21: Downtown Commercial Property Values (non-exempt)

	2005 Property Value	2016 Property Value	% Change	Annual Growth
Downtown District	$177,872	$411,221	131%	7.92%
Renaissance Zone Projects	$125,041	$755,825	504%	17.77%
Storefront Rehabilitation Projects	$111,368	$310,895	179%	9.78%
Neither Incentive	$183,809	$366,880	100%	6.48%

*Excludes residential properties/projects

Source: RDG Planning and Design; Morton County Assessor Data

Figure 70: Mandan's Renaissance Zone, 2017

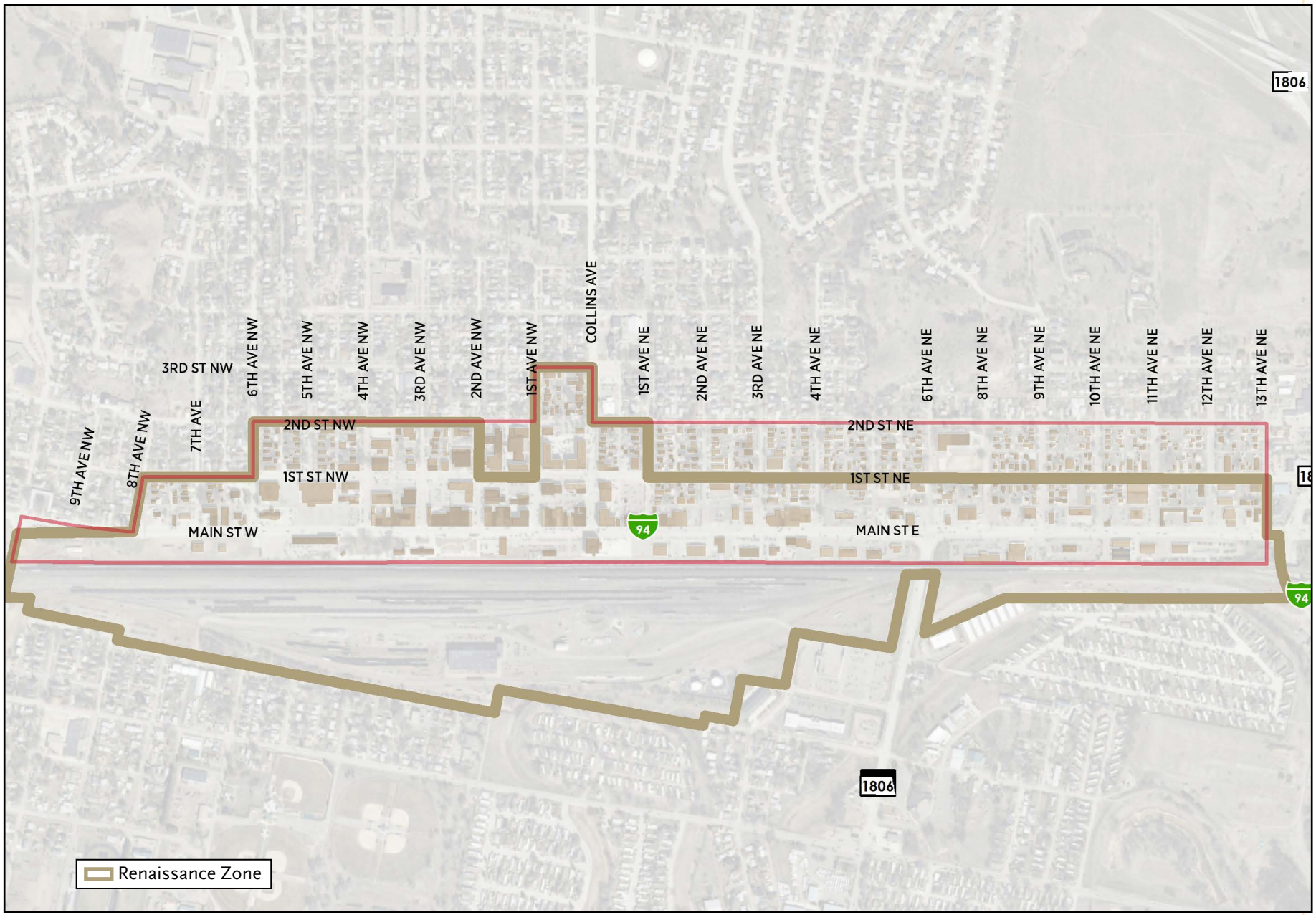


Table 22: Mandan Business Incentive Programs

Program	Description	Incentive	Eligibility	Process	Timeline
Renaissance Zone Program	Property investments in downtown and blighted areas	Commercial Project: » Up to 100% property tax exemption for 5 years » 100% exemption from state tax on business income for 5 years » Transferable incentives with sale or lease	Purchase with improvements, renovation, expansion, or new construction where significant investment is made and consistent with the 2003 Downtown Mandan and Memorial Highway Redevelopment Plan	Renaissance Zone Committee; Architectural Review Commission; City Commission; North Dakota Department of Commerce	3-4 Weeks from Application
Storefront Improvement	Improvements to building facades including finishes, windows, doors, awnings, canopies, landscaping, and signage in downtown and along Memorial Highway	Forgivable loan up to $30,000 over 5 years for 50% of investment cost	Improvements visible from the right-of-way that must include an automatic door on at least the main entrance compatible with all City Plans and policies: All commercial/ mixed use buildings in downtown or along Memorial Highway	Architectural Review Commission; Growth Fund Committee; City Commission review and approval	Up to 45 days from application
State Historic Preservation Tax Credit	Rehabilitation projects on historic buildings or properties within the designated Renaissance Zone	25% state tax credit of rehabilitation investment, up to $250,000	Must be in a designated Renaissance Zone, listed on the National Register of historic places, a contributing property in a historic district, or eligible for listing on the national register; improvements must follow the Secretary of the Interior's Standards	Application and review through the State Historical Society and National Park Service	Varies with Renaissance Zone application process
Federal Historic Preservation Tax Credit	Rehabilitation projects on historic buildings	20% federal tax credit of rehabilitation investment	Must be listed on the National Register of historic places or a contributing property in a historic district; improvements must follow the Secretary of the Interior's Standards	Application and review through the State Historical Society and National Park Service	At least 60 days from completed application
Retail and Restaurant Incentive	Retail and restaurants that fill a gap in Mandan's market (as identified in market statistics), fill vacant properties, and stimulate new construction	Forgivable loan up to $5 per square foot of operating space, not to exceed $20,000 per property.	Businesses not already operating in Mandan or new expansions to existing businesses	Growth Fund Committee; City Commission review and approval	Up to 45 days from application

Table 23: Mandan Business Incentive Programs (Continued)

Program	Description	Incentive	Eligibility	Process	Timeline
Restaurant Rewards Program	Attract new restaurants and encourage expansion of existing eateries. Restaurants that are full-service restaurants (table side service), limited service (order w/ cashier, food brought to tables), and fast food (counter service or drive-up only). Restaurateurs may choose any location within the City.	100% rebate of 1% city sales tax and local match for the PACE interest buy down program	First-time restaurateurs, new and expanding concepts by existing restaurateurs, and expansion by restaurateurs from outside the City with 50% of revenue from prepared food sales	Growth Fund Committee; City Commission review and approval	Up to 45 days from application
Commercial Remodeling Exemption	Remodeling or additions projects that add value to commercial properties	Exemption from property taxes on increased assessed value for 3 years	Renovation, remodeling, and alterations: Any improvement project on properties city wide	Application to the Assessor and City Commission prior to beginning the project	Varies
Property Tax Abatement	Businesses that add value to a product, process, or service and generates revenue from customers outside of North Dakota	» 100% abatement for 5 years » 100% abatement for 2 years down to 25% in year 5 » 100% abatement for 2 years	» Newly constructed or expanded buildings: Large retail services; full service restaurants; hotels w/ meeting room, pool, convention space » Mid-size retail services; limited service restaurants; hotels w/ meeting rooms » Small retail services; fast food restaurants; small scale hotels	Growth Fund Committee; City Commission public hearing	Up to 30 days from application if meeting requirements
PACE Interest Buy Down Program	For new and expanding businesses in Mandan	Interest buy down on the borrower's rate by as much as 5% by splitting loan amounts between the Bank of North Dakota and a local lender	Must include the Bank of North Dakota with a 35% city match	Varies by project	Varies
Tax Increment Financing	Permits the use of a portion of local property taxes to assist funding the redevelopment of certain designated areas within the community	Taxes produced by the added value of the property caused by redevelopment or improvements are used to finance project-related improvements or other public improvements in the district	Property within a designated TIF district.	Before a TIF district is established or to establish one, review goes through a financial consultant, the Growth Fund Committee, and the City Commission	Varies

Mandan Renaissance Zone

A Renaissance Zone is intended to encourage private investment to develop, renovate, rehabilitate and revitalize downtown areas. The Renaissance Zone program offers financial incentives in the form of property tax exemptions and state income tax exemptions to encourage capital investments within the Zone and to produce the desired economic, commercial, residential and entertainment outcomes. Mandan's program began in 2005 at the maximum allowed 28 blocks of both residential and commercial property, although starting in 2015 the size may be up to 49 blocks.

Nearly all the downtown study area falls within the current Renaissance Zone. Figure 71 shows the projects completed in the downtown study area. As of the end of 2016, 55 projects given incentives were completed. Table 24 shows the completed projects and their impact on assessed valuation. There are two projects approved in 2016 yet to be completed, and thus, are excluded from analysis.

Another important component of the Renaissance Zone Program is that taxpayers who lease a property for business uses can qualify for a 5-year state income tax exemption. No improvements to the property are needed, only evidence of a new business, an existing business expanding, or the continued lease in a building previously rehabilitated as a Renaissance Zone Project. Income tax exemptions can have a significant impact on business performance, especially for small businesses. The savings can be reinvested in their business or property to indirectly improve the downtown environment. Table 25 shows the impact of state income tax exemptions.

Table 26 shows the number of completed projects each year. Projects are clustered around the downtown core, with a handful of sites on the east and west ends of downtown.

Renaissance Zone improvement projects are mostly investments in service and office uses on the first floors and multi-family on upper floors. Table 27 shows the types of building uses by floor for Renaissance Zone projects that made improvements.

In regards to new construction projects, multi-family and office mixed-use projects were the most pursued as shown in Table 28. Two projects alone, Mandan Place and Collins Place, account for nearly all the multi-family square footage. New construction projects are also typically much larger making the program's multiple incentives more beneficial given the time and expense of following program requirements.

Table 24: Renaissance Zone Projects

Project Type	Number	Total Private Investment	Beginning Building Assessed Value	Ending Building Assessed Value (At Completion)	Increased Building Assessed Value	Per Project
Rehab	22	$6,679,210	$2,772,900	$5,978,900	$3,206,000	$145,727
New Construction	7	$9,651,687	$117,800	$7,547,100	$7,429,300	$1,061,328
Leasehold Improvement	2	$212,881	$62,091	$248,246	$186,155	$93,077
Purchase w/ Improvements	2	$164,473	$721,054	$1,289,400	$568,346	$284,173
Lease Only	22	N/A	N/A	N/A	N/A	N/A
Total	55	$16,708,252	$3,673,845	$15,063,646	$11,389,801	$345,145

Source: RDG Planning and Design; City of Mandan

Figure 71: Renaissance Zone Projects

Table 25: Renaissance Zone State Income Tax Benefits

Project Type	Number	Estimated Income Tax Benefit	Per Project
Lease	22	$293,310	$13,332
Improvement	33	$699,768	$21,205
Total	55	$993,078	$18,055

Source: City of Mandan

Table 26: Completed Projects by Year

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of Completed Projects	6	8	8	8	1	4	7	4	1	8

Source: City of Mandan

Table 28: Renaissance Zone Improvement Project Use Types

Use	1st Floor SF	2nd Floor SF	3rd Floor SF	4th Floor SF	Total SF
Retail	45,343	5,577	-	-	50,920
Restaurant	13,619	-	-	-	13,619
Service	54,814	10,550	-	-	65,364
Office	53,265	11,381	-	-	64,646
Single Family	3,974	-	-	-	3,974
Multi-Family	10,426	33,691	28,565	28,565	101,247
Unknown	-	9,329	-	-	9,329
Vacant	4,164	-	8,600	-	12,764

Source: RDG Planning and Design; City of Mandan

Table 27: Renaissance Zone New Construction Projects

Use	1st Floor SF	2nd Floor SF	3rd Floor SF	4th Floor SF	Total SF
Retail	16,000	-	-	-	16,000
Restaurant	-	-	-	-	-
Service	16,0164	-	-	-	16,064
Office	22,290	-	-	-	22,290
Single Family	-	-	-	-	-
Multi-Family	6,505	29,770	28,565	28,565	93,405
Unknown	-	-	-	-	-
Vacant	4,164	-	-	-	4,164

Source: RDG Planning and Design; City of Mandan

Storefront Rehabilitation Program

The Storefront Rehabilitation program started in 2006 and grants forgivable loans to commercial property owners who rehabilitate building façades. Eligible properties must be commercially used and located in one of the downtown zoning districts or along Memorial Highway. The loans are forgiven over 5 years upon project completion.

Table 29 shows data on the 38 projects completed in the Downtown Study Area and Figure 72 their location. Table 30 shows the number of projects by year. Two projects were completed along Memorial Highway since the project was extended to this area in 2014; two projects in the Downtown Fringe Area.

The storefront rehab program cannot be used in conjunction with the citywide commercial rehab tax exemption for building improvements. However, the program can be used in conjunction with the Renaissance zone program.

Table 29: Downtown Core Storefront Rehabilitation Program

Downtown Core Storefront Rehabilitation Program	$ Value
Total Project Investment	$1,555,780
Average Completed Private Investment	$45,758
Average Award Reimbursed	$10,514
Total Award Reimbursement	$357,479
Net Private Investment	$1,198,301

Source: RDG Planning and Design; City of Mandan

Nearly all properties using the storefront rehabilitation incentive fall within and are eligible to apply for the Renaissance Zone incentives. Table 31 shows the differences between façade projects that were also Renaissance Zone projects.

Many existing businesses that are not looking to expand or undertake new construction appear to use the façade program for smaller facade repairs and maintenance of the downtown streetscape. Renaissance Zone projects by their nature should be impactful projects, under strict review and evaluation by the State.

Table 30: Completed Projects by Year

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of Completed Projects	6	8	8	8	1	4	7	4	1	8	4*

Source: City of Mandan

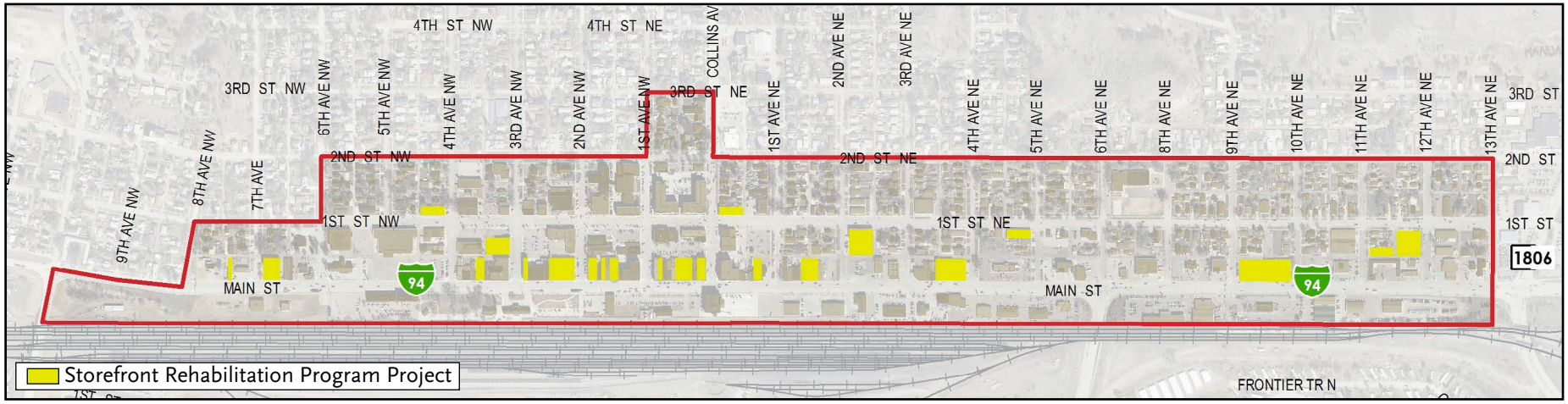
*Projects Still in Progress

Table 31: Location of Storefront Rehabilitation Projects

	In Renaissance Zone	Not In Renaissance Zone
Total Properties	18	20
Average Project Investment	$73,968	$20,683
Average Award Reimbursed	$11,553	$9,591

Source: City of Mandan

Figure 72: Downtown Storefront Rehabilitation Projects



Historic Tax Credit Program

The final incentive targeted for the downtown study area are Federal and State Historic Tax Credits, 20 percent and 25 percent respectively, available for buildings within the Mandan Commercial Historic District. Generally, properties must be income-producing buildings and work must adhere to the Secretary of the Interior's Standards for Rehabilitation. Currently, Mandan staff sends all projects altering the exterior of a building within the historic district to the North Dakota State Historical Society for review and comment. Therefore, it would seem beneficial for these properties to apply for the tax credits while taking advantage of other programs.

However, no properties in the Historic District have used the tax credit program, while 19 properties within the Historic District completed Renaissance Zone projects and 27 completed storefront rehab projects. The lack of interest in historic tax credits could be from several reasons, including:

- The application and approval process through the National Park Service is perceived to be cumbersome
- Typically smaller façade projects do not receive as great of a financial benefit from tax credits
- Property owners are hesitant to follow Secretary of the Interior Standards for interior rehabilitation work
- Property owners do not fully understand the benefits that tax credits can provide

Program Evaluation

Evaluating the effectiveness of any incentive program can be challenging. Many benefits and costs when incentivizing new and expanding businesses are intangible with no clear method of measurement. Nonetheless, the primary goal of targeted incentives for downtown Mandan is urban revitalization. Opportunities for evaluation include:

- Opportunity Costs. Could the money used for incentives be better used on other projects such as infrastructure?
- Market Impacts. Are there new or sustained businesses that increase the vitality of downtown?
- Quality of Life. Are there fewer vacancies, increased residents, and improved character in the downtown district?
- New Revenue Streams. Do projects lead to a more diverse revenue base in the future?
- Spin-off Effects. Is there the potential to generate additional demand as a solidified commercial/residential market develops.

For the purposes of this plan, metrics for evaluation include project costs and additional tax revenues, residential population, and intangible benefits.

Program Costs

The City of Mandan has made a commitment to downtown's viability and character, with over $655,000 in exemptions and loans granted since 2005, not including state level income tax exemptions. The project costs for the incentive programs targeted at downtown are listed in Table 32.

Table 32: Program Costs in Downtown Study Area

Program	Estimated Local Taxes Exempted (Through 2017)	Loan Awards
Renaissance Zone	$299,019	
Storefront Rehabilitation		$357,479
Total Targeted Costs since 2005	$655,498	

Source: City of Mandan

Property Values

Investment in buildings has a direct effect on assessed value of the property and could indirectly affect the value of surrounding properties by creating a desirable business and living environment. Determining increases in assessed value is the most straightforward method for insight into whether an incentive program is producing monetary benefits to the city.

However, it is important to note the incentive alone is not the only cost for these programs. With additional investment downtown comes potential additional costs from increased building activity. These include infrastructure costs, improved downtown programming, public space maintenance, and general staff time reviewing applications and property inspections – all which are beneficial for downtown success and on-going investment in downtown – but nonetheless these costs should not be overlooked when interpreting property values.

Renaissance Zone

Table 33 shows the change in property tax revenue to the city on Renaissance Zone projects. In 2017, the city has already received more property taxes than the total exemptions since the program began, by roughly $146,000.

All projects at the beginning of the program received tax exemptions. Property tax exemptions reduce tax revenues and thus showed a reduction in tax revenue from 2007-2011. However, increased building valuations increase property tax revenues. These first projects came back into the local revenue stream in 2011. Since 2011 there has been a net increase in local property tax revenue from Renaissance Zone projects.

These estimates are conservative. Many project sites continue to increase in value after project completion. The state income tax exemptions to these businesses and residents add even more savings and the opportunity for additional investments.

These projects currently make up a good portion of the downtown retail base and contribute to increased sales potential and spin off shopping in the entire district. New commercial development can generate additional sales tax revenues, generally from retail and restaurants. As previously shown in Table 24, new construction from the Renaissance Zone program varied in use types. Assuming rehabilitation projects sustained existing business or resulted in a new business, Renaissance Zone projects could generate/sustain around $273 thousand in annual sales tax revenue as shown in Table 34.

Note the analysis does not include service industries that may have taxable sales, or indicate that sales revenue is a direct result of the RZ incentive since these businesses may have chosen other areas in Mandan to locate.

*Table 33: Net Local Property Tax Gain**

	Net Cost/Benefit Local Tax Exemption	Total Property Tax Exempt	Total Property Tax Revenue
2007	($22,473)	$22,473	$0.00
2008	($29,713)	$29,713	$0.00
2009	($28,299)	$28,299	$0.00
2010	($28,597)	$28,597	$0.00
2011	($31,304)	$31,304	$0.00
2012	$32,220	$13,400	$45,619
2013	$18,256	$31,320	$49,576
2014	$41,943	$30,121	$72,065
2015	$35,974	$28,904	$64,877
2016**	$63,661	$27,564	$91,225
2017	$94,882	$27,324	$122,207
Total	$146,549	$299,019	$445,568

*Considering yearly tax rate changes and no increases in building value after project completion

**No projects completed in 2016

Source: City of Mandan, RDG Planning and Design

Table 34: Sales Tax Revenue of Renaissance Zone Improvement Projects

Area	Retail SF	Restaurant SF	Potential Sales	Potential Annual Sales Tax Revenue *
Renaissance Zone	50,920	13,619	$16,134,750 - $22,588,650	$195,395 - $273,553
Downtown Study Area Sales Capacity (2016)	198,107	93,621	$72,932,000 - $102,104,800	$963,372 - $1,348,722

*Sales for retail and limited service restaurant uses generally range between $250-$350 per square foot; 1% sales tax and 1% restaurant tax

Sources: RDG Planning and Design; Urban Land Institute

Storefront Rehabilitation Program

Properties participating in the storefront rehab program saw increases in total valuation similar to commercial properties in the study area as a whole. Renaissance Zone projects had a large influence on increased values in the district and storefront rehab projects, a 217 percent increase for storefront rehab projects also designated as Renaissance Zone projects compared to a 122 percent increase in total value for storefront projects alone. Table 35 shows the amount of investment and increase in total valuation.

Noted previously, the city offers a 3-year tax exemption on the increase in assessed value for rehabilitation of commercial properties. However, the two programs cannot be used together.

The façade program is likely more beneficial for downtown properties, especially smaller scale projects where a property owner merely wants to upgrade their building but does not have immediate funding. The average downtown commercial building was built in 1965. After 60 years, many of these buildings are still in good condition, but need repair to exterior elements exposed to weather conditions. Figure 73 shows the year buildings were built downtown.

Residential Population Change

Two RZ projects included new residential units – a direct impact to downtown (two storefront rehab projects were also in buildings with upper story residential units). While the trend across cities toward downtown living may be attributed to the demand for units, developers take some level of risk to undertake residential projects in new market areas, especially where few comparison projects exist.

Little new residential activity has occurred downtown aside from Renaissance Zone projects and subsidized affordable housing. Nearly one third of the current multi-family square footage in the downtown area is attributed to Renaissance Zone projects. Table 36 shows the estimated change in downtown's population and Table 37 the number of new units in the past 15 years. These types of mixed use projects can be a catalyst to change the environment of a block and spur additional downtown development.

Potential Intangible Benefits

While it is hard to determine whether intangible benefits of urban revitalization in downtown Mandan are directly attributable to the use of incentives, it is fair to determine that overall increases in commercial and residential activity improve the atmosphere, character, and desirability to live, work, and play in downtown.

Table 35: Storefront Rehab Project Building Values

	Study Area*	All Rehab Properties	Rehab Also RZ	Rehab Not RZ
Average Total Value 2005	$177,872	$111,368	$121,976	$107,737
Net Private Investment		$1,198,301	$1,183,486	$372,294
Net Private Investment per Project		$31,534	$65,749	$18,615
Average Building Value 2016	$351,609	$239,932	$287,267	$197,330
Average Total Value 2016	$411,221	$310,894	$386,939	$238,853
% Increase in Total Value	131%	179%	217%	122%

*Only commercial properties

Source: City of Mandan, RDG Planning and Design

Table 36: Population Change

Year	Downtown Mandan*	Percent Change	City of Mandan	Percent Change
2000	1,388		16,718	
2010	1,460	5.2%	18,331	9.6%
2015	1,582	8.3%	21,382	16.6%

*Census Tract 201 - Block Group 2

Source: U.S. Census, ESRI Community Analyst

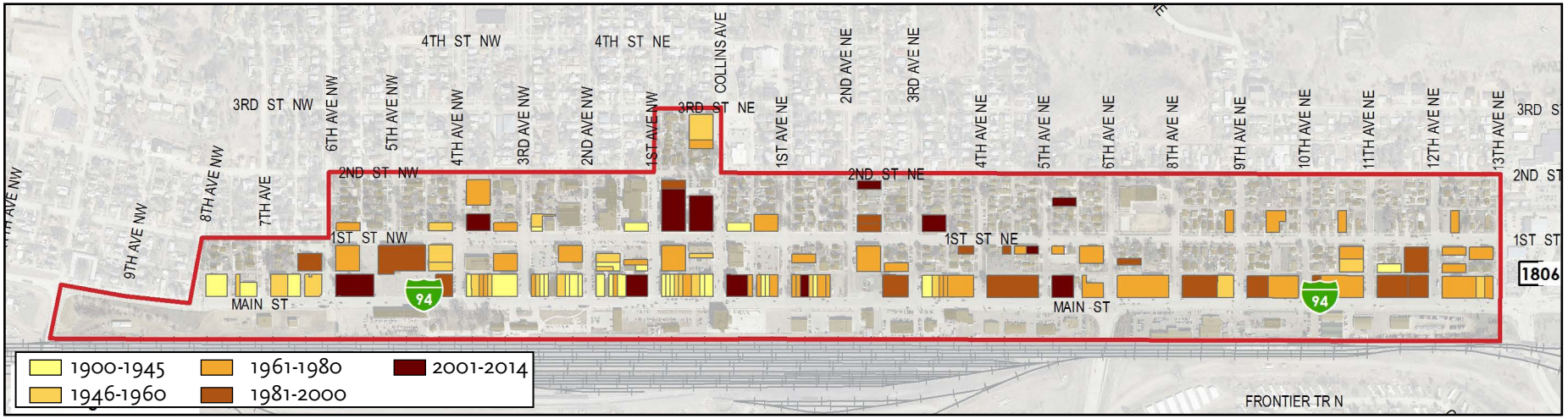
Table 37: New Downtown Residential Units (2003-2016)

Location	Year	Units	Assistance
Library Square - 100 1st Street NW	2003	46*	
Library Square - 100 1st Street NW	2009	45*	
Mandan Plan - 101 1st Avenue NW	2011	28	Renaissance Zone
Collins Plan - 100 Collins Avenue	2014	29	Renaissance Zone

*Affordable senior housing

Source: City of Mandan

Figure 73: Year Building Built



Public Space Assessment & Audit

Figure 74 identifies Downtown Mandan's current public and open space, while Figure 75 identifies street closures for special events. The assessment considers areas for public gathering for day-to-day activities and special events. Mandan's most notable public spaces are Dykshoorn Park and Heritage Park. Downtown has many other public spaces that attract people and function as a park, including Main Street, Heritage Plaza, and even City Hall and Public Library.

Figure 74: Current Public Spaces

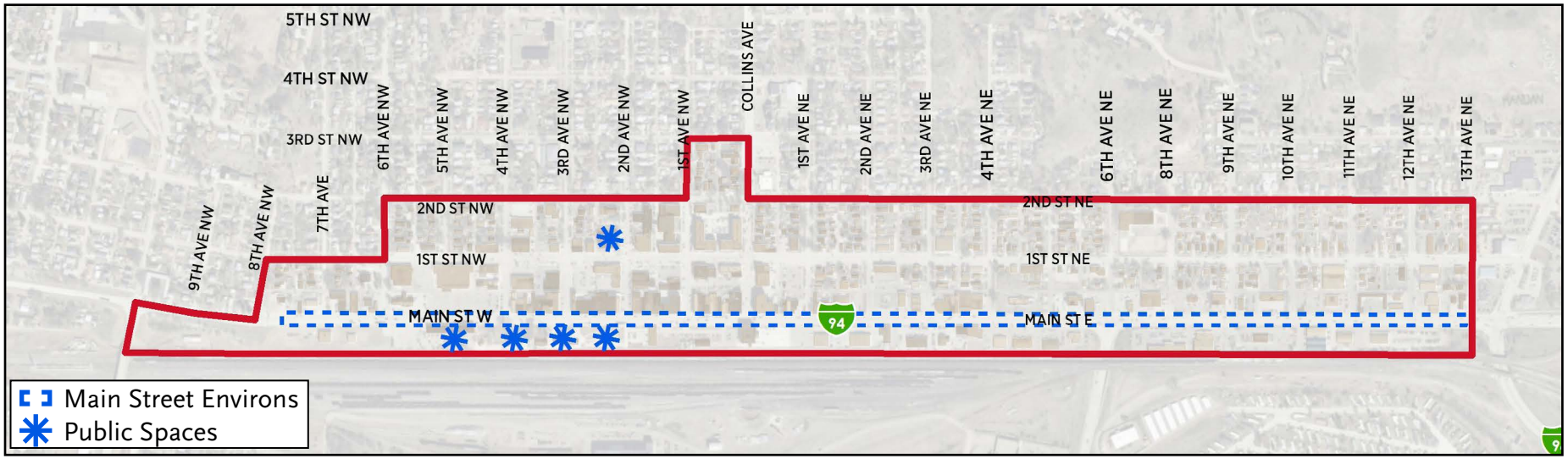


Figure 75: Street Closures for Events

Street Closures for Events

A Oktoberfest and Grill Fest
B Art in the Park (A+B+C)
C Santa Arrival
D Touch-A-Truck
E Buggies-n-Blues

Dykshoorn Park

Dykshoorn Park is Mandan's premier park that shares in the programming for all the city's community events. Bordered by Main Street and the rail yard, the park consists of a large open space with shade trees. A band shell at its west edge is the center attraction. From May to October, Dykshoorn Park hosts an event nearly every day and a major community event every month. During the winter holidays, the park is decorated with an 82-piece display.

Dykshoorn Park is in excellent condition. Several challenges are present and should be considered when planning improvements to downtown, including:

- **Conflicts between pedestrian movement and highway traffic.** Dykshoorn Park is a major attraction for people. Yet, crossing Main Street to the park or walking on the sidewalk along the park is challenging for pedestrians. Pedestrian crossing signs are posted for motorists to yield for pedestrians on Main Street at 4th Avenue NW and 2nd Avenue NW. However, pedestrians fear that drivers will not stop for them to cross, and often dart across the street when there is a gap in traffic. In addition, walking the sidewalk between Main Street and Dykshoorn Park is uncomfortable for pedestrians. The speed of traffic is concerning for pedestrians, and noisy trucks splash them with snow, water, and dirt. Altogether, Main Street presents a challenge to people's enjoyment of Dykshoorn Park.
- **Temporarily rerouting traffic.** During special events, segments of Main Street are closed and traffic is detoured to 1st Street. Detours pose a circulation challenge, yet limits the number of conflicts between pedestrians and vehicles. As trucks maneuver for their detour, they sometimes damage planters and other items in their path.
- **Loss of trees.** In recent years, several trees have been removed in Dykshoorn Park because of ash bore infestation or strong winds. The Mandan Progress Organization has replaced several lost trees with more mature trees to retain the tree canopy.
- **Buffer between park and railroad.** The railroad, albeit an attraction itself, will occasionally disrupt activities at the park. The fencing could be upgraded from a chain link fence to an attractive feature.

Table 38: Dykshoorn Park Events

Dykshoorn Park Events
Summer Concert Series. Outdoor concerts occur most summer weeknights, Monday through Thursday. Dakota West Arts Council provides a stipend to performers.
Touch-A-Truck (May). First held in 2016, this event was a success, offering children an up-close, hands-on opportunity to explore heavy machinery, safety vehicles and other cool trucks.
Buggies-n-Blues (June). Buggies-n-Blues is an annual event that includes a car show, parade of classic cars on Main Street Mandan and block party dance at Dykshoorn Park featuring music in downtown Mandan. Food booths and beer garden. Sunday is a classic car show, featuring more than 500 cars, swap meet, business vendors and music in the Dykshoorn Park, beer gardens and food vendors.
Art in the Park (July). The Art in the Park Festival is held in conjunction with Mandan Rodeo Days and Fourth of July Celebration. It has grown to be a popular event, attracting 25,000-30,000 visitors from across North Dakota and surrounding states. Location of the festival is in the Robert Dykshoorn Park and Heritage Park which are along the parade route on Main Street in Mandan. They will host art and craft booths as well as food booths and cultural entertainment. Proceeds of the shows have gone toward park improvements, scholarships and the public library. Previous monies have paid for landscaping, underground sprinkling systems and band shell.
Lunch for Heroes (July-August). The Mandan Public Schools and Morton Mandan Public Library sponsor free lunch for people under 18 in Dykshoorn Park
Back 2 School Extravaganza (August). The public library hosts a free event with school-age children before school starts. The event includes self-guided crafts, book giveaway, prizes, and a concert.
Wild West Grill Fest (August). Area restaurants and novices compete with their grilling. The event features live music, beer garden, art and craft vendors and a Farmer's Market.
Oktober Fest (September). Oktober Fest celebrates German food, live music, fall crafts, games and contests for all ages, and beer tasting.
Private Events. Dykshoorn Park can be rented for private events. In a typical year, the park will be rented for 4 to 5 weddings over the weekend. A modest deposit is required for potential clean-up of the park.

Heritage Park and Plaza

Heritage Park is primarily an open lawn with a meandering path that connects the depot to the businesses towards the east. Benches, ornamental lighting, and small trees appear throughout the park and features a small fountain on its eastern edge. Parking is available behind the greenspace near the railroad tracks. Heritage Park is in excellent condition. Several challenges are present and should be considered when planning improvements to downtown, including:

- **Safety of the fountain.** The fountain is a fun attraction for children, yet is not adequately designed to be an interactive water feature. Children will splash in the water and sit on the spigot. Sitting on the spigot causes the water pressure to build up and occasionally fail because of blocking the spigot. The fountain consists of recycled water, which for an interactive water feature for children should be potable. All of the concrete and rock surfaces present more concerns of children falling and hurting themselves. The Heritage Foundation has installed signs to prohibit people from climbing the fountain, which has cut down the number of problems.
- **Conflicts between pedestrian movement and highway traffic.** Similar to comments to Dykshoorn Park, traffic along Main Street is noisy and presents a challenge to people's enjoyment of Heritage Park.
- **More interactive features.** Participants in the planning process express a desire to attract more people by having more art and water.

Table 39: Heritage Park Events

Heritage Park Events
Santa's Arrival & Shop Small Saturday. An event for children to greet Santa and take photos at Heritage Park and Plaza. Main Street is partially closed during the event as pedestrians will walk from downtown to the temporary fire pits in Heritage Park.
Farmer's Market. The Mandan Farmers Market has been held in Mandan for about 30 years with an average 5 vendors each market day. The market is open on Tuesday (morning), Thursday (afternoon), and Saturday (morning). Vendors offer locally grown foods, homemade products, food related sales, green or organic items.
Flea Market. Money raised from the market goes to planting trees in the park.
Touch-A-Truck. See Dykshoorn Park for Description.
Art in the Park. See Dykshoorn Park for Description.

space between the buildings includes a pergola, informational kiosk and signage that tell the backstory of Mandan's railroad, Native Americans, rodeo, region, agriculture, trails and transportation.

Beanery Building and Depot

The Beanery Building is owned by the City of Mandan and leases space to Mandan Progress, The Dakota Store, and Susie Q's. The building has been upgraded significantly since being reoccupied in ~2008 and is in good condition today. Mandan Progress manages the upkeep of the building and continues to complete minor renovations with the help of fundraising. Emerging issues include:

- **Access Point.** Entrance to the Beanery Building is from the south side of the building, facing away from Main Street. Having a more visible entrance may attract customers and visitors to the Beanery Building.
- **Landscaping.** The landscaping around the Beanery Building and Depot could be further enhanced with shrubs, flowers, and ornamental trees.

Morton Mandan Library

Located at 609 W Main Street, the Morton Mandan Library renovated the historic Northern Pacific Railroad freight warehouse in 2006. The facility supports library services for both Morton County and the City of Mandan. Also, it operates as a museum space with historic exhibits distributed throughout the library. Emerging issues include:

- **Operating at Full Capacity.** The library is at full capacity. The current library is 12,000 square feet. According to the North Dakota Library's Standards for Public Libraries, a library servicing a population of 25,000 or more should have a minimum of 25,000 square feet. Mandan's population estimate for 2015 is over 21,000 while Morton County is over 30,000. The Mandan Comprehensive Plan (prepared in 2015) projects a 2030 population of ~28,500, while the Plan Facilities Assessment Report (prepared in 2015) projects a 2035 population of 30,000.
- **Commission a study.** The library should commission a study for renovation/addition or identifying a new site as it currently does not meet state standards for libraries.
- **Continue programming.** The library hosts a free event with school-age children in Dykshoorn Park called Back 2 School Extravaganza (August). This popular program and many others should continue.

City Hall

The City of Mandan completed a Facilities Assessment Report in 2015. The study considered Mandan's growing population and providing adequate services that respond to the needs for a population of 30,000 by 2035. City Hall dedicates 15,500 square feet for its 33 staff members. Space is at capacity and yet they have the potential need for 21 additional staff members by 2035. To accommodate this growth, City Hall needs to either renovate its 26,790 total square feet or relocate. Issues described in more detail in the report include:

- Inadequate heating, cooling, and ventilating
- End of life mechanical and electrical systems
- Building code and ADA compliance issues
- No security – multiple public entries
- Inefficient and inflexible spaces
- Minimal public interaction spaces
- Out of date technology

Table 40: City Hall Impact of Growth

	2015	2020	2025	2035
City Staff	33	40	49	54
Projected Space Need	18,000	22,400	23,950	24,950
Projected Population	19,777	25,828	28,563	30,000

Source: City of Mandan Facilities Assessment Report, JLG Architects, 2015

Main Street Environs

Main Street is one of Mandan's principle centers for commercial and civic life that hosts a mix of retail, offices, and housing. Newer projects, like the Collins Place and American Bank renovation, establish a design standard for new and old projects. Despite these newer projects, Main Street's character changes from end-to-end in the study area and discussed below.

- Downtown Core. Downtown is the most distinguishable business district in the city, lined with early-1900s buildings and newer mixed-use structures. Main Street's south side exhibits many civic qualities with the presence of the library, parks, and depot.
- West Gateway. Travelers approaching downtown from the west on Main Street start near the railroad overpass at 10th Street. As drivers approach downtown, they see Main Street curving but not before they see a dirt parking lot and industrial-looking storage building. Reaching the library signifies the first sense that they are arriving to downtown, and motorists begin to slowdown. The open views and wide lanes naturally motivate the driver to increase their speed until they reach the library.
- East Gateway. Travelers approaching downtown from the east on Main Street starts near the railroad underpass at 6th Avenue E. From 6th Avenue to 2nd Avenue E, Main Street is bounded by auto-oriented commercial uses. Some buildings are built to the property line like those in the downtown core, while others are setback with a bay of parking in front. Travelers often feel that they have arrived to downtown once they near Collins Avenue.

Design challenges facing Main Street as a public space include:

- Sidewalks are too close to the street. Sidewalks along Main Street accommodate pedestrians, yet the proximity of the sidewalk to the street creates a degree of discomfort for pedestrians walking or sitting outside near busy traffic. Crossing Main Street for events is difficult as pedestrians often do not feel that they have the right-of-way unless the street is closed.
- Lack of streetscape. The streetscape for Main Street should continue to evolve and refresh, providing a positive and memorable experience to attract returning customers and private investment in downtown. The corridor lacks pedestrian-scaled lighting, furniture, art, landscaping and planters, signage and graphics. Visually, the expanse of concrete for the street and sidewalks presents a challenge - downtown looks gray with the exception of the buildings and parks.
- Inconsistent development character. Development outside of the core is sometimes setback with parking in front and sometimes on the property line. This inconsistency in the design, however minor, creates confusion for visitors who have a set of expectations for the feel of a downtown.
- Cleanliness and maintenance. Sidewalks are inconsistently cleaned from storefront to storefront, particularly after a snowfall.
- Improve Alleys. The alleys are used for circulation within the block. Business owners have private entrances and parking from the alley. Most businesses place their trash receptacles nearby. Participants in the planning process desire to see the alleys become more attractive for pedestrians, and possibly serve as additional access points to businesses facing Main Street. They desire to see the alley as a potential attraction, much like the alley art program in Bismarck.

Policy & Ordinance Evaluation

Ordinance Amendments

The framework of the Mandan zoning ordinance recognizes that downtown is different and should be subject to different standards. Two districts – the Downtown Core and Downtown Fringe – require additional review for all project types.

- Downtown Core district - maintain a mixed-use and pedestrian friendly environment, while exhibiting historical integrity, quality design, and human scale development.
- Downtown Fringe district – build on the activity in the downtown core by preserving more residential uses as a transition to areas with differing character and intensity, limiting the density of commercial uses through site coverage and open space requirements.

The applications for development are reviewed by the Mandan Architectural Review Committee (MARC). The zoning ordinance often defers design review to the MARC with guidelines, but little detail on what could be required. While the members of the MARC likely know the principles and context of quality design, developers and property owners may not.

It is important to specify desirable development upfront through objective standards, understanding that guidelines are sometimes appropriate where the expertise of the MARC is needed to evaluate context sensitive elements. More objective standards reduce surprises for developers looking to build in Mandan and ensures fair treatment on all properties.

Current Guidelines for Approval:

1. Site layout, orientation, location and structures in relationship to one another and to open spaces and topography. Definition of pedestrian and vehicular areas (i.e., sidewalks as distinct from parking lot areas).
2. Harmonious relationship with existing and proposed adjoining developments, avoiding both excessive variety and monotonous repetition, but allowing similarity of style if warranted.
3. Maximum height, area, setbacks and overall mass, as well as parts of any structure (i.e., buildings, walls, screens, towers or signs) and effective concealment of all mechanical equipment.
4. Building design, materials and colors to be sympathetic with surroundings.
5. Harmony of materials, colors and composition of all sides of the structure which are visible simultaneously.
6. Consistency of composition and treatment.
7. Location and type of planting, with due regard for climatic conditions. Preservation of specimen and landmark trees upon the site with proper irrigation and pruning to ensure maintenance of all plant materials.
8. Design and appropriateness of signs, as well as interior and exterior lighting.
9. Graphics, as understood in architectural design

With the variety of building and use characters in the downtown zoning districts, particularly the downtown core district, zoning standards can be more tailored. Design standards to develop and expand upon the guidelines in both downtown special districts:

- Currently, building treatments are often guided by how adjacent buildings look. This could be troublesome for developers and the MARC to evaluate if adjacent buildings lack architectural quality, differentiation, or good site design. Consider more formal material and treatment standards to avoid blank walls and/ or reference compatibility with buildings on the block rather than only those adjacent to the project.
- Further describe screening of all mechanical equipment in addition to rooftop equipment. Either behind the building, with landscaping, or similar paint colors. For example, utility meters on building walls or air conditioning units.
- Expand landscaping standards to include specific treatments for parking lots (interior and perimeter), building foundations, and buffer areas when adjacent to residential uses.
- Require landscaped areas in parking lots and buffer areas have some trees or decorative elements other than simply grass. While grass is considered a landscaped material in the ordinance, grass does little to provide shade or aesthetic elements to a site.
- Clear parking standards should be developed. These include location and treatment of parking lots accessory to building uses even if no minimum amount of parking is required. Considerations for whether to require bicycle parking for properties in the Downtown Core are desirable as bicycle routes extend toward downtown in the future.

Downtown Core District

Design standards to develop and expand upon in the Downtown Core District:

- Restaurants and coffee shops often find it desirable to have outdoor seating areas when the seasons allow. Buildings that occupy entire lots leave little opportunity for outdoor seating. While the city may allow seating in the public

right-of-way, the municipal code should explicitly state "sidewalk cafes" are allowed and detail requirements to ensure the design benefits both the business and the downtown pedestrian.

- Require new projects maintain an 8 foot sidewalk along the street and incorporate pedestrian routes leading from sidewalks/parking areas to building entrances.
- Continue to forward projects that fall within the Commercial Historic District to the State Historical Society.
- Adjust signage standards for the pedestrian environment downtown.
  - Reduce the maximum size of projecting signs to below 10 square feet or add another sign category allowing blade signs for storefronts at the pedestrian level.
  - Continue to allow sidewalk signs, but require there be at least 4 feet of unobstructed sidewalk when in place.
  - Add size requirements for window signs. A transparent window does little if visitors cannot see in the storefront. A standard of 15-25% of the window area is reasonable.

Downtown Fringe District

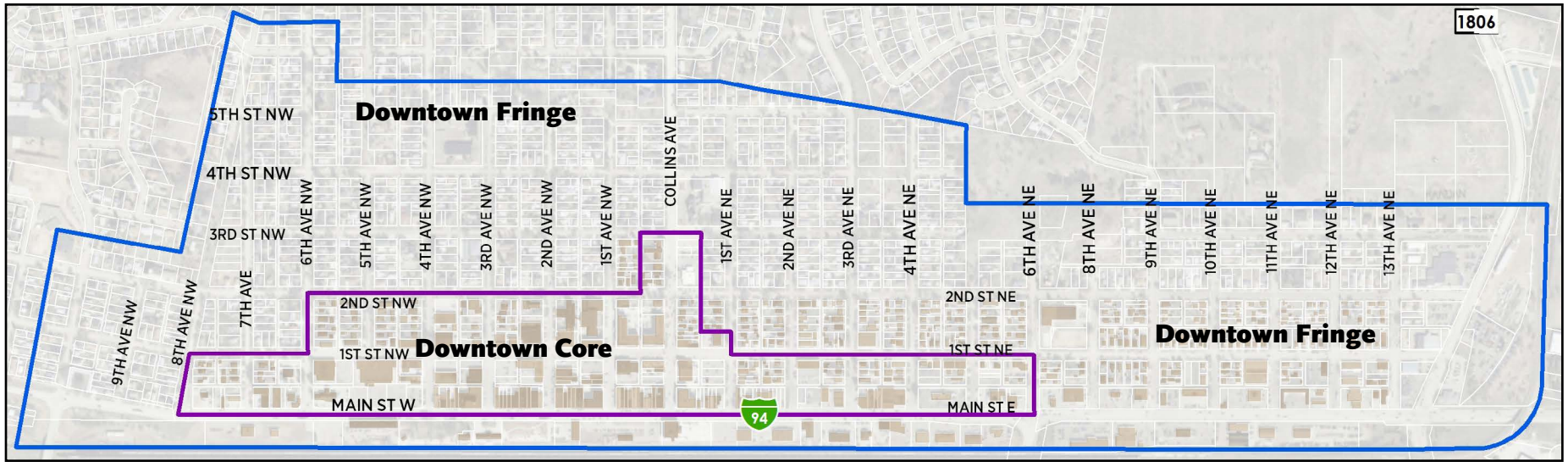
The Downtown Fringe District contains mostly residential uses on small lots around 7,000 square feet or less. Areas on the east end of the district are more commercial/light industrial in nature while areas on the north and west are established residential neighborhoods. Standards for non-residential development in the district reduce the feasibility of these projects on smaller lots, requiring the use of larger lots.

- Multi-family is allowed in the Fringe at high densities, up to 30 units per acre. A 7,000 square foot lot can have 4 units (25 units/acre) and a duplex can be on a lot as small as 5,000 square feet – although feasibly limited through parking and maximum building coverage requirements. Nonetheless, the district is set up to preserve the existing neighborhood fabric. However, with the variety of uses allowed additional steps should be taken to protect residential uses and make the area a desirable place to live.

Design standards to develop and expand upon in the Downtown Fringe District:

- Consider specific buffer treatments for non-residential uses, in addition to general setbacks, to protect potential adverse effects on residences. These can include evergreen tree plantings, opaque fences, berms, and orienting parking areas away from residential property.
- Auto repair garages and limited auto service uses should require a special use permit. These uses by nature conflict with residential uses and should require additional treatments and consideration by the neighborhood.
- Constructing multi-family units on existing lots is limited by building coverage maximums and parking requirements (appropriate in most cases). In addition,

Figure 76: Downtown Zoning Map, 2017



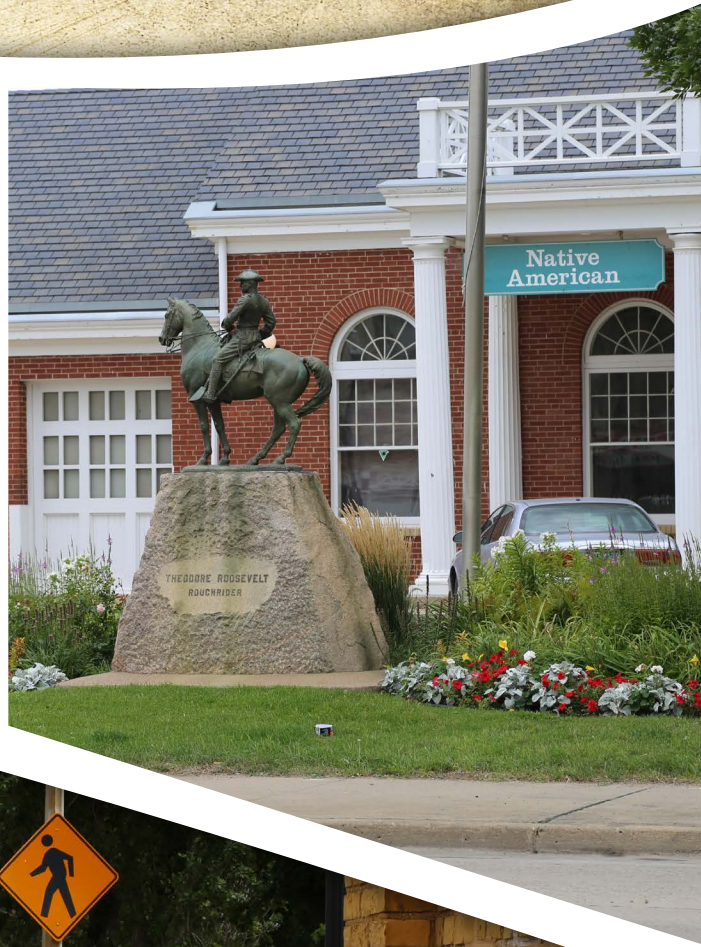
many people looking to live close to downtown often are younger people and seniors. Both have a desire to be within walking distance of a variety of amenities, while not demanding a lot of living space. To complement these trends zoning should allow accessory dwelling units (ADU).

Generally, an ADU means a residential dwelling unit located on the same lot as a single-family dwelling unit. ADUs can be in the same building as the single-family dwelling unit or in a detached building such as above a detached garage or out building. ADUs should not be allowed on lots under 7,000 square feet and be subject to all other site requirements in the RM district, although can be exempt as a dwelling unit for parking requirement calculations. Generally, an ADU means a residential dwelling unit located on the same lot as a single-family dwelling unit. ADUs can be in the same building as the single-family dwelling unit or in a detached building such as above a detached garage or out building. ADUs should not be allowed on lots under 7,000 square feet and be subject to all other site requirements in the RM district, although can be exempt as a dwelling unit for parking requirement calculations.

RDg... PLANNING • DESIGN

LAND USE AND DEVELOPMENT ALTERNATIVES

KLJ



DEVELOPMENT PROGRAM

The development program for downtown Mandan combines the input received from the public, the review of current conditions and trends, market potential, previous plans and studies, and recommendations by the consultant team to create feasible and realistic alternatives for future implementation. The development program begins much like the architectural program for a building project. This program identifies the ingredients of development – the amount of space and mix of commercial and residential projects, present and future possibilities, public spaces, aesthetics, and other opportunities. Generally, the ingredients for success can be organized into three agendas: development, community, and function.

Development Agenda

The development agenda is based on the development potential of retail, office, residential, and cultural uses.

Redevelopment areas. The success of recent mix-use developments shows that new, unique projects can succeed downtown. Strategies to identify opportunity areas should focus on sites that are under used, vacant, blighted, or incompatible with surrounding buildings and uses. These areas were previously described "subject to change". The plan does not prescribe their redevelopment, but recognizes that a market demand may exist for their redevelopment.

Building reuse and preservation. There is a strong building stock in downtown. Many of the vacant buildings are not beyond rehabilitation or repair. Some of the buildings may not provide adequate space and may need to expand to larger spaces, which opens the building to new opportunities. Reuse can reduce development costs and present opportunities to preserve buildings for other uses.

Residential options. Growing population and recent housing studies show a need for moderate increases in downtown residential units. Conversion of vacant upper floors that retain original interior features, and new mixed-use development throughout downtown are most marketable for young professionals looking for a unique setting and limited maintenance, as well as seniors looking to downsize.

Public Space options. Having two heavily used parks in a downtown is a great asset for Mandan. Accessing these parks can be challenging for pedestrians as the traffic on Main Street creates a psychological barrier. Strategies should be considered to unite the public spaces to areas north of Main Street, and create a series of connections between other plazas, parks, and landscaping to create a more attractive pedestrian environment.

Community Agenda

The community agenda is based on goals and recommendations that enhance the image and experience of being in downtown, while reflecting the citizen's desired outcomes for the downtown area.

Expanded arts, culture, and civic uses. Mandan's public facilities are undersized and need more space. Development concepts consider strategies to expand the library and city hall. Other strategies to incorporate art galleries, museums, co-working spaces, and other niche uses will help leverage the vision of Downtown Mandan as a memorable destination for visitors and residents in the metro region.

Leverage downtown events. Downtown is the hub of community activity and consistent daily activity. Strategies for redevelopment should look to add more gathering spaces, such as a community market or special event space. The success of downtown revolves around giving people a reason to visit the downtown.

Promote downtown as a destination. Downtown is like a business. Active promotion and marketing informs customers about activities, things to do, new businesses, and other amenities. Strategies to brand downtown through signage, gateways, and general appearance establish an image in visitor's minds. Creating a business group to oversee implementation and maintenance of downtown can spread efforts and responsibilities to give many stakeholders a sense of ownership in the district.

Beautify downtown. Aesthetic improvements go a long way to create a place customers enjoy. Lighting, landscaping, public art, and streetscape furniture improve the pedestrian environment for a memorable experience.

Preserve history. Mandan's downtown is a National Historic District. Strategies should preserve and enhance the historic status of Main Street and maintain the building appearance in the district.

Embrace the neighborhood. Downtown quickly transitions into an established residential neighborhood. All strategies should respect the transition from commercial development to residential uses through buffering, step-down density, and other means to make downtown a feature of surrounding neighborhoods rather than a perceived boundary.

Functional Agenda

The functional agenda is based on improving access to, and circulation through, the downtown area - a primary focus later in this plan. The functional agenda works as part of the development and community agendas to reach a cohesive and connected program for development.

Evaluate Main Street configuration. Main Street is a heavily traveled four-lane road. Development scenarios should inform the transportation modeling phase of this plan that considers trip generation for future commercial and residential possibilities. Projections for future development should guide alternative configurations to Main Street.

Improve pedestrian safety. Traffic on Main Street competes with pedestrians walking on the sidewalks and attempting to cross the street. This creates a safety concern for pedestrians. Strategies should look to maximize pedestrian safety through improvements to crosswalks, traffic signals, and traffic movements.

Activate the alley. Alleys serve a functional use for loading and unloading at the rear of businesses. Also, they serve as walkways between the customer's parking spot to an entrance of a business. Alleys are often overlooked as public spaces, and several communities are realizing that the slower speeds and lower traffic volumes make alleys ideal candidates for shared spaces for vehicles and pedestrians.

Improve parking design. Some of downtown's parking areas are designed inefficiently. Clearly striped and signed parking areas tell visitors where and how long they can park. Functional and aesthetic improvements to new and existing parking lots are essential.

Upgrade the walking experience. Sidewalks in downtown are functional, yet could be optimized for better walkability. Unobstructed sidewalks and updated amenities create a friendly, and safer pedestrian environment that invites people to walk from business to business.

Establish a system of gateway entrances and wayfinding. Gateway features near entrances to downtown welcome the customer and define the arrival to their destination. Once in downtown, wayfinding signage identifies important destinations, parking, and gathering spaces. The system should function at two levels - the motorist and pedestrian.

LAND USE AND DEVELOPMENT SCENARIOS

The recommendations for future land uses and development scenarios are divided into two parts. The process to reach the final development program includes an analysis of what could happen in the future under certain market demands, development potentials, and city regulations on sites that are under used, vacant, or incompatible with surrounding uses. The analysis informs how a realistic future growth scenario will impact transportation to create recommendations for downtown.

Part 1 Land Use Scenarios

Part 1 focuses on land use scenarios and their implication on policy and travel demand. These scenarios range from significant new commercial space and residential units to a focus on reuse and rehabilitation of existing buildings.

Part 2 Development Opportunities

Part 2 focuses on economic development strategies to improve the quality of downtown and each customer's experience. These strategies stem from the land use scenario that has the highest probability for long term success in downtown Mandan. Strategies range from reuse, redevelopment, preservation, parking, and public spaces to lead into future transportation needs.

Part 1: Land Use Scenarios

Downtown Mandan has many opportunities for preservation and redevelopment. As markets change over time, so do demands for reusing vacant buildings or redeveloping under used sites. This section presents scenarios for development in downtown and evaluates these possibilities to determine the preferred development mix to form a cohesive, successful district. The four scenarios considered for this study include:

1. **Current.** The Current scenario assumes that conditions remain as they are with no reuse of buildings or vacant land.
2. **Hybrid.** The Hybrid scenario assumes the reuse of existing buildings and redevelopment on some sites. Existing vacancies transition to commercial, civic, and mixed-uses. Redevelopment occurs in logical locations that may transition during the next 20 years, following recent redevelopment patterns. This scenario is the target concept for economic development efforts.
3. **Mixed Build-out.** The Mixed Build-out scenario assumes that most sites will transition for reuse of existing buildings and small scale redevelopment. Additionally, select sites will experience moderate to aggressive redevelopment supporting potential market demand for new commercial and residential space.
4. **Build-out.** The Build-out scenario assumes property experiences redevelopment at a moderate to aggressive market demand. The concept includes higher-density buildings and parking to occupy most of the "Subject to Change" sites. This scenario is the target concept for modeling travel demand.

To reach the preferred and feasible development pattern and identify development opportunities for downtown, considerations for each scenario include:

- **Traffic Circulation.** How much will the alternative increase traffic and can the infrastructure support it?
- **Parking Needs**. Will the alternative eliminate existing parking or generate additional parking needs?
- **Public Input.** What do residents of Mandan want and does the alternative fill a community need?
- **Market Demand**. Is there enough demand to support uses within the alternative while also fiscally feasible for developers?
- **Land Use Compatibility and Transition.** Will the alternative be compatible with existing uses that are not anticipated to change? How much will the alternative affect residential neighborhoods?

Methodology for Land Use Scenarios

Scenarios are a projection of future conditions to inform decision making on the desired development pattern for downtown. In reality, not every property will develop the same. Each scenario is an aggregate of what could happen over time across the entire downtown. To create realistic scenarios, several assumptions need to be considered, including:

- All scenarios consider existing zoning regulations, including differences between the Downtown Core and Downtown Fringe areas shown in Table 41. However, Downtown Fringe regulations are applied to all blocks east of 2nd Ave NE to respect the character of these blocks as more residential in nature.
- Each "Subject to Change" site redevelops as a single project, meaning parcels are assembled for a larger-scale development rather smaller individual projects. Planning for a single project provides for more efficient project design and yields the most square footage for commercial use and dwelling units.
- Redevelopment projects are generic in nature, meaning the distribution of uses are comparable to recently completed projects. In other words, new projects are modeled off existing projects like Collins Place, which includes ground floor tenant space and upper-story housing.

Table 42 shows the land use mix for scenario modeling similar to existing conditions. Residential uses occur north of Main Street, reserving sites south of Main Street for commercial and civic uses.

Table 41: Zoning Code Regulations for Downtown Redevelopment

Area	Maximum Building Coverage	Maximum Building Height	Maximum Lot Coverage	Open Space Requirements	Permitted Units per Acre
Downtown Core	100%	130 feet	100%	0%	N/A
Downtown Fringe*	70% next to residential	50-75 feet	Varies based on setback	Varies based on setback	30

*Requirements vary if development is next to residential
Source: RDG Planning and Design

Table 42: Scenario Land Use Mix

	Retail	Restaurant	Service	Office	Civic/ Other	Multi-Family	Single-Family
North of Main*							
First Floors	20%	10%	20%	15%	35%		
Upper Floors				20%		80%	
South of Main							
First Floors	20%	10%	20%	15%	35%		
Upper Floors			50%	50%			

*Downtown Fringe: Under the Build-Out and Hybrid scenarios, 100% of land use is multi-family or single family
Source: RDG Planning and Design

Basic Block Redevelopment Concept Methodology

The purpose of Part 1 of this section is to understand potential travel demand because of new development and building reuse. The basic block concept is a redevelopment form that maximizes yield for commercial square footage and residential units. Smaller projects may emerge in reality, but the travel demand will be less than the basic block concept. Figure 77 through Figure 79 illustrates the terms used in the basic block diagram.

- Building Coverage: The area of a site covered by buildings.
- Building Height: The number of stories for buildings on the site.
- Lot Coverage: The amount of impervious surface on a site, including building coverage. Generally impervious areas above building coverage are considered parking areas.
- Open Space: The area of the site with pervious surface and landscaping.

For example, Table 43 illustrates recent developments under these criteria used to assign similar calculations for the different scenario.

Table 43: Characteristics of Downtown Core Redevelopment Projects

Project	Building Coverage	Building Height	Lot Coverage	Open Space	Units per Acre
Collins Place	65%	4 stories	100%	0%	77
Mandan Place	65%	4 stories	100%	0%	75
American Bank	20%	3 stories	~95%	~5%	N/A

Source: RDG Planning and Design

Figure 77: Example Building Coverage

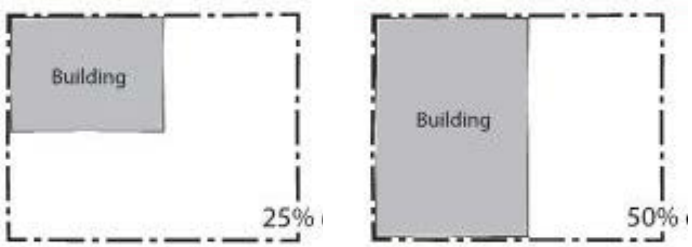


Figure 78: Building Height

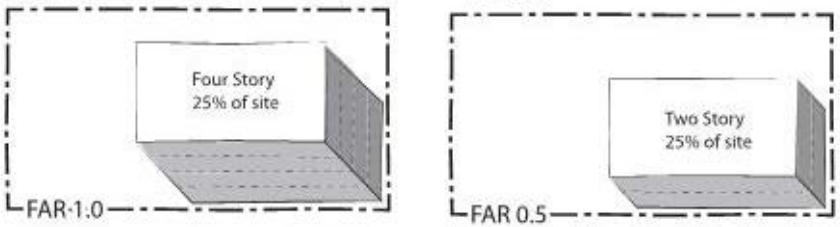
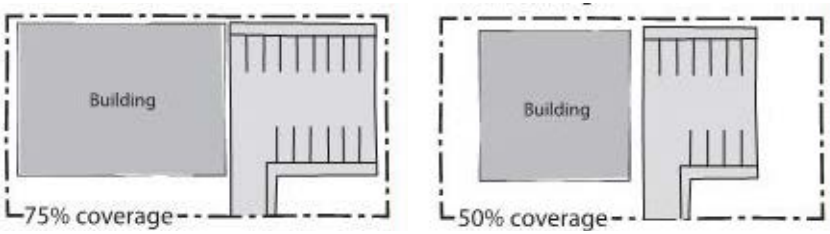


Figure 79: Example Lot Coverage and Open Space



Each of these criteria helps indicate the level of additional impact related to traffic, parking, and changes in urban form, either from more commercial space or residents living downtown. Table 44 shows the increase in intensity for each scenario.

- **Current.** Sites remain unchanged, both in building footprint and building use.
- **Hybrid.** Reuse and rehabilitation considers maximizing the use of existing buildings with minor additions for expanded uses.
- **Mixed Build-out.** Reuse and rehabilitation maximizes the use of existing buildings, while build-out occurs on selected sites to imitate recent multi-story development patterns. Sites identified for build-out in this scenario include the Central Market block, Library, and former Elks Lodge.
- **Build-out**. Build-out imitates recent multi-story development patterns, like Collins Place and Mandan Place. New projects include areas for parking, shared-space and landscaping.

"Subject to Change" sites south of Main Street and the Central Market block are assigned different development criteria based on their unique characteristics. Projects south of Main Street will rely on surface parking because of narrow lot widths. The Central Market site is treated differently because of the large lot size

Table 44: Zoning Code Regulations for Downtown Redevelopment

	Building Coverage	Building Height	Lot Coverage	Open Space
Downtown Core				
Current	15-100%	1-4 stories	Up to 100%	<10%
Hybrid	40%	2 stories	50-85%	15-50%
Mixed Build-out	40-65%	2-4 stories	50-90%	10-50%
Build-out	65%	3-4 stories	90%	10%
Central Market Block				
Current	35%	1-2 stories	100%	0%
Hybrid	35%	2 stories	85%	15%
Mixed Build-out	45%	3 stories	90%	10%
Build-out	45%	3 stories	90%	10%
Downtown Fringe				
Current	<70%	1-2 stories	Varies	Varies
Hybrid	30%	1.5 stories	60%	40%
Mixed Build-out	30%	1.5 stories	60%	40%
Build-out	40%	2 stories	80%	20%
Downtown Fringe – South of Main				
Current	<20%	1-2 stories	Varies	Varies
Hybrid (includes a new park)	0-15%	0-2 stories	20-85%	15-80%
Mixed Build-out	0-25%	0-3 stories	20-90%	10-80%
Build-out	25%	3 stories	90%	10%

Source: RDG Planning and Design

Basic Block Redevelopment Concept

Figure 81 through Figure 88 on the following pages show the Basic Block Redevelopment Concept for the four scenarios. The diagrams illustrate each scenario's total yield for commercial and residential use. The total coverage of the site by the building and its number of floors drops based on the intensity of the scenario. Again, these are generic in nature.

Figure 80: Downtown Zoning, 2017

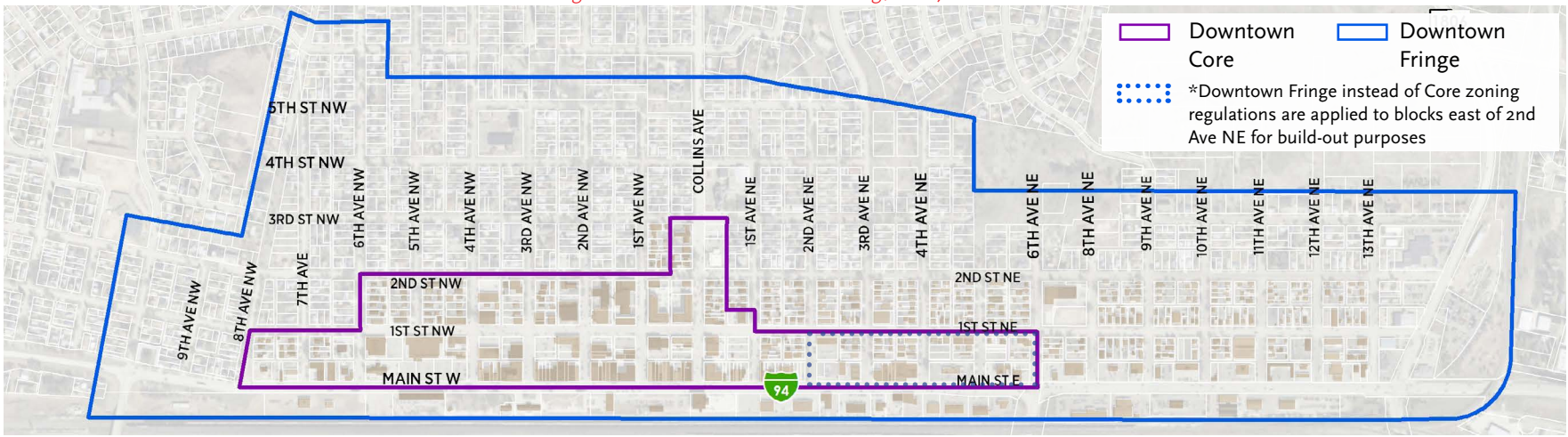


Table 46: Current Conditions

	Building Coverage	Building Height	Lot Coverage	Open Space
Downtown Core	15-100%	1-4 stories	Up to 100%	<10%
Central Market Block	35%	1-2 stories	100%	0%
Downtown Fringe	<70%	1-2 stories	Varies	Varies
Downtown Fringe – South of Main	<20%	1-2 stories	Varies	Varies

Source: RDG Planning and Design

Table 47: Mixed Build-Out Criteria

	Building Coverage	Building Height	Lot Coverage	Open Space
Downtown Core*	40%	2 stories	50-85%	15-50%
Central Market Block	45%	3 stories	90%	10%
Downtown Fringe	30%	1.5 stories	60%	40%
Downtown Fringe – South of Main	0-25%	0-3 stories	20-90%	10-80%

*Elks Lodge site built-out with 65% building coverage and 4 story redevelopment

Source: RDG Planning and Design

Table 45: Hybrid Criteria

	Building Coverage	Building Height	Lot Coverage	Open Space
Downtown Core	40%	2 stories	50-85%	15-50%
Central Market Block	35%	2 stories	85%	15%
Downtown Fringe	30%	1.5 stories	60%	40%
Downtown Fringe – South of Main	0-15%	0-2 stories	20-85%	15-80%

Source: RDG Planning and Design

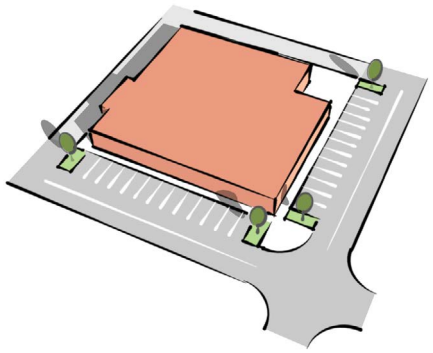
Table 48: Build-Out Criteria

	Building Coverage	Building Height	Lot Coverage	Open Space
Downtown Core	65%	3-4 stories	90%	10%
Central Market Block	45%	3 stories	90%	10%
Downtown Fringe	40%	2 stories	80%	20%
Downtown Fringe – South of Main	25%	3 stories	90%	10%

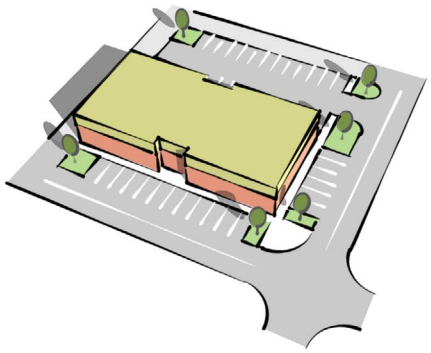
Source: RDG Planning and Design

Downtown Area

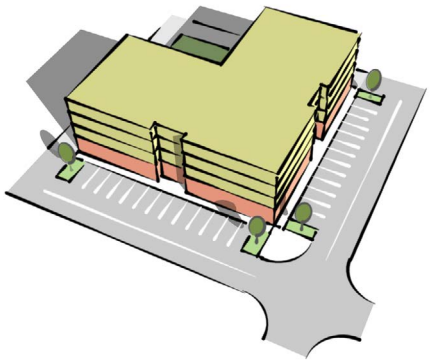
Current



Hybrid



Build-out



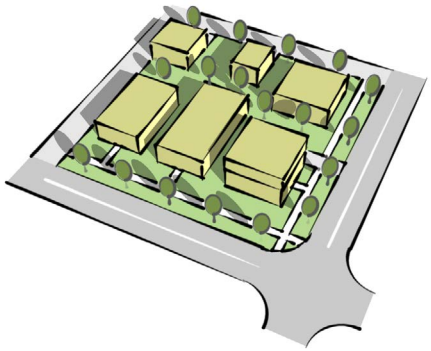
Increasing Intensity of Use

Increasing Intensity of Use

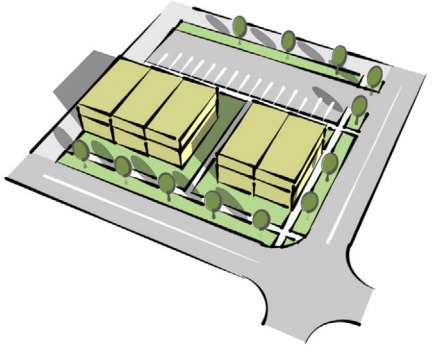
Increasing Intensity of Use

Fringe Area

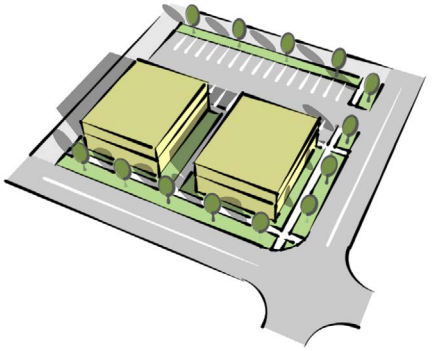
Current



Hybrid



Build-out



Increasing Intensity of Use

Increasing Intensity of Use

Increasing Intensity of Use

Current

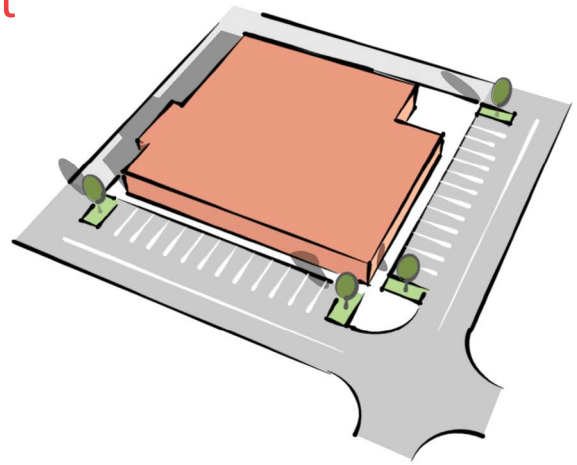


Figure 81: Current Core Character

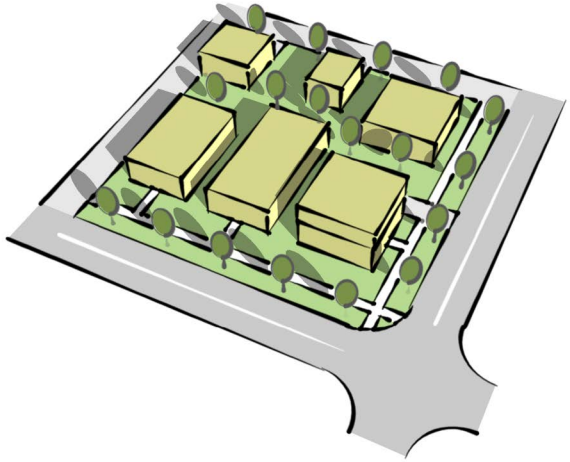


Figure 82: Current Fringe Character

The Current scenario assumes that conditions remain as they are with no reuse of buildings or vacant land.

Opportunities

- This scenario does not present immediate, near- or long-term improvements.

Challenges

- Limited new investment.
- Reliance on existing business to attract visitors and new residents.
- No major site improvements such as landscaping.
- Strain on city facilities as the population grows and requires more resources.
- No addition of new public spaces to support growing downtown events.

Table 49: Current Conditions Use Characteristics

	First Floor Use	Upper Story Uses	Residential Units	Dwelling units per acre	Probable Parking Demand
Retail	9,505	0			24
Restaurant	2,950	5,643			34
Service	0	0			0
Office	5,480	0			14
Civic/Other	18,772	0			47
Single and Multi-Family	2,245	2,245	55	5-6	83
Vacant	59,705	1,460			0

Notes:
1 Parking demand assumes 1.5 stalls per residential unit, 2.5 stalls for every 1,000 SF of retail, service, office, civic space and 4.0 stalls for every 1,000 SF of restaurant.
2 Dwelling units range from 700 SF to 1000 SF for multi-family units; 1,700 for single family townhomes
Source: RDG Planning and Design

Hybrid

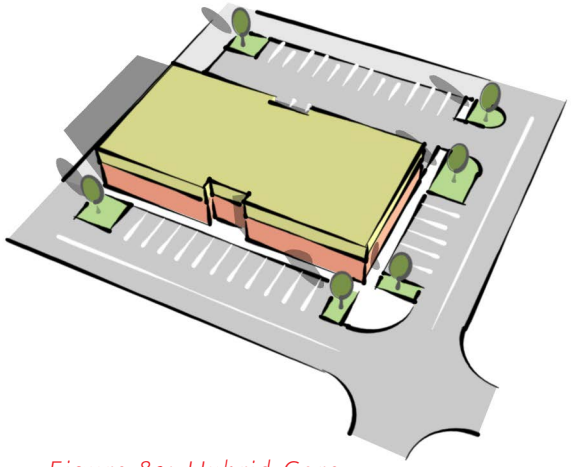


Figure 83: Hybrid Core Character

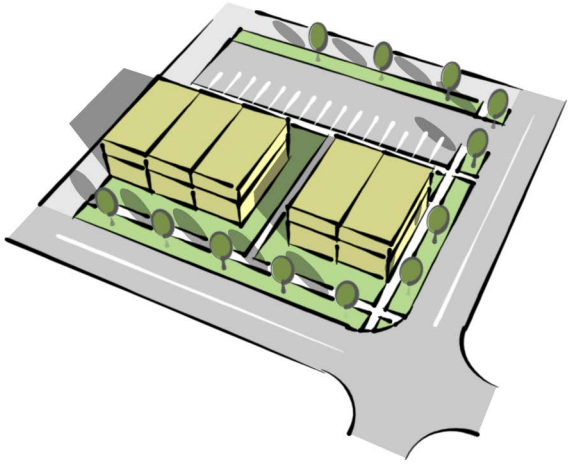


Figure 84: Hybrid Fringe Character

The Hybrid scenario assumes the reuse of existing buildings and redevelopment on some sites. Existing vacancies transition to commercial, civic, and mixed-uses. Redevelopment occurs in logical locations that may transition during the next 20 years, and follows recent redevelopment patterns. This scenario is the target concept for economic development efforts.

Opportunities

- Maintains existing buildings that may be underused.
- Largely maintains existing parking supply.
- Offers more areas for open space and landscaping features.
- Low residential density to better transition to fringe areas.
- Limited building scale to protect impacts on residential areas.

Challenges

- Lower building heights can make mixed-use projects difficult for developers to see benefits.
- Trade-off between open space and building development.
- Townhome development in fringe areas is more dense than current conditions.

Table 50: Hybrid Characteristics – Basic Block

	First Floor Use	Upper Story Uses	Residential Units	Dwelling units per acre	Probable Parking Demand
Retail	20,523	0			51
Restaurant	10,262	0			41
Service	20,523	8,318			72
Office	15,392	25,514			102
Civic/Other	35,915	0			90
Multi-Family	21,900	21,900	93 Core	14 Core	140
Single-Family	107,190	63,645	99 Fringe	13 Fringe	149

Notes:
1 Parking demand assumes 1.5 stalls per residential unit, 2.5 stalls for every 1,000 SF of retail, service, office, civic space and 4.0 stalls for every 1,000 SF of restaurant.
2 Dwelling units range from 700 SF to 1000 SF for multi-family units; 1,700 for single family townhomes
Source: RDG Planning and Design

Mixed Build-Out

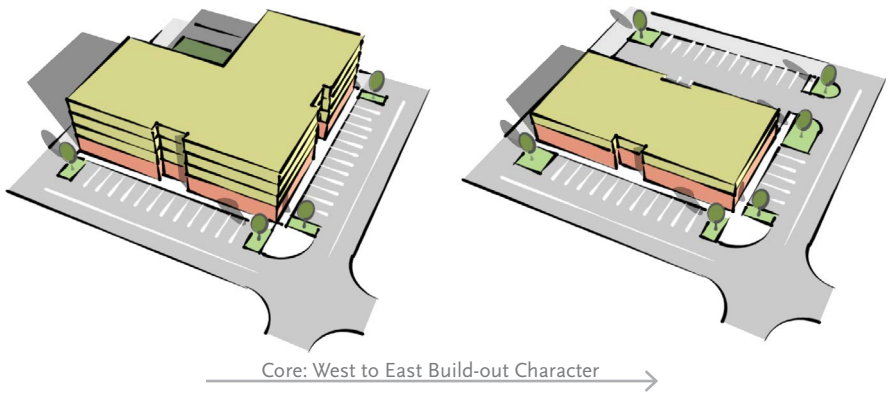


Figure 85: Mixed Build-out Downtown Core Character

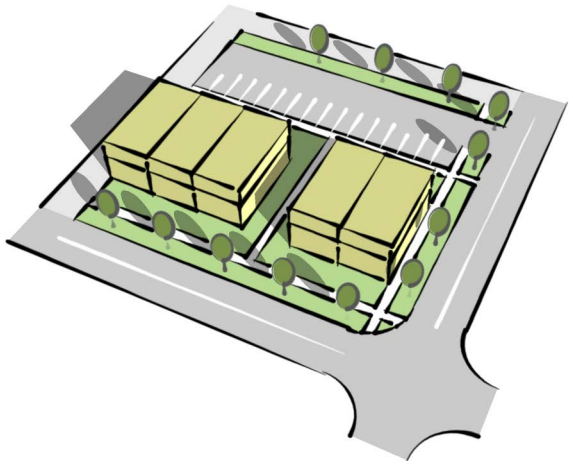


Figure 86: Mixed Build-out Downtown Fringe Character

The Mixed Build-out scenario assumes properties transition similar to the Hybrid scenario. However, the scenario recognizes there are certain sites such as the Central Market block, Elks Lodge, and Library in the Downtown Core that are positioned for larger redevelopment under certain market demands. When one of these sites experiences redevelopment, the probability of surrounding sites transitioning increases – a chain reaction effect.

Opportunities

- Fills a housing need downtown.
- Maintains the existing historic core.
- Space available for off-street parking or potential parking structures in the future.
- Ability to reshape western gateway into downtown and expand civic space.
- Lower density in the eastern Core provides a transition into Fringe areas.

Challenges

- Building heights and increased traffic, on the western gateway can cause impacts and be incompatible with adjacent residential areas.
- Build-out of the western gateway hinges on market demand, a variable that can lead to vacancies if over supplied.
- Maintaining a cohesive downtown district between the build-out of the western gateway and existing character in central downtown.

Table 51: Mixed Build-Out Characteristics – Basic Block

	First Floor Use	Upper Story Uses	Residential Units	Dwelling units per acre	Probable Parking Demand
Retail	26,815	0			67
Restaurant	13,408	0			54
Service	26,815	23,315			126
Office	20,111	66,425			217
Civic/Other	46,926	0			118
Multi-Family	21,900	284,080	182 Core	25 Core	273
Single-Family	107,190	63,645	99 Fringe	13 Fringe	149

Notes:
1 Parking demand assumes 1.5 stalls per residential unit, 2.5 stalls for every 1,000 SF of retail, service, office, civic space and 4.0 stalls for every 1,000 SF of restaurant.
2 Dwelling units range from 700 SF to 1,000 SF for multi-family units; 1,700 for single family townhomes
Source: RDG Planning and Design

Build-Out

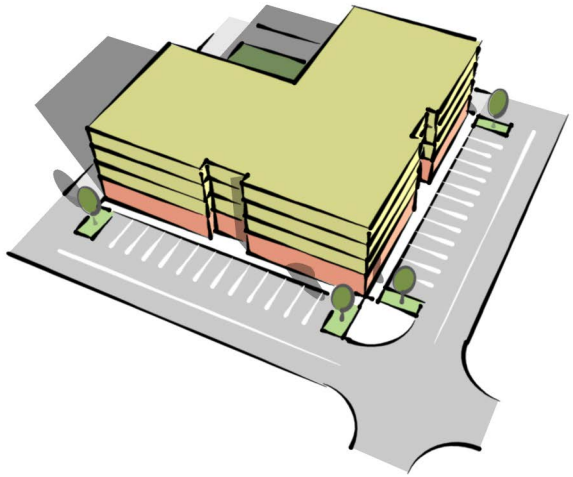


Figure 87: Build-out Core Character

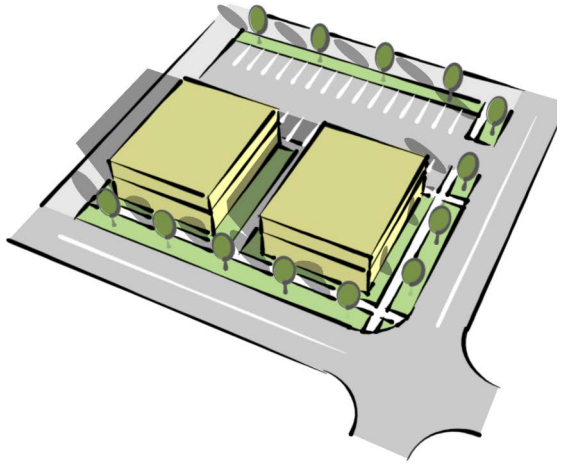


Figure 88: Build-out Downtown Fringe Character

The Build-Out scenario assumes property experiences redevelopment at a moderate to aggressive market demand. The concept includes higher-density buildings and parking to occupy most of the "Subject to Change" sites. This scenario is the target concept for modeling travel demand.

Opportunities

- Recent development shows that this development pattern can succeed, especially when using incentive programs offered at the local and state level.
- Potential room for limited off-street parking or underground parking.
- Reserved space for landscaping along property lines or within parking areas.
- Fill a need for housing in downtown.

Challenges

- Fewer surface parking lots, while significantly increasing parking demand for commercial and residential uses.
- Building heights, increased traffic, and limited building setbacks can cause impacts on adjacent residential uses if not properly mitigated though landscaping, screening, or other buffering treatments.
- High amounts of commercial space hinges on market demand, a variable that can lead to vacancies if over supplied.

Table 52: Build-Out Characteristics – Basic Block

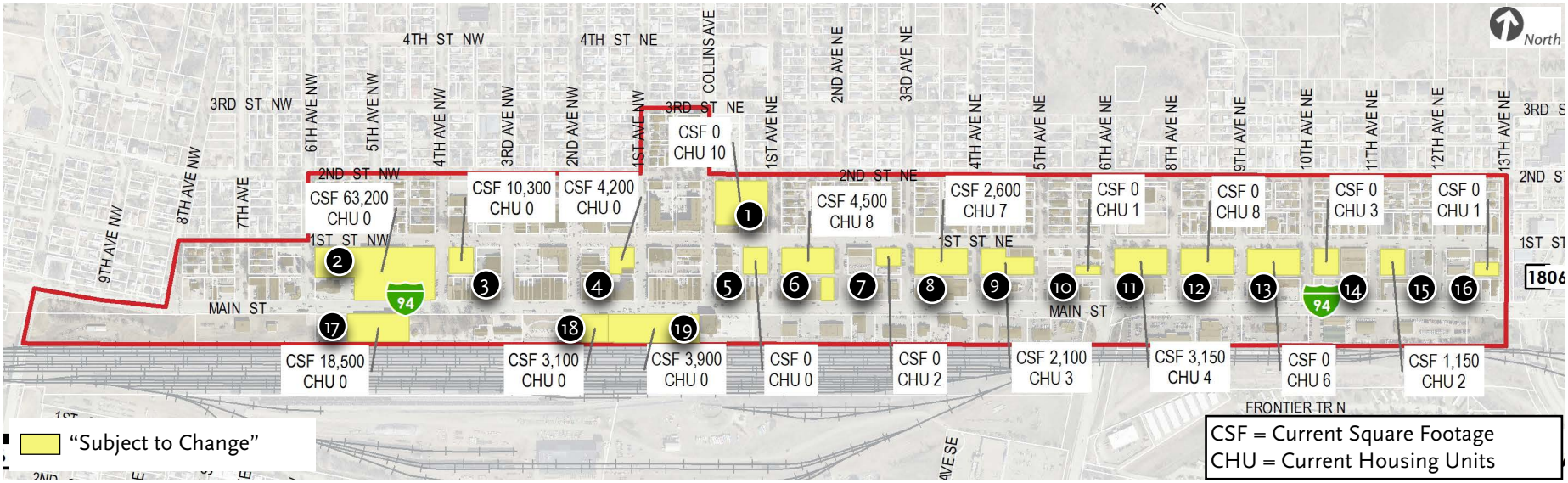
	First Floor Use	Upper Story Uses	Residential Units	Dwelling units per acre	Probable Parking Demand
Retail	40,597	0			102
Restaurant	20,298	0			81
Service	40,597	48,625			223
Office	30,447	125,364			390
Civic/Other	71,044	0			178
Multi-Family	142,920	476,674	261 Core 267 Fringe	50 Core 30 Fringe	792
Single-Family	0	0			

Notes:
1 Parking demand assumes 1.5 stalls per residential unit, 2.5 stalls for every 1,000 SF of retail, service, office, civic space and 4.0 stalls for every 1,000 SF of restaurant.
2 Dwelling units range from 700 SF to 1000 SF for multi-family units; 1,700 for single family townhomes
Source: RDG Planning and Design

Development Scenarios

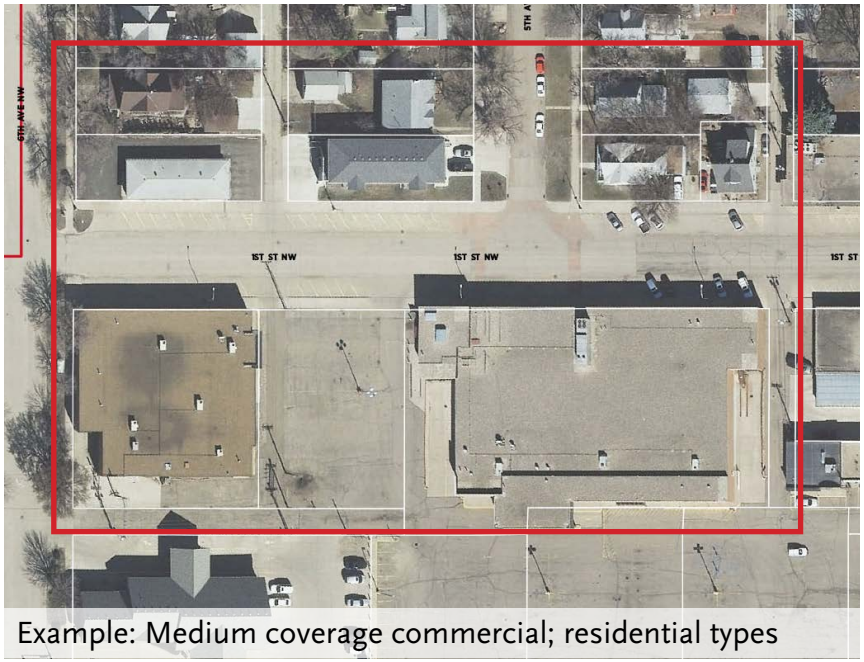
Figure 89 through Figure 92 shows the intensity of commercial and residential development generated from each scenario. Each block for the three development scenarios is annotated with the yield of additional non-residential square footage and additional housing units above current conditions.

Figure 89: Current Conditions



Core Area

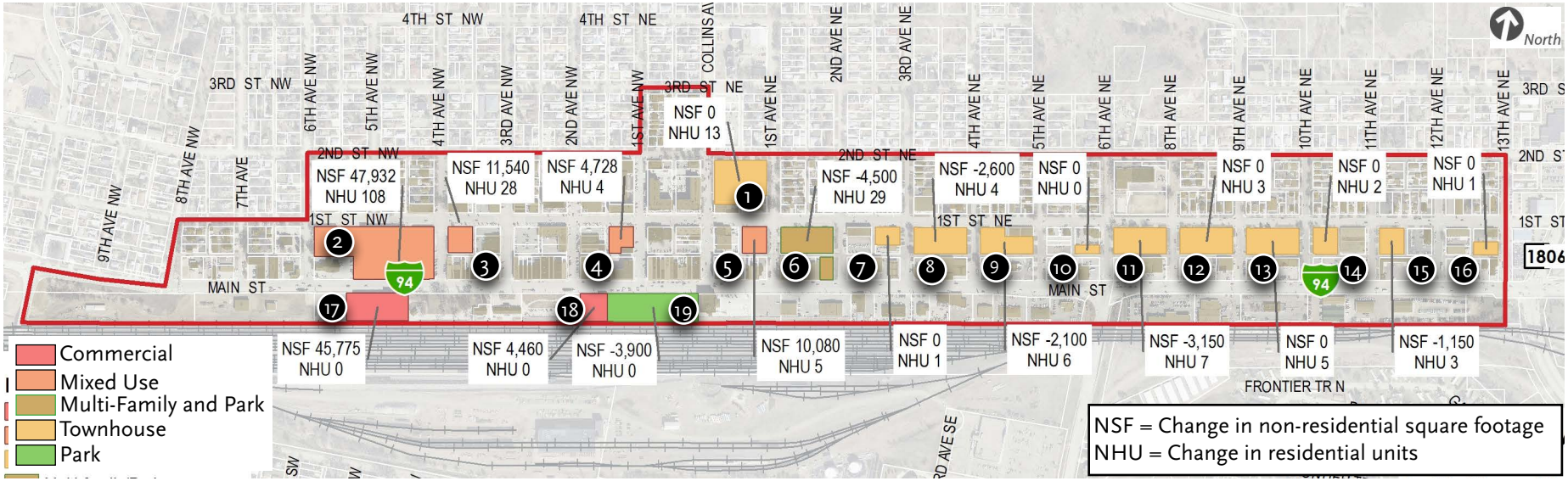
Fringe Area



Example: Medium coverage commercial; residential types

Figure 90 shows the future land uses modeled in the Hybrid scenario. Labels indicate the change from the current condition in non-residential building square footage and change in residential units for each "subject to change" site.

Figure 90: Hybrid Scenario



Core Area

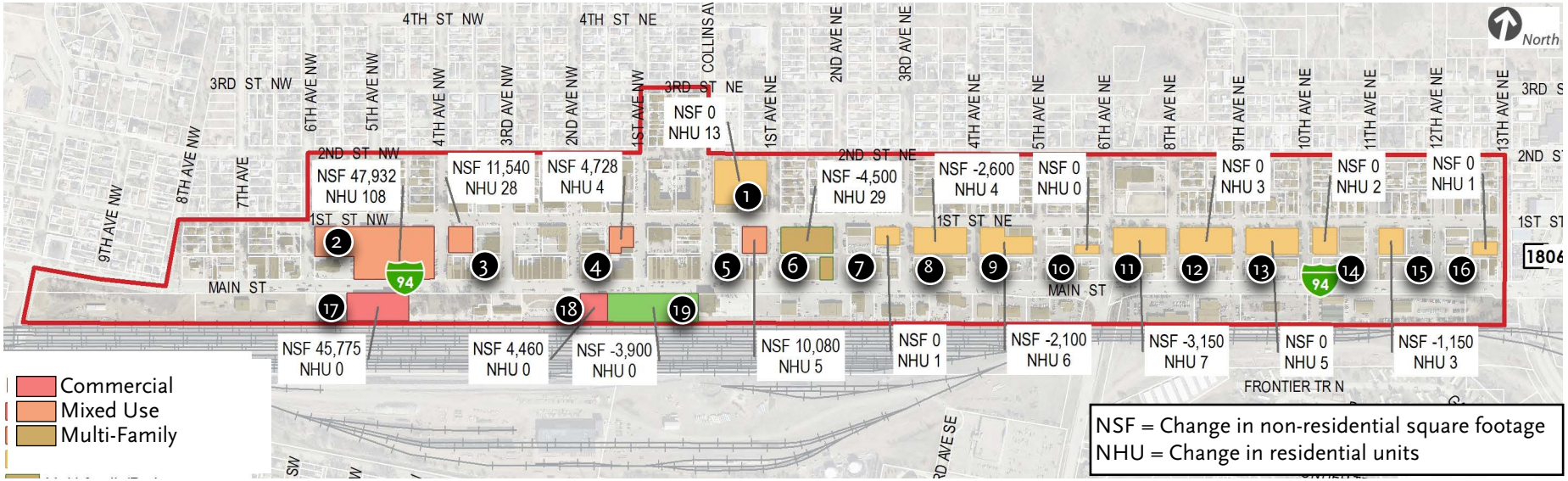
Fringe Area

Example: Starion Bank Site

Source: Google Maps

Figure 91 shows the future land uses modeled in the Mixed Build-out scenario. Labels indicate the change from the current condition in non-residential building square footage and change in residential units for each "subject to change" site.

Figure 91: Mixed Build-Out Scenario



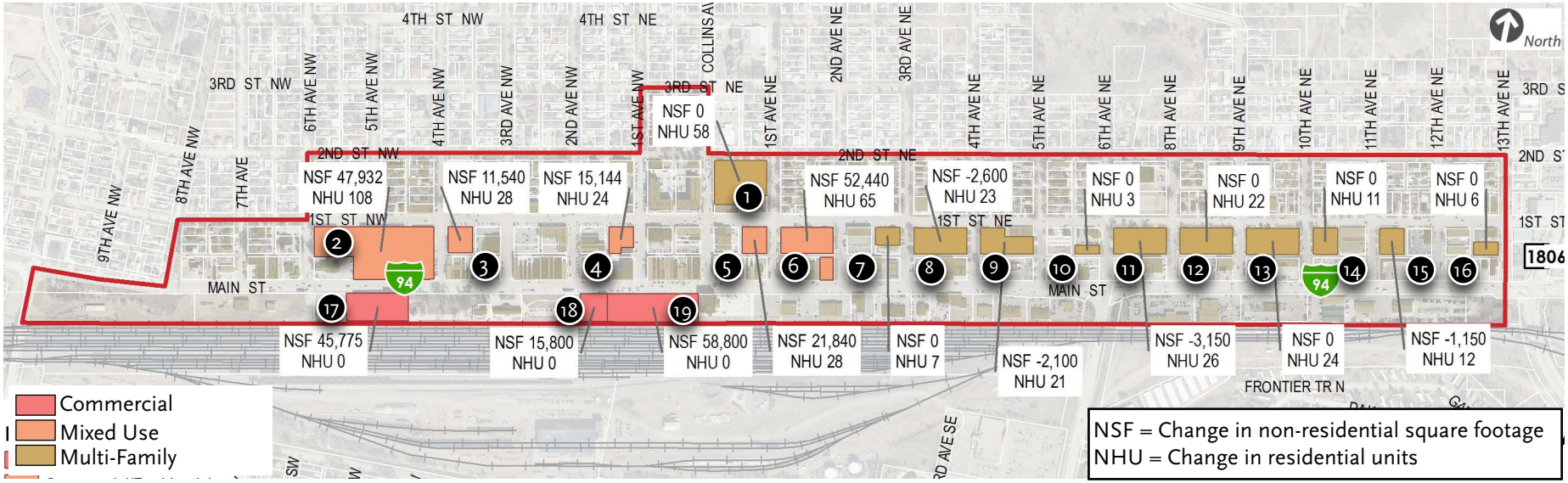
Core Area

Fringe Area

Example: Build-out and Hybrid mix - County and Library Square

Figure 92 shows the future land uses modeled in the Build-out scenario. Labels indicate the change from the current condition in non-residential building square footage and change in residential units for each "subject to change" site.

Figure 92: Build-Out Scenario



Core Area

Fringe Area

Example: Collins Place Site

Figure 93: Subject to Change Current Conditions

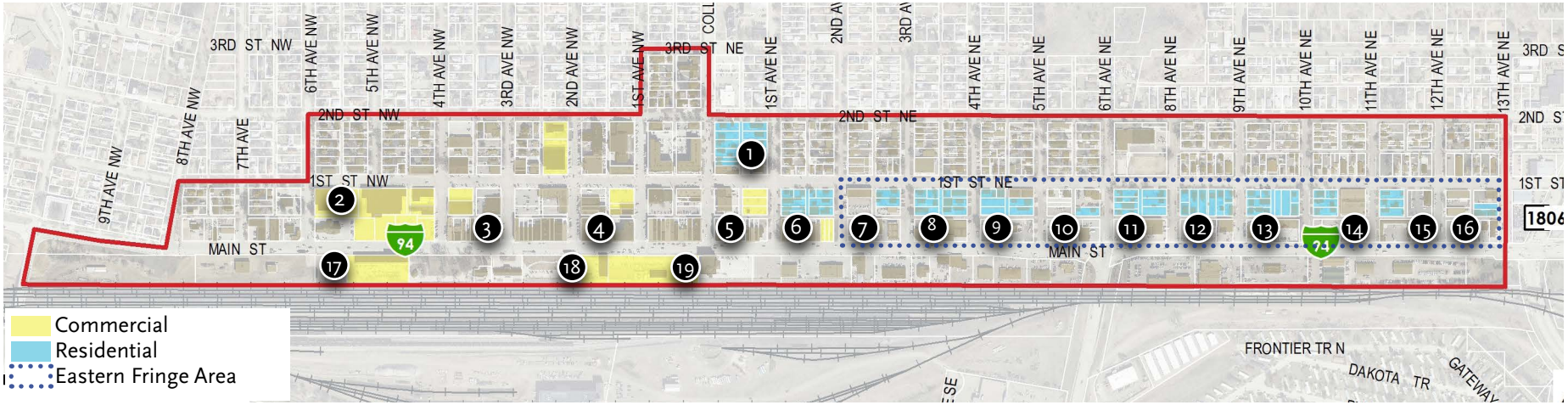


Table 53: Summary of Total Residential and Commercial Space

	Current		Hybrid		Mixed Build-Out		Build-Out	
	Non-Residential Square Feet	Residential Units	Non-Residential Square Feet	Residential Units	Non-Residential Square Feet	Residential Units	Non-Residential Square Feet	Residential Units
Block 1	0	10	0	23	0	23	0	68
Block 2	63,200	0	74,088	42	111,132	108	111,132	108
Block 3	10,300	0	10,080	5	21,840	28	21,840	28
Block 4	4,200	0	8,928	4	8,928	4	19,344	24
Block 5	0	0	10,080	5	10,080	5	21,840	28
Block 6	4,500	8	0	37	0	37	56,940	73
Block 7	0	2	0	3	0	3	0	9
Block 8	2,600	7	0	11	0	11	0	30
Block 9	2,100	3	0	9	0	9	0	24
Block 10	0	1	0	1	0	1	0	4
Block 11	3,150	4	0	11	0	11	0	30
Block 12	0	8	0	11	0	11	0	30
Block 13	0	6	0	11	0	11	0	30
Block 14	0	3	0	5	0	5	0	14
Block 15	1,150	2	0	5	0	5	0	14
Block 16	0	1	0	2	0	2	0	7
Block 17	18,500	0	25,710	0	64,275	0	64,275	0
Block 18	3,100	0	7,560	0	7,560	0	18,900	0
Block 19	3,900	0	0	0	0	0	62,700	0
Total	116,700	55	136,446	185	223,815	274	376,971	521

Eastern Fringe Area

Note: City Hall remains as current use and not included. Residential units rounded for fractional square footage on each block.
Source: RDG Planning and Design

Comparing the Scenarios

Each scenario unveils opportunities and challenges for downtown Mandan. In summary, impacts to the downtown environment and the community as a whole generally come from changes to residential uses, commercial uses, and parking.

Residential Comparison

The scenarios display a wide difference in the amount of residential units provided in the downtown core and surrounding downtown fringe areas. Build-out projects 521 residential units (261 in the downtown core) whereas the Hybrid scenario projects 185 units (93 in the downtown core). Currently these "subject to change" sites contain 55 residential units, primarily single-family dwellings in the downtown fringe area.

The Build-out scenario projects an aggressive residential demand with low probability of being produced in the next 30 years. The Bismarck and Mandan Housing Demand Analysis completed in 2015 indicates that Mandan will need 3,930 new housing units by 2030, with 78 of these units targeted at downtown (roughly 2%) and about 70% of downtown units being rentals. While the Hybrid scenario projects slightly more downtown residential units than 78 (93 in the core), it is realistic that as improvements to the downtown continue, demand for living downtown will increase. For example, the Mandan Place and Collins Place developments completed recently contain a combined 57 units alone.

Commercial Comparison

Similar to the residential comparison, the projections for commercial space varies widely between scenarios. Under Build-out there is 60,895 square feet of new retail and restaurant space, 89,222 square feet of service space, and 155,811 square feet of office space. The Hybrid scenario projects less, at 30,785 square feet of retail and restaurant space, 28,841 of service space, and 40,906 square feet of office space. Much of the space under the Hybrid scenario is reuse of roughly 50,000 square feet of vacant buildings on the Central Market block. Currently the downtown district contains 291,728 square feet of retail and restaurant space, 212,349 square feet of service space, and 143,677 square feet of office space.

In today's changing retail markets, the success of major retail in downtown markets is uncertain. Generally, $300 of sales is needed to support 1 square foot of commercial space. Nielsen Retail Market data shows a gap in Morton County of total retail and restaurant sales of about $85.6 million, translated to about 285,000 square feet of space. A gap indicates that consumers are spending more than the market supplies. This additional spending occurs outside of Morton County.

Table 54: Basic Block Scenario Comparison

	Retail, Restaurant, Service Square Footage	Service Square Footage	Office Square Footage	Civic/ Other	Residential Dwelling Units	Probable Parking Demand**
Current	18,098	0	5,480	79,937*	55	201
Hybrid	30,785	28,841	40,906	35,915	93 Core 99 Fringe	648
Mixed Build-Out	40,223	50,130	86,536	46,926	182 Core 99 Fringe	1,004
Build-out	60,895	89,222	155,811	71,044	261 Core 267 Fringe	1,769

*61,165 SF of vacant space

** Total demand does not indicate total additional spaces needed. The existing parking supply downtown will accommodate some additional parking demand.

Notes: 1 Parking demand assumes 1.5 stalls per residential unit, 2.5 stalls for every 1,000 SF of retail, service, office, civic space and 4.0 stalls for every 1,000 SF of restaurant.

Source: RDG Planning and Design

Downtown Mandan will not satisfy the majority of the gap, nor should it. The Build-out scenario projects around 60,895 square feet of retail and restaurant space – a possibility to help meet 21% of the retail gap. However, downtown's niche is small scale specialty stores, services, and civic space. Areas like Memorial Highway are designed for new, large commercial building development. The Hybrid scenario projects downtown filling about 11% and the Build-out scenario about 21% of the County retail/restaurant gap, not including additional service and office space.

Parking Comparison

Parking in downtown is a balance between using properties for their highest and best use, while comfortably accommodating people arriving by vehicle. Each scenario will eliminate some current surface parking lots. The Build-out assumes some new buildings will include underground parking, while the Hybrid scenario focuses mostly on existing parking areas, creating a demand for about 288 spaces beyond what the subject to change sites demand today. Build-out scenarios would require consideration for new parking structures in downtown.

Summary

Not every property will develop exactly as shown under the scenarios in Part 1. Unique site conditions, market demands, property owner desires, zoning regulations, development costs, and several other factors will affect when and how redevelopment or rehabilitation will occur, if at all.

Hybrid. Reuse, rehabilitation, and small-scale redevelopment and building additions are the highest future probability for sites subject to change and an economic development strategy to pursue. A general theme from the public input also indicates a desire for more civic space, a more "green" downtown, and limited expansion of residential uses. However, some residential is still needed and included in this scenario. Some of these may come from reuse of vacant upper story units, others through development of new mixed-use sites.

This hybrid approach described in Part 2 recommends build-out on appropriate sites, but overall respects the existing fabric of downtown with new opportunities for mixed-uses, better parking design, and expansion of public spaces for residents and downtown employees.

Mixed Build-out. The Mixed Build-Out scenario becomes more feasible for downtown than the total Build-out scenario. Market demand coupled with incentives will make some properties desirable for full redevelopment. Challenges associated with consolidating properties under multiple ownerships is an obstacle to overcome.

Build-out. The Build-out Scenario is possible, but the likelihood of every property developing under this scenario is minimal.. There are likely only a few properties suited for large scale build-out, similar to Collins Place and Mandan Place. Nonetheless, traffic modeling after the Build-out scenario is recommended as a contingency for the maximum traffic impact.

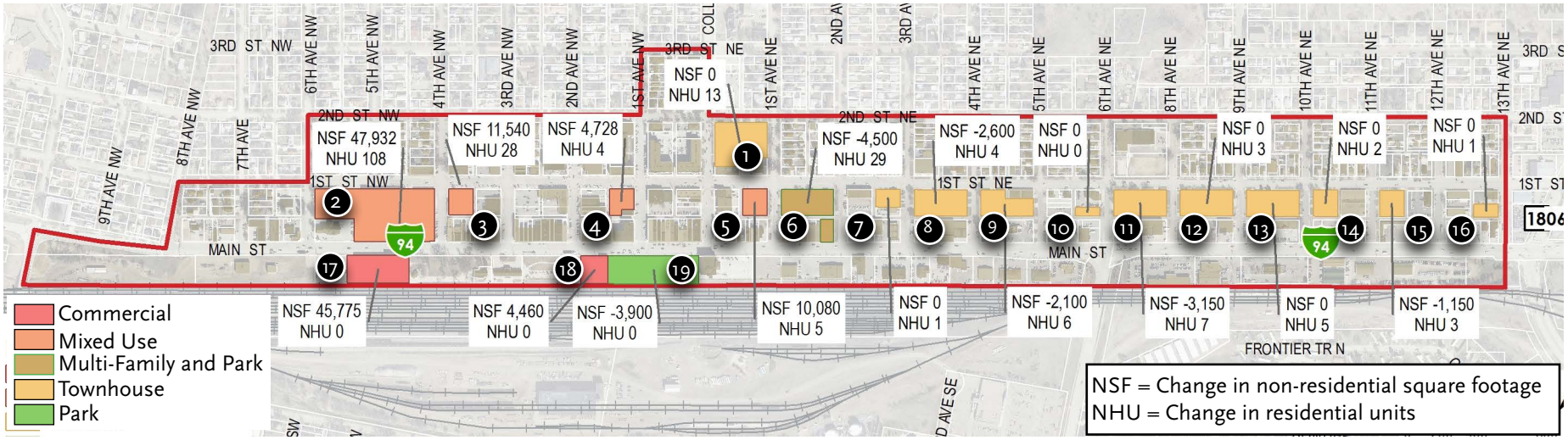
Evaluation

Hybrid: Probable in the next 30 years; similar to current development patterns with some new development opportunities.

Mixed Build-out: Somewhat probable in the next 30 years; development build-out isolated to certain areas.

Build-out: Less probable in the next 30+ years; similar to development patterns in high demand downtown markets.

Figure 94: Hybrid Development Scenario



Part 2: Development Opportunities

Development opportunities focus on economic development strategies for downtown Mandan, building on the hybrid scenario in Part 1 as the model which has the highest probability for long-term success. Multiple strategies for individual sites range from reuse, redevelopment, and preservation to effectively evaluate future transportation and parking needs along with overall public space improvements downtown. Additional sites are included as potential parking structure and public space opportunities.

Downtown serves as the hub of civic uses, cultural amenities, community events, and specialty retail in Mandan. The uniqueness of its urban character makes downtown a destination. All development strategies should maintain and enhance these aspects. The land use and development framework shown in Figure 95 displays how downtown functions and the key components to maintain in the district.

Main Street Core. Historic buildings line Main Street and house the majority of retail uses downtown. Main Street is the "spine" of the district as the primary east/west travel route and commercial hub. Enhancement of this corridor is a priority.

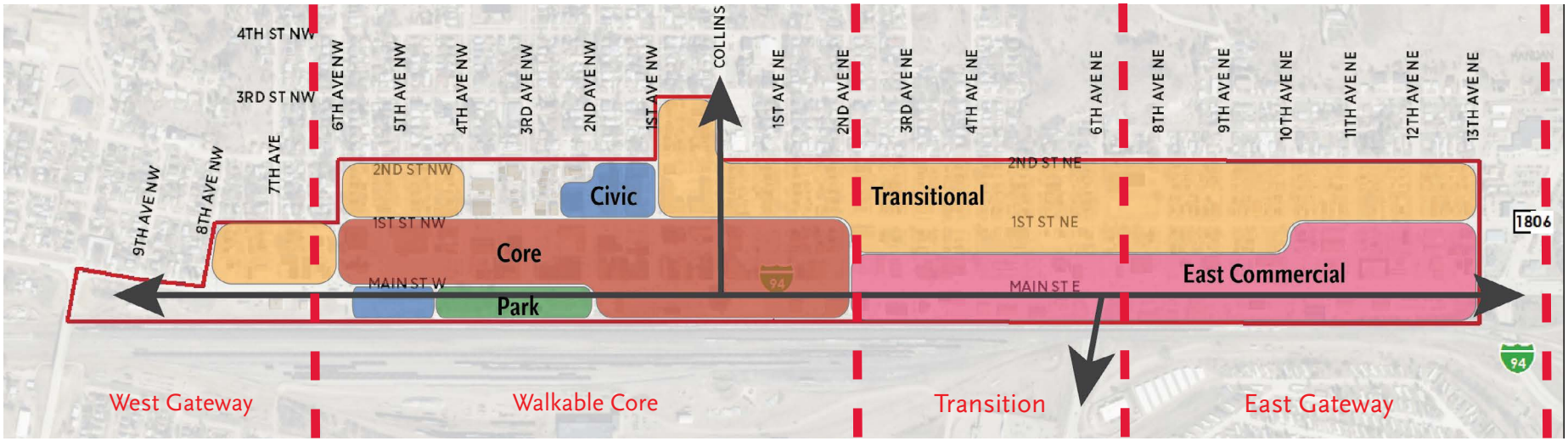
East Commercial. The character of Main Street along the east gateway differs significantly from the historic downtown core. Modern buildings and commercial uses line this stretch of Main Street. Aesthetic enhancements and gateway features are targeted for this area.

Civic. Similar to most downtowns, downtown Mandan is home to several public buildings – City Hall, Morton County facilities, the Mandan Progress Organization, and the Morton Mandan Public Library. These buildings generate consistent traffic and are essential facilities. However, City Hall and the Library need to expand to continue to serve community needs.

Parks. Downtown Mandan is fortunate to have two excellent parks. Dykshoorn Park and Heritage Park border the southern edge of downtown, forming a nice buffer from the railroad and edge for the district. Popular for community events and activities, these parks are destination features within downtown.

Transitions. Residential uses intertwine with downtown uses. Transitions between residential neighborhoods to the north and west present challenges. Opportunities need to limit impacts on residents and still encourage a lively downtown.

Figure 95: Downtown Development Framework



The development program for downtown addresses prospective projects related to development, public spaces, parking, pedestrian circulation, and aesthetic improvements. These include:

Reuse Opportunities. What buildings should be preserved and reused for something else? Several properties are identified as reuse candidates, either because the existing building adds to the character of downtown or because demolition and reconstruction presents fiscal challenges.

Redevelopment Opportunities. What areas are under used and could support new buildings and uses? Sites for redevelopment leverage downtown incentive programs, market trends, and community needs for new residential, commercial, and civic projects.

Public Spaces. Where should people gather? Major community events occur downtown throughout the year. Enhancing Dykshoorn Park and Heritage Park helps retain and attract visitors. The future design of Main Street and supporting network could be complemented with new enhancements that encourage people to stop and explore the district. Special features add to the experience of being in downtown, like landscaping, seating areas, comfortable sidewalks, and safe crosswalks.

Parking. Where do people park? Public perceptions on parking availability downtown vary – some believe it is convenient while others not. The plan recognizes the increased demand for parking from reuse and redevelopment and presents concepts to increase the efficiency of customizing parking lots.

Pedestrian Circulation. Equally important to getting around by car, the pedestrian experience should leave a memory that people want to come back to.

Aesthetic Improvements. Discussed in later chapters of this plan, aesthetic elements include streetscape furnishings, wayfinding, downtown gateway features, landscaping, lighting, and pedestrian level improvements to leave visitors with a memorable impression of downtown Mandan.

Current Conditions








Development Opportunities

The following section presents land use strategies for opportunity sites. Each development site will evolve differently over time. The concepts are meant to provide choices and blend new projects into the existing urban fabric. These concepts do not prescribe a design, but rather are exhibits of possibilities to stimulate further discussion towards reinvestment. Figure 96 identifies development opportunity sites.

Property owners and developers, in responding to development opportunities, may take different, equally valid approached to these available sites. Therefore, this plan takes an approach that identifies strategies, opportunities, and challenges rather than matching a specific development or project with each site.

Reuse. Reuse indicates rehabilitation of existing buildings for another use with possibly small scale additions. Often more sustainable, reuse can cost less and maintain the original character of a streetscape. Reuse does not come without its own challenges. Spaces can be difficult to renovate for conventional commercial or residential uses. There is often no "one size fits all" model to approach reuse.

Redevelopment. Redevelopment indicates new construction of existing building(s) or site(s) for a new use, building, or development. Ideal redevelopment sites include vacant property or obsolete buildings. Recent examples of redevelopment projects in downtown include the Collins Place and Mandan Place.

Preservation. Preservation indicates that existing uses will remain for the foreseeable future. These uses may have been successful in their current location for many years and are not immediately necessary to change to different uses.

Table 55 summarizes the range of land uses recommended in the development strategies and alternatives for each site.

Table 55: Possible Land Uses

Site	Name	Range of Possible Uses
A	Central Market Block	Library, public market, event space, co-working, mixed-use retail, restaurant, office, residential.
B	Northern Pacific Railroad Freight Warehouse	Library, restaurant, retail, civic uses, art studio, gallery, co-working.
C	Elks Lodge	Mixed-use retail, office, residential.
D	North Remediation Building	Mixed-use retail, office, residential.
E	City Hall	City Hall rehabilitation or redevelopment.
F	209-211 Main Street	Commercial retail and restaurant.
G	South Remediation Building	Park, public space, civic uses.
H	1st Street NE Quarter Blocks	Parking lot, mixed-use office/parking structure, retail (along Main), park, public space, townhomes, residential.
I	Fringe Transition Areas	Light commercial, multi-family residential, townhomes, single-family residential.

Source: RDG Planning and Design

Figure 96: Development Opportunity Sites

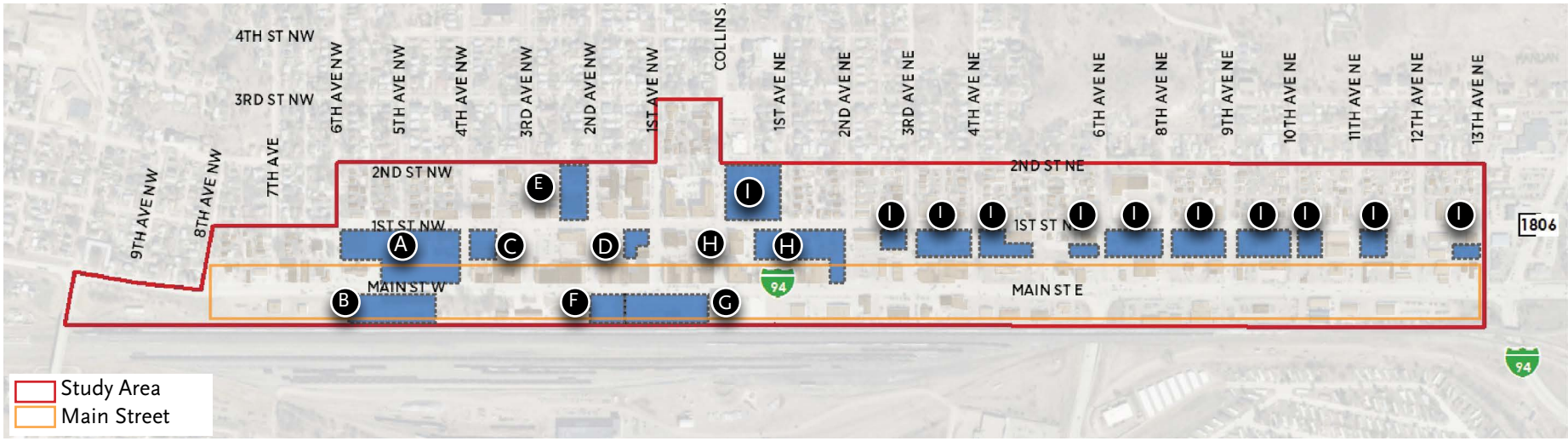
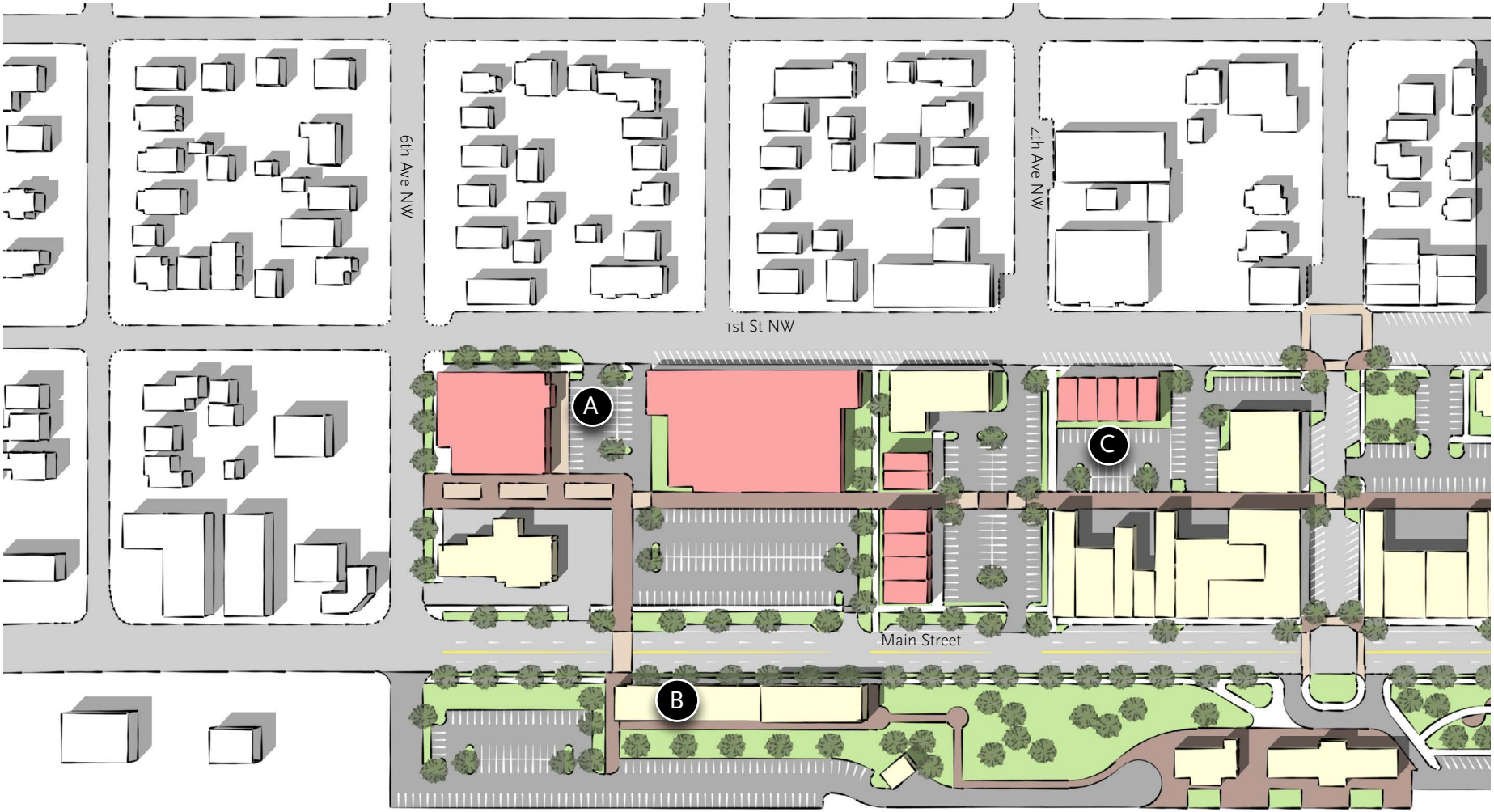


Figure 97: Downtown Development Opportunity Sites



A Central Market Block

B Northern Pacific Railroad Freight Warehouse

C Elks Lodge

D North Remediation Building

E City Hall

F 209-211 Main Street

G South Remediation Building

H 1st Street NE Quarter Blocks

I Fringe Transition Areas

A. Central Market Block

Figure 98 shows the Central Market Block, which includes a two block area containing five buildings of which the two larger buildings are vacant - one formerly a grocery store and one a drug store. Apparently, when the grocery store closed the sale of the building prohibits a future grocery store to reoccupy the space. Presently, the large surface parking area is used as overflow parking by surrounding businesses. The size of these buildings present some challenges for converting to new retail, office, service-oriented, or residential uses. However, the scale of these building presents a unique opportunity to fill other needs for downtown before considering demolition and new construction. Strategies for reuse are possible before considering redevelopment that may be more costly.

Strategy A – Public Library and Marketplace

This concept focuses on relocating the library into the vacant Central Market building and converting the Thrifty Drug Store into a community marketplace. Retaining the library in downtown and placing it in a more central location to residents and shoppers may increase the number of patrons who visit the library and surrounding businesses.

1. **Library Reuse.** This would increase the amount of space for the library from 12,000 square feet to over 30,000 square feet if using the entire Central Market space, making the size consistent with the space needs evaluation in Chapter 2.
2. **Leasable Space.** The size of the Central Market building is large enough that a portion of the building could be dedicated to co-working or low rent office space.
3. **Community Marketplace.** A community market could include small tenant spaces for incubator businesses, like artisans and other start-ups.
4. **Mixed-Use Project.** The east side of the block can redevelop into a new mixed-use project to complement other uses on the block.
5. **Parking Street.** Fourth Avenue becomes a "parking street" – drive lanes are reduced for additional parking spaces to support new uses and help offset parking loss on the block. Parking streets provide relief to parking demand, yet preserves north/south access. Slower traffic speeds and narrower lanes make people feel comfortable walking from shared parking areas across the street.
6. **Walkability and Market Mall.** Patrons to the library have greater access to other businesses in downtown when not having to cross Main Street. A "market mall" provides outdoor gathering space and a gateway for pedestrians into downtown.
7. **Access Management.** A curb cut on Main Street is eliminated and replaced with a pedestrian walkway leading to uses south of Main Street.

Figure 98: Current Central Market Block

Figure 99: Strategy A Concept

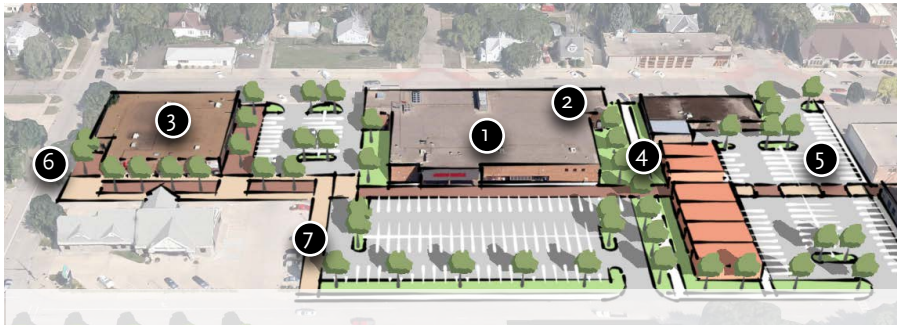
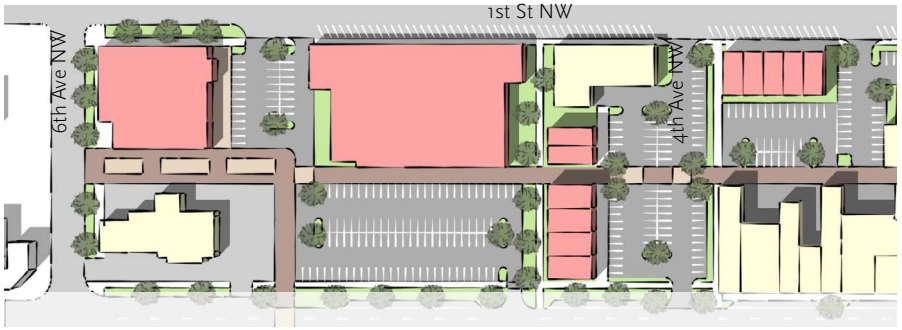
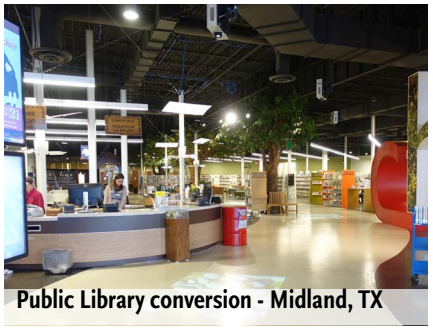


Figure 100: Strategy A Concept



Newbo City Market - Cedar Rapids, IA



Public Library conversion - Midland, TX

Strategy B - General Reuse

This strategy focuses on reuse of the former Central Market and Thrifty Drug buildings much like Strategy A. However, reuse options include new commercial retail, or specialty uses, such as co-working or event space. Restoring a commercial use to the building adds sales tax base to the city and keeps the property in private operation.

1. **Single-tenant Reuse.** The building has about 33,000 square feet. Similar businesses with this footprint include Walgreen's, Ace Hardware, or mid-scale retail. These uses rely on high visibility to well-traveled streets like Main Street
2. **Multi-tenant Reuse.** A precedent for the reuse of the building is The Source in Denver, Colorado. The project is an artisan food market that includes everything from baked bread and butcher shop to craft beer and restaurants. The interior space is primarily open and split into various-sized vendor spaces. The similar reuse of the Central Market space allows for the building to be reactivated, while having the flexibility to modify the building's program in the future without major costs to renovation. Creating the project may require a public/private partnership to ensure consistent activities throughout the year and initial start-up assistance.
3. **Community Marketplace.** A community market in the Thrifty Drug building could include small tenant spaces for incubator businesses, like artisans and other start-ups.
4. **Mixed-Use Project.** The east side of the block can redevelop into a new mixed-use project. New construction should be setback similar to other buildings along Main Street. Storefronts should face Main Street, but could also have accessory entrances to the parking behind.
5. **Market Mall.** A "market mall" provides outdoor gathering space and a gateway for pedestrians into downtown.

Parking and Circulation Strategy for A and B.

Under each strategy, parking lots can be reconfigured to include green space near Main Street. The lot could become a convertible space for special events and activities. Future outlots could be defined for drive-thru coffee or new development.

Each strategy decreases off-street parking. However, supply is still ample to serve new civic and commercial uses. There are around 240 parking spaces currently on the block that are hardly used because of vacant buildings. With reuse and redevelopment, off street parking supply on the block decreases to around 140-160 spaces. Even if the vacant buildings become reused for all retail commercial, and new mixed-use buildings are developed on the east side of the block, parking (if required based on city code of 1 space per 400 square feet) ranges at about 160-170 spaces.

Figure 101: Strategy B Concept

Figure 102: Strategy B Concept

The Source - Denver, CO

Co-working in former big box - Omaha, NE

The size of the site requires special consideration for circulation and access management for pedestrians and motorists. Both strategies should accommodate safe pedestrian crossings on Main Street, buffer new sidewalks from parking areas and streets, and limit the number of access driveways onto the property for vehicular and pedestrian safety.

Drive aisles should be clearly marked, buffered by landscaping, and include sidewalks. Strategies A and B suggest a "market mall" within the alley north of Security First Bank. Signage or re-striping would be required to direct motorists exiting the teller drive aisle to avoid conflicts with pedestrians.

B. Northern Pacific Railroad Freight Warehouse

Currently housing the Morton Mandan Library, the old Freight Warehouse remains a destination in downtown and essential service for many people – residents and visitors alike. Access and parking for Dykshoorn Park are provided on the property, where many times during the year events are held. As the population continues to grow library resources will need to expand. Limited space exists in the current building for new books, computer equipment, or private rooms. The library could relocate or add space to the existing building. All surrounding property on the existing site is owned by the city. No additional costs for land or building acquisition would be required.

Similar to strategies for the Central Market Block, any strategy should accommodate pedestrians crossing and walking along Main Street through crosswalks, signage, and buffering. Both strategies eliminate the east access driveway to the site for efficiency and reduction of vehicle and pedestrian conflicts.

Strategy A - Redevelopment and Expansion

This concept keeps the library in its current location with an addition on the west side of the building over existing parking areas. The addition would double the ground floor space with the potential for upper stories.

1. **Library Expansion.** An addition to the existing building could increase the current size from 12,000 square feet to 24,000 square feet, or even more if a two-story addition. This size meets the needs for the Library for the next 10 years assuming consistent population growth.
2. **West Gateway.** An addition can be an opportunity to add an entryway feature along Main Street, public art, or wall murals on the new building to create a unique arrival experience for visitors to downtown and the library.
3. **Continuation of Main Street.** An addition built to the street continues the character of the Main Street core and removes the visibility of parking from the street.

Figure 103: Current Northern Pacific Railroad Freight Warehouse

Figure 104: Strategy A Concept

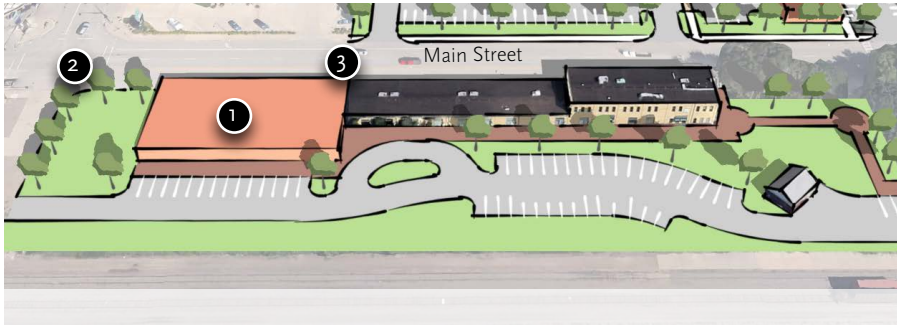


Figure 105: Strategy A Concept

Strategy B - Library Relocation and Site Reuse

This concept relocates the library into the former Central Market building, described previously. The old Freight Warehouse building becomes available for uses such as art galleries, additional restaurants, brew pubs, or other activities that complement Dykshoorn Park. The amount of parking available on the site deceases only slightly.

1. **Multi-tenant reuse.** Opportunities for other uses open up. The Rice Bowl is already a staple place to eat in the community. Other retail or service uses could build off the Rice Bowl's success and complement events held at Dykshoorn Park.
2. **Arts and Community Workspace.** Conversion of the ground floor into a "maker space" or an artist studio is a growing trend in many communities. A "maker space" is a space with shared tools for use by anyone in the community. Focuses can range from woodworking, metal working, 3D printing, general shop tools, and/or artist tools. These spaces allow those without experience, tools, or space to learn about various trades without having to invest significant personal resource on their own other than a membership fee – from students up to retirees.
3. E**nhanced Surface Parking**. Parking areas along Main Street can be enhanced with trees and landscaping under this strategy to buffer pedestrian and vehicles from Main Street traffic.

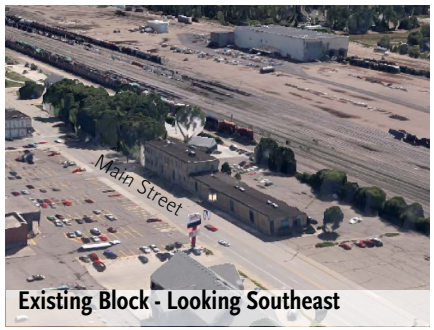
Parking Strategy for A and B

Off-street parking around the Freight Warehouse is at about 140 spaces. A building addition would significantly reduce the number of available off-street spaces to between 50-60 spaces. Including the Rice Bowl and addition under Strategy A, about 77 parking stalls are needed based on 1 space per 400 square feet, although there are not parking requirements for downtown. Nonetheless, an addition reduces available parking south of Main Street for visitors to the Library, Dykshoorn Park, and larger public events.

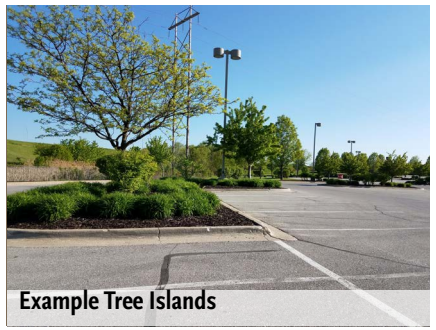
Relocating the library in lieu of other uses in the existing building would not affect parking significantly and still offer opportunities for landscaping and buffering from Main Street.

Figure 106: Strategy B Concept

Figure 107: Strategy B Concept



Existing Block - Looking Southeast


Example Tree Islands

C. Elks Lodge

The former home of the Mandan Elks Club sits vacant. The property is a candidate for redevelopment into a mixed-use site with ground floor commercial/service and upper story residential uses or reuse of the existing building.

Strategy A – Reuse

1. **Adaptive Reuse.** The existing 10,000 square foot building under this strategy is rehabilitated and reused as office, service, or a new civic use.
2. **Parking Lot Enhancement.** Enhancements to the existing parking lot with landscaping breaks up expanses of concrete and creates a more pedestrian friendly environment.
3. **Alley Safety.** With the current building abutting the alley, motorists exiting the alley have difficulty seeing pedestrians and cross traffic on 4th Ave NW. Signs and lighting at the intersection will notify both pedestrians and motorists of conflicts, especially needed as the area transitions into a more walkable environment.
4. **Building Art.** To complement improved east-west alleyways, this block could be transformed into an art alley with murals and art painted on the wall.

Strategy B – Redevelopment

1. **New Construction**. This strategy includes demolition and a new building brought to the street that aligns with other buildings at the intersection of 4th Ave NW and 1st St NW. The new building could hold ground floor retail, service, or office uses at a small scale with about 9,000 square feet of ground floor space, similar in size to the Mandan Guaranty and Title Company across the street.
2. **Mixed-Use Option.** Upper floors within a 2-3 story development could supply 4-6 residential units per floor. Market rate units should include modern finishes and appliances to appeal to young professionals or seniors looking to downsize. Owner-occupied condos could be explored as the downtown market evolves.
3. **Alley Vacation**. The north-south alley on the block terminates mid-block and is unnecessary. Vacating the alley grants area for parking and landscaping. Access to overhead utilities would be worked around for parking lot design.
4. **Parking in the Rear.** Redevelopment puts parking in the rear. Access would depend on adjacent development to the east and whether a 4th Avenue "parking street" is established. Parking lot enhancements should complement improvements to the east-west alley on the block.

Parking Strategy for A and B

This quarter block has 26 off-street parking spaces. Demolishing the existing building, vacating the north half alley, and new construction along the street could allow around 43 off-street parking spaces – an increase of 17 spaces.

Adaptive reuse will decrease a few stalls for landscaping, tree islands, and circulation improvements and increase parking demand, but not significantly reduce parking supply from existing conditions.

Figure 108: Current Elks Lodge Site, Reuse, Strategy A

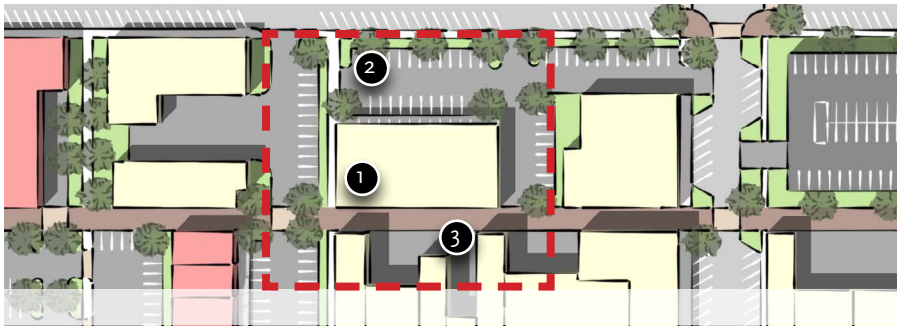
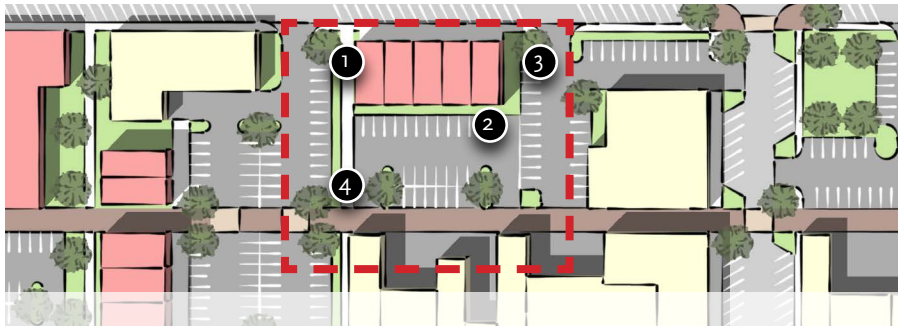
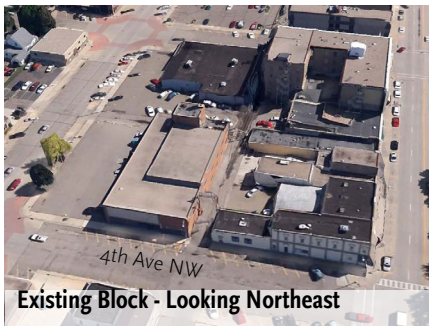


Figure 109: Redevelopment, Strategy B





Existing Block - Looking Northeast


3 Story Mixed-Use - West Des Moines, IA

D. North Remediation Building

Two remediation buildings will become obsolete in the next 5 years. Options for reuse are limited because of the small size of these buildings and unique locations. One remediation building located on the block south of the County facilities is situated in a challenging position to succeed as another use other than perhaps a storage building. Redeveloping the site as a unified, single development is preferred. However, multiple property owners and the need to assemble parcels presents a challenge that may require additional incentives to accomplish.

Strategy A – Redevelopment

1. **Mixed-Use New Construction.** Strategy A for this block includes redevelopment of existing parking lots for new mixed-use development. The scale of these buildings range from 3-4 stories, similar to other buildings at the north intersections and strategy A proposed for the Elks Lodge site.
2. **Residential Option.** Upper floors within new development could supply residential units. Market rate units should include modern finishes and appliances to appeal to young professionals or seniors looking to down-size. Owner-occupied condos could be explored as the downtown market evolves.

Strategy B – Reuse and Preservation

1. **Preservation.** The Remediation building remains for reuse or demolition when a development proposal comes forward. Leaving the building vacant for a short period of time will not affect the character of the block.
2. **Parking Lot Enhancement.** Enhancements to the existing parking lot breaks up expanses of concrete and creates a more pedestrian friendly environment and retains existing number of parking spaces for the Mandan Place building.

Parking Strategy for A and B

There are 47 off-street parking spaces on the block. Redevelopment could reduce the number of parking spaces to around 24 spaces, while reuse and preservation decreases only a few stalls for landscaping, tree islands, and circulation improvements.

Figure 110: Redevelopment, Strategy A

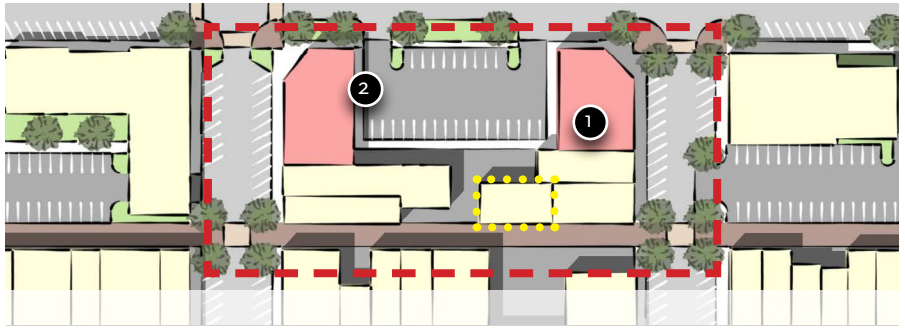
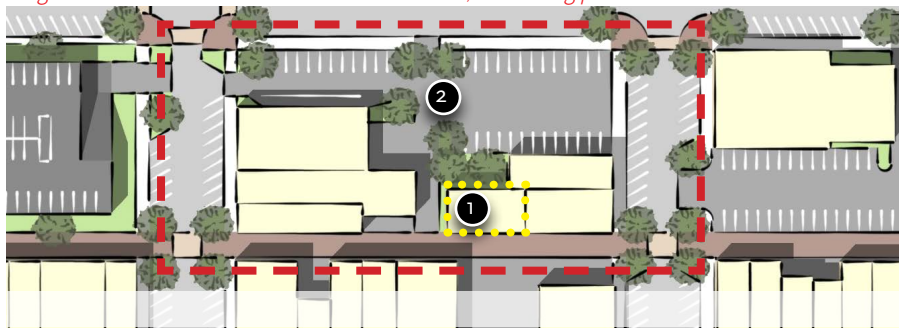


Figure 111: Reuse and Preservation, Strategy B



Existing Block - Looking North

3 Story Mixed-Use - Wauwatosa, WI

E. City Hall

The City Hall building continues to age and will require significant repairs soon. At about 15,500 square feet devoted to employees, the existing building does not provide adequate space to meet existing or future needs. A facilities assessment completed by JLG Architects in 2015 identifies several alternatives to meet future needs over the next 20 years. The recommended alternative by JLG includes a new building on the existing site shown in Strategy A. This plan includes a second strategy which rehabilitates and expands the existing building shown in Strategy B.

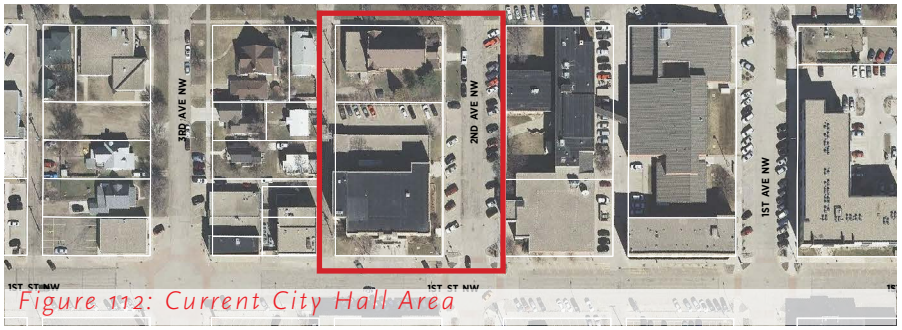


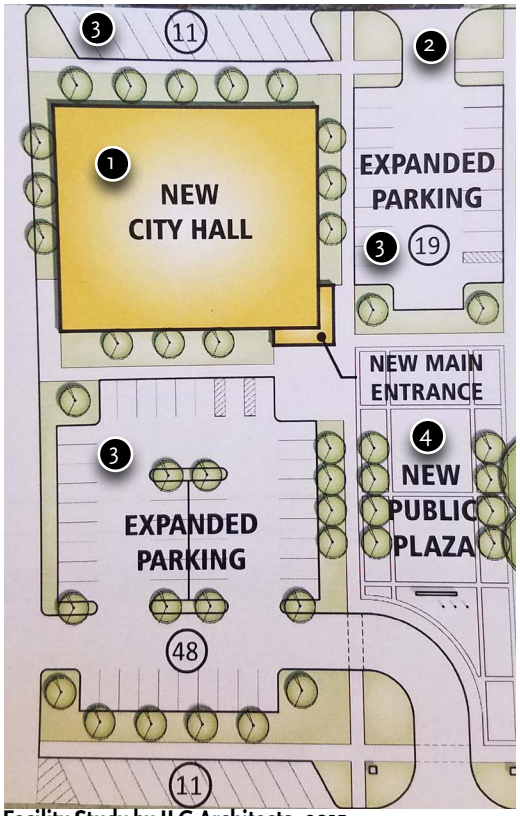
Figure 112: Current City Hall Area

Strategy A – New Building

This concept demolishes the existing building and rebuilds City Hall to the north, requiring demolition of the church. Parking areas are in front of the building with access available from streets on the north and south, and the west alley.

1. **New Building.** A new building ensures the most up-to-date facilities for employees and the public. The existing building remains functional during construction for as little disruption to city operations as possible.
2. **Vacated 2nd Ave NW.** Vacating 2nd Ave NW allows more area on-site for additions, parking, and public space. Turning movements north onto 2nd Ave NW are relatively low during peak hours (4-18 vehicles) and vacation would not eliminate access to any properties.
3. **New Parking.** Parking under this strategy moves most parking to the front of the building along 1st Street NW. Access to the south parking lot aligns with 2nd Ave NW to provide continuity at the intersection. A second parking lot provides site access from the north on 2nd Street NW.
4. **Large Public Plaza.** A public plaza builds off the memorial near the entrance to the County facilities and proposed new main entrance to City Hall. The plaza serves as a feature for public gatherings, announcements, and additional memorials.

Figure 113: New City Hall, Strategy A



Facility Study by JLG Architects, 2015

Strategy B - Rehabilitation and Expansion

This strategy demolishes the church for additional parking and expands City Hall to connect with the County facilities by vacating 2nd Ave NW.

1. **Renovation and Reuse.** While not listed on the National Register of Historic Places, City Hall has a history important to many. Built in 1934 as a World War Memorial, the option to renovate and reuse the existing building maintains the external character of the building along the street.
2. **Vacated 2nd Ave NW.** Vacating 2nd Ave NW allows more area on-site for additions, parking, and public space. Turning movements north onto 2nd Ave NW are relatively low during peak hours (4-18 vehicles) and vacation would not eliminate access to any properties.
3. **Building Addition.** A building addition across 2nd Ave NW connects City Hall to the County facilities. Visitors and employees can easily walk between facilities without having to go outside.
4. **New Parking.** This strategy includes demolition of the church north of City Hall for parking. Most existing parking is occupied by employees, leaving few areas for visitors to park. Demolition would require private property acquisition by the city.
5. **Small Public Plaza.** A civic plaza at the terminus of 2nd Ave NW where City Hall connects with County facilities. The plaza serves as an iconic feature approaching from the south for public gatherings, announcements, and memorials.

Parking Strategy for A and B.

Both strategies increase parking. There are 88 total parking spaces currently available for use near City Hall and County facilities, including on- and off-street spaces. Increases in parking spaces include:

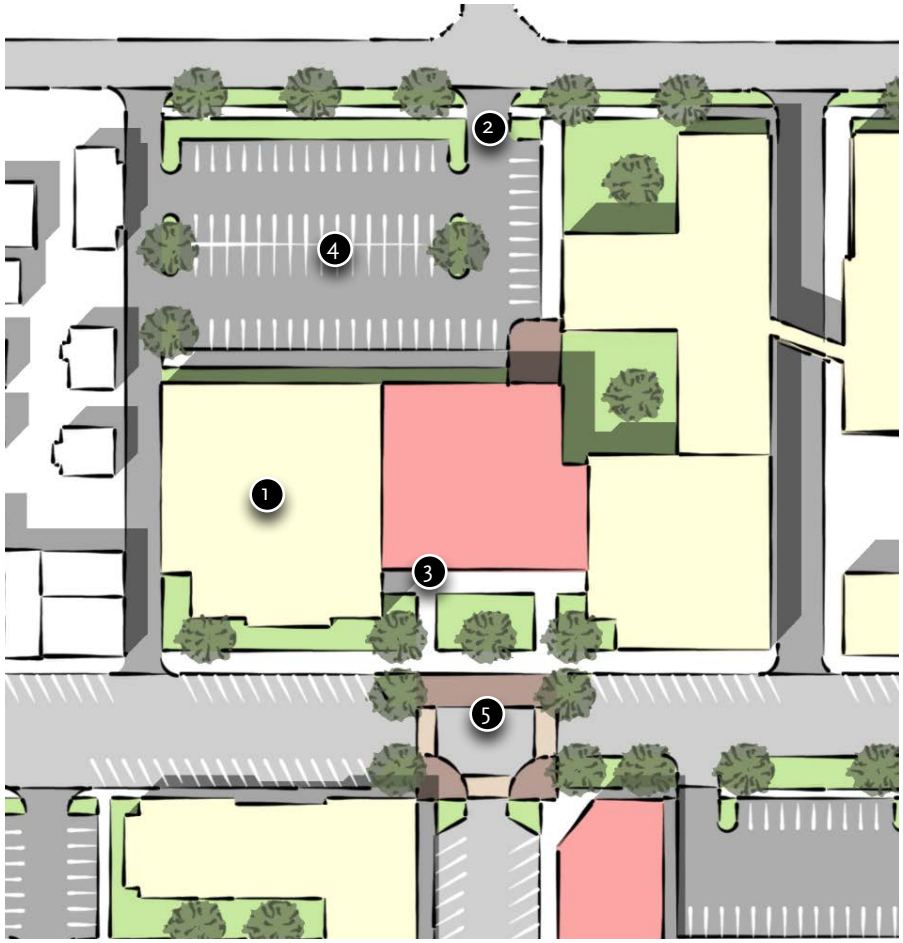
- Strategy A ~ 21
- Strategy B ~18

All surface parking lot scenarios should incorporate landscaping and trees within lots and along sidewalks to break up the expanse of concrete and create an aesthetically pleasing area around City Hall.

Existing Block - Looking Northwest


Downtown Plaza - Mason City, IA

Figure 114: City Hall Rehab and Expansion, Strategy B



F. 209-211 Main Street

Papa Murphy's and Hirsch Florist are two successful business that occupy 209-211 W Main Street. These businesses contribute to Mandan's economy and will continue for the foreseeable future. However, markets change over time and this plan considers the possibility for responding to such change.

Strategy A – Business Retention

1. **Retention**. This strategy focuses on retaining these existing businesses south of Main Street. These businesses contribute to the success of downtown. Facade improvements can increase the longevity and add a positive appearance to the Main Street corridor.
2. **Pedestrian Safety**. Discussed more later in this plan, aesthetic improvements along Main Street can create a buffer from vehicles and increase the comfort of pedestrians walking from surrounding park areas.
3. **Site Enhancements.** Site enhancements to complement customer experiences at Heritage Park including outdoor dining areas, seating, shaded areas, and retention of landscaping.

Strategy B – Redevelopment Expansion

1. **New Development.** As the market evolves, the site could transition to a higher intensity redevelopment project including the remediation site on the east. Designs could be similar to the bank on the east or strip style development with parking in the rear.

Parking Strategy for A and B

Parking will not change on-site in the short-term. Under a large scale development scenario adequate parking will be needed for customers and employees.

Figure 115: Current 209-211 Main Street Site

Figure 116: Strategy A

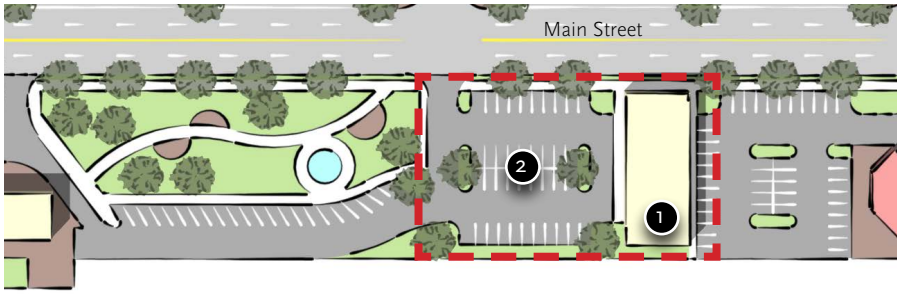
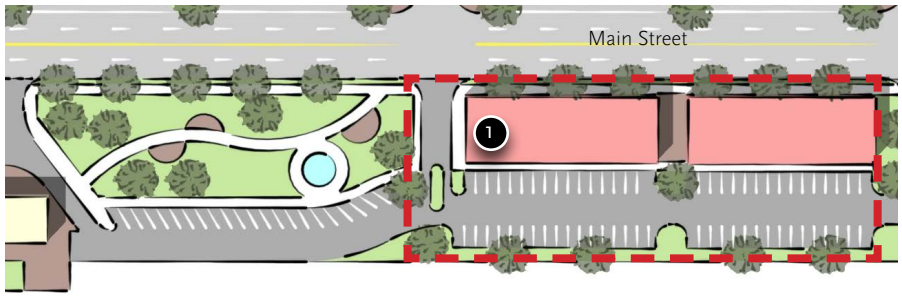
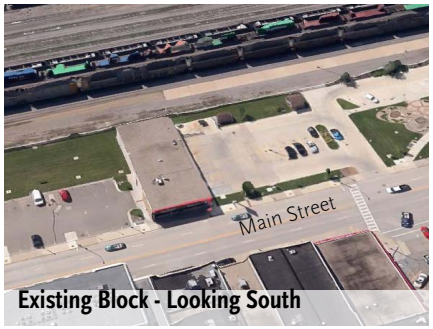


Figure 117: Strategy B





Existing Block - Looking South

G. South Remediation Building

Two remediation buildings will become obsolete in the next 5 years. Options for reuse are limited because of the small size of these buildings and unique locations. The second remediation building sits along the railroad south of Main Street. The building is about 4,000 square feet in the middle of a roughly 84,000 square foot lot.

Strategy A – New Park Space

1. **Expanded Park.** The strategy for this site builds on the success of Dykshoorn and Heritage Parks located south of Main Street. The size of the property grants an opportunity for a unique park feature not seen in downtown, let alone the City of Mandan. One concept to emulate from other northern climate communities is an ice skating path. For example, downtown Elkhart, Indiana, features a path that transitions to an ice-skating rink in the winter.
2. **New Public Facility.** A new building on site should provide restrooms and a place to warm-up during the winter months. Skate rentals are essential if an ice skating feature is constructed.
3. **Public/Private Partnerships.** To undertake and implement such a project will require partnerships between public and private entities. A fundraising campaign would help generate interest and offset capital costs that the City cannot fully fund.

Strategy B – Redevelopment

1. **New Commercial.** As the market evolves, the site could potentially transition to commercial office, retail, or restaurant redevelopment. Designs could be similar to American Bank or strip style development that offers ample parking in the rear.
2. **Parking in Rear.** Redevelopment should consider parking areas in the rear with landscaping. Buildings should form the "walls" along Main Street.

Parking Strategy for A and B

There are 67 off-street parking spaces on the remediation site south of Main Street. The strategy for a new park reduces the number of parking spaces to around 51 spaces. Expanded park uses south of Main Street will require some visitors to park downtown and walk to the park. Any development should include improvements to pedestrian crossing on Main Street, discussed later in this plan.

Parking for redevelopment will vary with the use. Any parking design should limit the number of access points onto Main Street and include landscaping enhancements and possibly areas for public space. Retaining ample parking on site is a priority to serve Heritage Park and potential new uses.

Figure 118: Current South Remediation Site

Figure 119: New Park, Strategy A

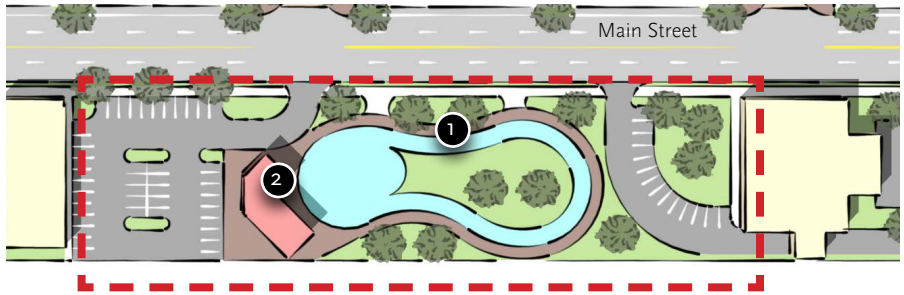
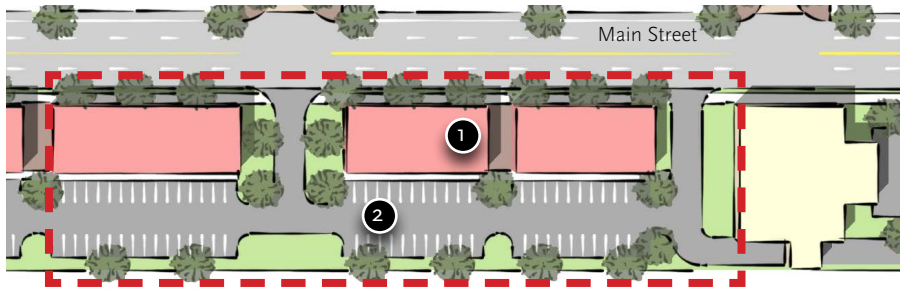
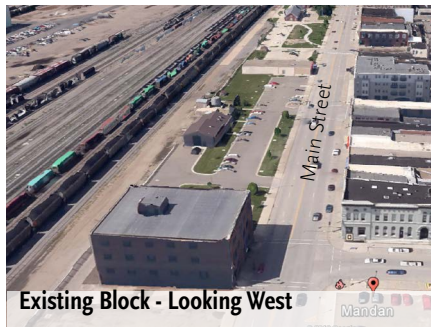


Figure 120: Redevelopment Strategy B





Existing Block - Looking West


Downtown Ice Rink - Elkhart, Indiana

H. 1st Street NE Quarter Blocks

A parking lot and residential area along 1st Street NE between Collins Ave and 2nd Ave NE are areas for enhancement. The fire station will continue to need parking. The residential uses on these blocks are incompatible with uses to the south and are an abrupt transition from commercial to single-family residential. A vacant lot along Main Street is not used.

Strategy A – Redevelopment and Public Space

Strategies for redevelopment consider parking needs, park spaces, and transitional commercial uses shown in Figure 122.

1. **Parking Structures.** While there is not an immediate parking shortage in downtown, future development will generate parking needs. As discussed previously, even with the closure of the Central Market grocery store off-street private parking demand increased by 33 percent from 2009. The increase in events downtown increases consideration for more parking.
2. **Office Development.** Office space above parking (not shown) makes full use of properties and provides leasable space. Office uses do not generate as much traffic as retail or service uses.
3. **Retail/Mixed-Use Development.** Retail uses are suited for the vacant lot on Main Street where there are high traffic volumes and visibility. A second possible mixed-use site is possible across from the Fire Station.
4. **Park/Plaza Square.** A square between the two parking structures reduces the perceived scale and provides a space for both downtown workers and residents to enjoy. Options in the space include playgrounds, water features, and seating areas. A secondary site for greenspace could accompany new mixed-use development across from the Fire Station
5. **Land Acquisition.** These sites have multiple property owners and will require acquisition and combination of private property. Acquisition will require significant investment by developers.

Strategy B – Enhancement and Preservation

1. **Parking Lot Enhancement.** Enhancements to the existing parking lot with landscaping breaks up expanses of concrete and creates a more pedestrian friendly environment. Parking structure are not built in this location.
2. **Residential Preservation.** Existing homes are preserved on the northern blocks. Residences could also transition to townhomes.
3. **Retail/Mixed-Use Development.** Retail uses are suited for the vacant lot on Main Street where there are high traffic volumes and visibility. A second possible mixed-use site is possible across from the Fire Station.

Parking Strategy for A and B

There are 55 parking spaces in the existing lot east of the fire station. Enhancements under Strategy B will reduce the number of spaces slightly with an increased parking demand created by a new park use. The number of spaces with new parking structures under Strategy A will vary depending on the design and height of the structures, but will significantly increase parking supply to serve areas of downtown.

Figure 122: Redevelopment, Strategy A

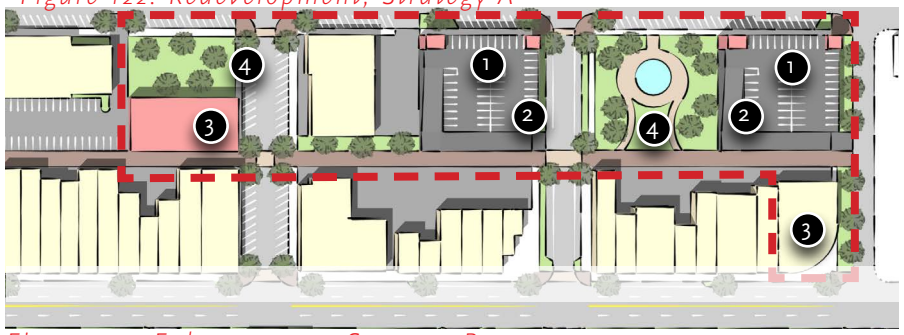
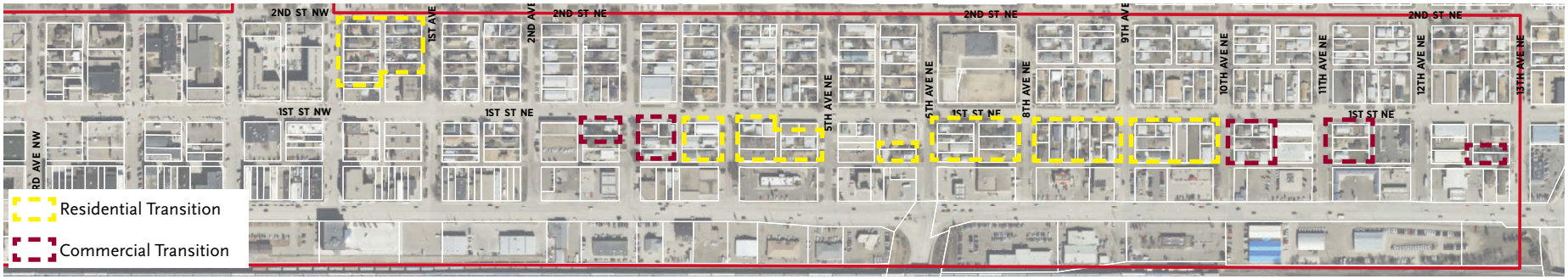


Figure 121: Enhancement, Strategy B

Existing Block - Looking North

Public Square - Rapid City, SD

Figure 123: Fringe Transition Areas



I. Fringe Transition Areas

The residential block east of the Library Square Apartments, and half blocks east of 2nd Ave NE have existed for many years as primarily single-family residential homes. As commercial uses expanded east along Main Street, these homes became difficult to buffer from traffic, overflow parking, and other impacts of commercial uses. Some blocks may also transition to commercial uses.

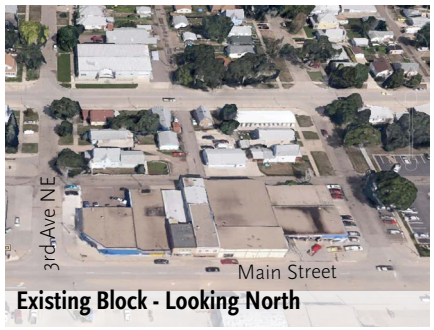
Strategy A – Protection and Preservation

This strategy maintains the existing residential fabric with no change in use.

1. **Preservation.** With each residence being privately owned, every block is maintained as single-family homes at a density of 5-6 units per acre.
2. **Buffering Improvements.** Code enforcement should require buffer treatments such as fencing and landscaping along alleys and property lines when uses change or site improvements are made to commercial property.

Strategy B – Higher Density Transition

1. **Townhome Development.** Trends toward smaller owner-occupied residences, less maintenance, and being within walking distance to amenities has led to the emergence of townhouse (or row house) style development near downtowns. This strategy shows transitions from single-family residences to higher density townhomes (12-20 dwellings per acre) developed on quarter blocks.
1. **Neighborhood Commercial.** Key areas near arterial intersections at 6th Ave NE and Mandan Ave can appropriately transition to light, neighborhood commercial uses. These include small-scale retail, service, or appointment based offices that generate less traffic and generally operate during daytime hours, potentially with upper story residential.



Existing Block - Looking North

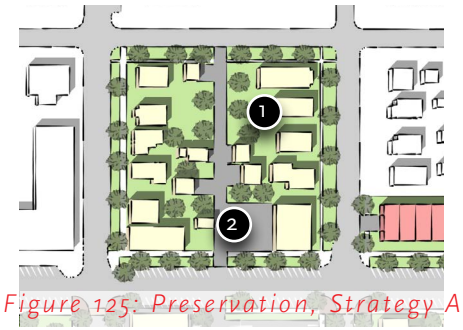


Figure 125: Preservation, Strategy A


Neighborhood Scale Commercial

Figure 124: Townhome Concept, Strategy B

2. **Parking in Rear.** Much like today, townhomes are designed with parking accessed from alleyways. Another alternative could include underground parking for 2-3 story townhomes development.

Parking Strategy for A and B

Parking within these residential transition areas should remain similar to current conditions, with parking generally accessed from alleys or detached garages. Off-street parking needs to be required for any new development to prevent over use of street parking.

Future Parking

Parking strategies are included for all the development opportunity sites above. Most development strategies increase the amount of commercial space and residential units and do not add additional parking. Currently parking is oversupplied in the downtown core. However, a few large redevelopment projects can quickly strain available parking near downtown amenities.

A development strategy for the 1st Street NE Quarter Blocks offers an option for parking structures. Property acquisition, assembly, and impact on surrounding residential properties could delay or even prevent development of structures in the foreseeable future. The Wells Fargo Bank property offers a more suitable site for a parking structure in downtown.

Central Parking Structure

The site of the Wells Fargo Bank along 1st St NW between 3rd Ave NW and 2nd Ave NW offers an alternative and more suitable site for a parking structure over new development.

1. **Central Location.** The location sits two blocks or less from City Hall, County facilities, Main Street retail, Heritage and Dykshoorn Parks, and future redevelopment on the Central Market block.
2. **One Owner.** Wells Fargo owns the entire northern half of the block. Acquisition would be easier if and when a project moves forward.
3. **Existing Parking Improvements.** Demand for a parking structure will take time as markets change and redevelopment occurs. In the meantime, enhancements to the existing parking lot can be made to improve the appearance of the intersection. A pocket park would add shade, greenery, and a place for downtown employees to eat their lunch or simply relax.

Figure 126: Potential Parking Structure Location

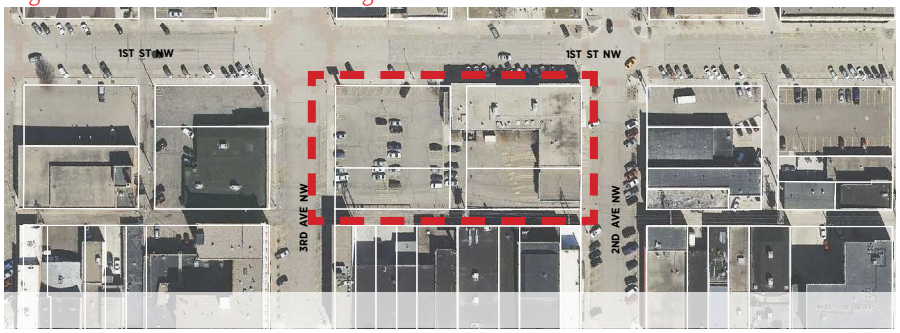
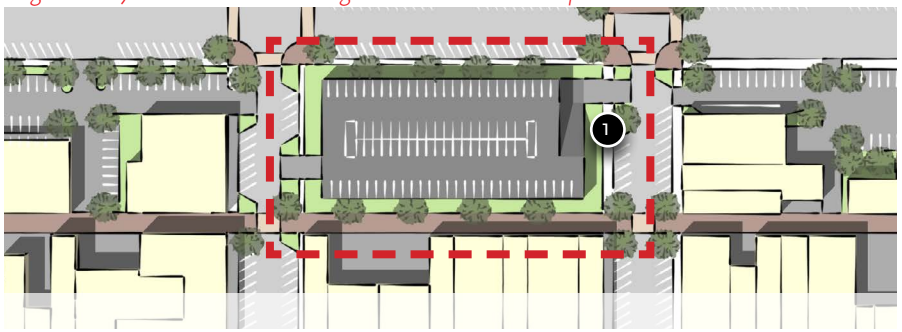


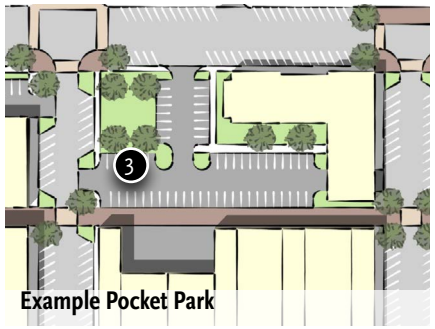
Figure 127: Central Parking Structure Concept




Existing Block - Looking North

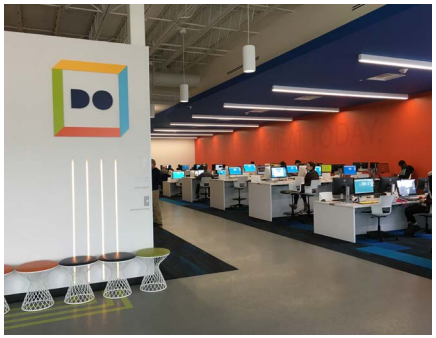

Existing Block - Looking West


Small Scale Parking Structure, 2-4 stories



Example Pocket Park

Figure 128: Development Opportunities



Park and Shared Space Opportunities

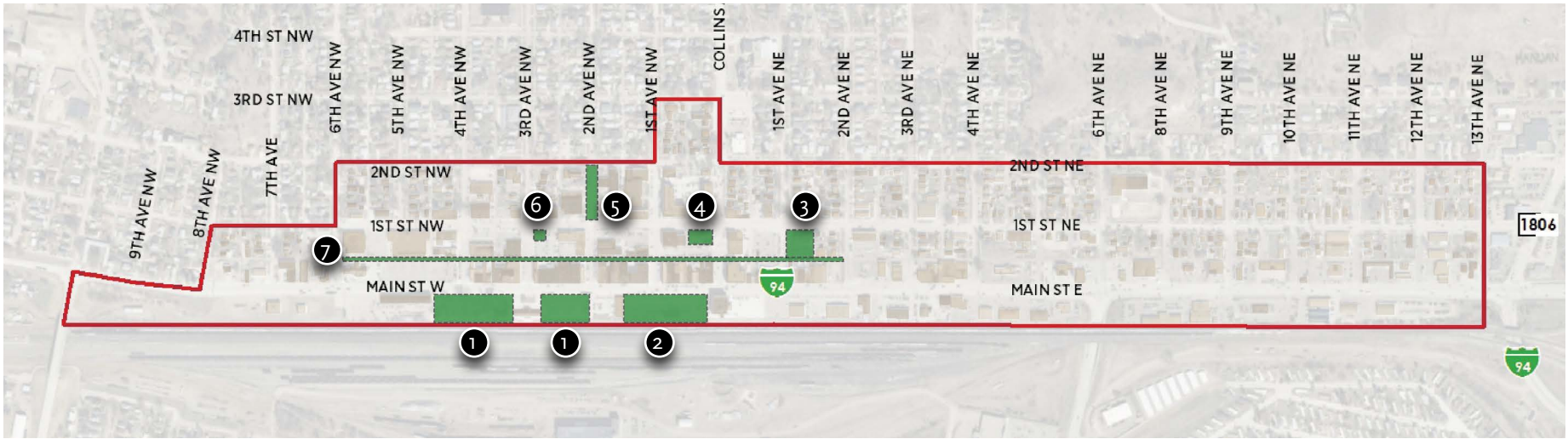
With limited public space in the Downtown core north of Main Street, there are several opportunities to incorporate parks and shared spaces into the land use development strategies as described previously. Ideas include neighborhood parks, mini-parks, plazas, and greenspace enhancements.

The parks, shared spaces, and streetscape for downtown Mandan should continue to evolve and refresh, providing positive and memorable experience to attract visitors and private investment in downtown. Amenities within new park and shared spaces will add life to downtown rather than simply have a green lawn.

Features such as pedestrian lighting, trees, and benches can be used to create a sense of place and human scale. Similar applications can be made along streets.

1. **Existing park enhancements.** Enhancements to Dykshoorn and Heritage Park should continue to be made to meet the needs as a destination public event space. Seating, water fountains, small promenades or plazas, decorative lighting, and other aesthetics feature have function and visual appeal.
2. **Remediation Park**. The remediation site south of Main Street will soon become obsolete. A park space complements the theme of civic and event space south of Main Street. The site is large enough to engage people in unique activities. Ice skating rinks have proven popular in other Midwestern communities and would fit nicely on this site, also adding to the aesthetics of the Main Street corridor.
3. **Family Square at 1st and 1st NE.** The option for a family oriented park could provide playground equipment, water features, and significant greenspace to provide a visual break in building mass and serve residents and downtown employees.
4. **Firehouse Square.** A greenspace across from the Library Square Apartments would provide residents with an area to relax, sit, socialize, or take pets.
5. **City Hall Square.** Any change to the City Hall site should incorporate public gathering space where city officials can make announcements, memorials could be placed, or other civic activities could be held.
6. **Mini-parks/green corners.** Opportunities to incorporate small greenspaces and landscaping along intersections or alley breaks up the amount of concrete and keeps the district interesting for pedestrians and drivers alike, also reserving space for future development if need and desired.
7. **Walkable alleys**. Alleyways in Downtown Mandan are an untapped resource for shared space. Improvement such as overhead lighting, colored concrete, landscaping, and improvements to rear building facades offer the opportunities for a secondary pedestrian area that is safe, attractive, and unique to downtown.
8. **Public art.** Public art gives the community a chance to showcase local artists throughout all public spaces and boasts pride for the downtown. All development strategies can incorporate public art through sculptures, wall art, murals, monuments, and lighting. An example could be transforming the fencing along the railroad into a community wall art project.

Figure 129: Public and Shared Spaces



Walkable Alleys

Rear Alley Entrances

Wall Art and Murals

Green Alleys

Enhanced Parks

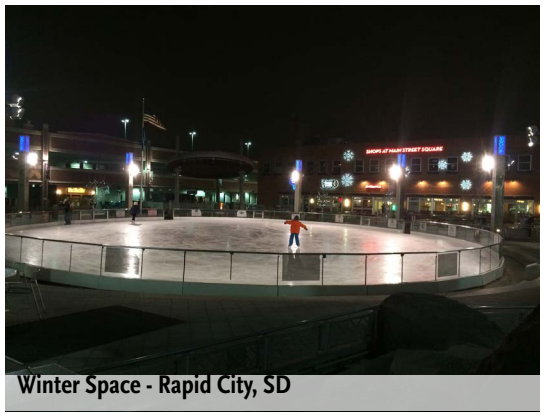
Play Area - Windsor Heights, IA

Iconic Features - Council Bluffs, IA

Play Equipment - Williston, ND

New Public Spaces

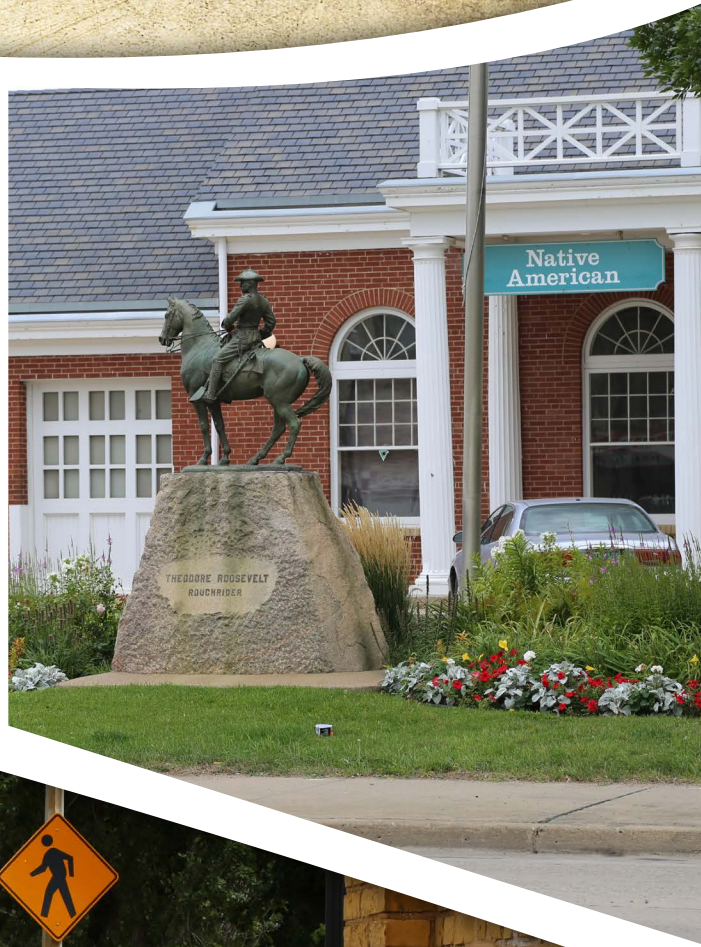
Water Features - Council Bluffs, IA



Winter Space - Rapid City, SD

Summer Space - Rapid City, SD

TRANSPORTATION ALTERNATIVES ANALYSIS



INTRODUCTION

This document has been prepared to present and discuss potential roadway improvements in downtown Mandan and the methods used to develop and evaluate these improvements. Improvements are intended to improve and balance the needs of all travel modes: automobiles, trucks, pedestrians, and bicyclists.

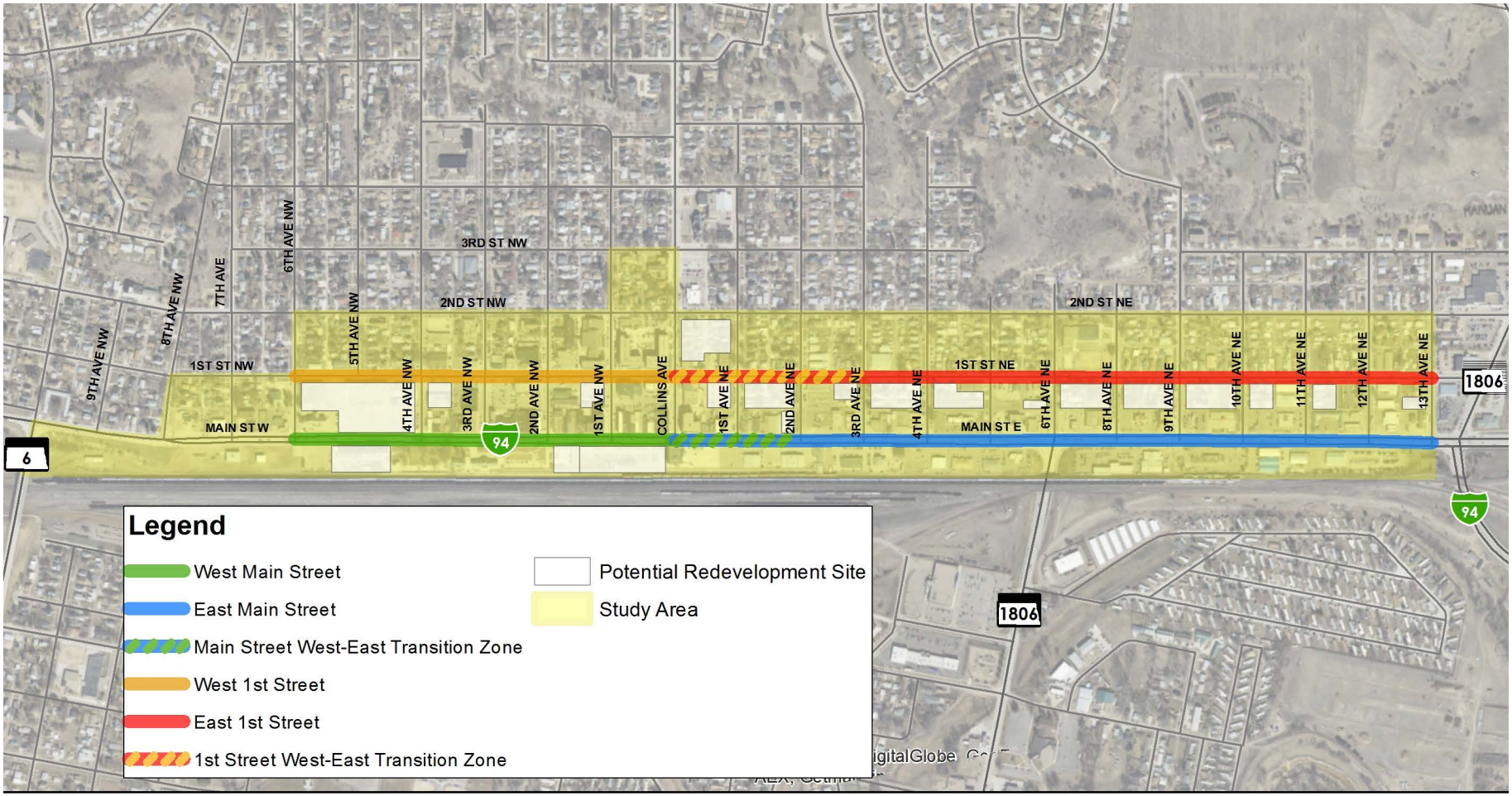
Analysis in this alternatives analysis report builds upon data and findings from both the ***Existing and Future Conditions Analysis*** and ***Land Use and Development Alternatives*** reports. This Transportation Alternatives Analysis report will summarize key information from these previous reports.

To best identify improvements appropriate for the varying characteristics in the downtown area, downtown was split into different roadway segments for independent alternatives development and evaluation (see Figure 130):

- West Main Street
- East Main Street
- West 1st Street
- East 1st Street

Potential improvements will also be presented for side streets (between Main Street and 1st Street) and subarea concepts.

Figure 130: Study Segments



Current Programmed and Planned Improvements

Main Street Signal Replacement and Interconnect

A 2016 NDDOT traffic operations study for the downtown Main Street corridor (PCN 21173, NHU-1-094(182)915) recommended the replacement of all traffic signals on Main Street between 10th Avenue NE and 6th Avenue NE. This will include improved pedestrian signals and detection, vehicle detection, and interconnection of these signals.

Key decisions from the NDDOT traffic operations study are currently being put on hold to best incorporate findings from this Downtown Subarea Study. Specifically, the following decisions include:

- Maintain or remove traffic signal at Main Street and 1st Avenue W
- Lane reduction from four lanes to three lanes on Main Street in downtown core
- Keep or remove traffic signal at Main Street and 10th Avenue E

DEVELOPMENT SCENARIOS

To evaluate transportation infrastructure under a variety of future land use conditions, travel demand was estimated for four different development scenarios. These scenarios assume differing levels of development at sites that have potential to be redeveloped (see Figure 131).

- Existing Land Use (No growth): Retains existing use of all buildings in downtown
- Hybrid Scenario (Moderate growth): Retains the existing use of some buildings and redevelopment on some sites
- Mixed Scenario (High growth): Assumes property experiences redevelopment on selected sites at a moderate market demand
- Build-Out Scenario (Aggressive growth): Assumes property experiences redevelopment on selected sites at a moderate to aggressive market demand

Note that locations of redevelopment are subject to change, however these sites are reasonable candidates for such land use revisions.

Detailed discussion and maps related to development assumptions can be found in the ***Land Use and Development Alternatives*** report that was developed as part of this study. A summary of the land use changes by development scenario is shown in Table 58 below.

Figure 131: Potential Redevelopment Sites

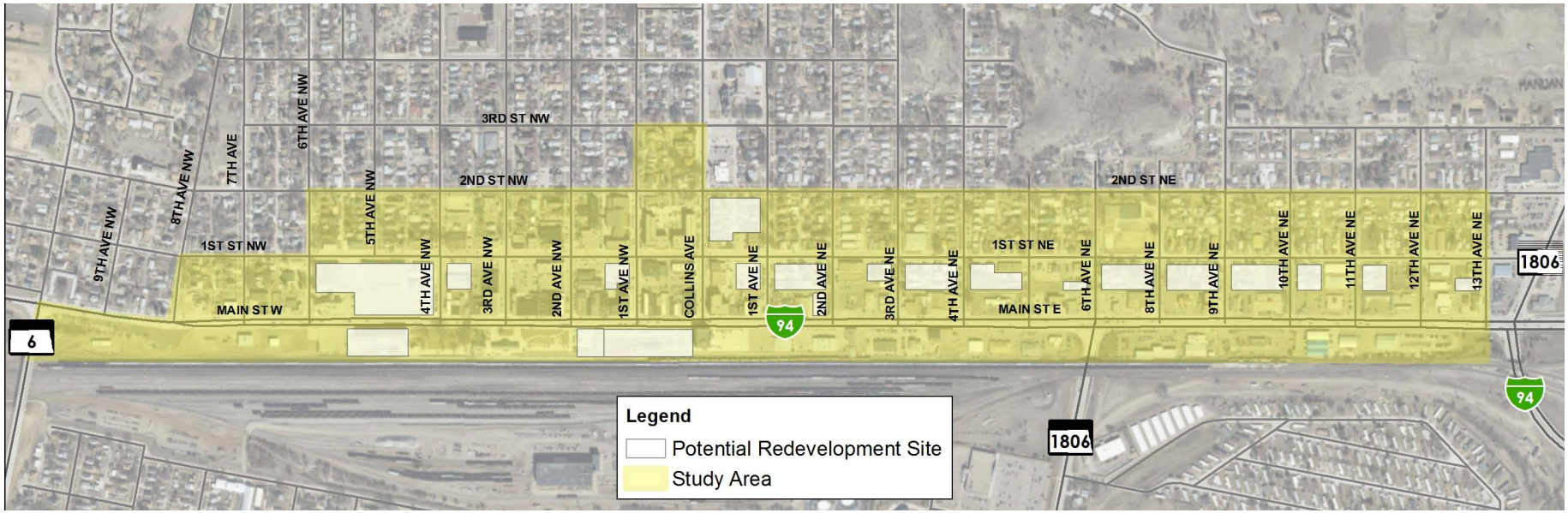


Table 56: Development Details by Land Use Scenario

Scenario	Added Ft² Retail	Added Ft² Restaurant	Added Ft² Service	Added Ft² Office	Added Ft² Civic/ Other	Added Residential
Hybrid Scenario	5,413	2,707	8,331	11,223	9,473	130 Units
Mixed Scenario	14,256	7,128	30,629	47,555	24,947	219 Units
Build Out Scenario	17,018	8,509	37,543	65,180	29,781	466 Units

Travel Demand Assumptions

To estimate travel demand associated with potential redevelopment, it was necessary to convert information in the ***Land Use and Development Alternatives*** report to data that can be used as inputs into the Bismarck-Mandan regional travel demand model.

The ***Land Use and Development Alternatives*** report documents assumed redeveloped square footage by non-residential development types (i.e. retail, restaurant, etc.) and the number of new dwelling units for each development scenario. This information was then converted to household and employment data, then aggregated by Traffic Analysis Zone (TAZ) for use in the travel demand model.

To convert the total number of households to the number households by household size, the following assumptions were made, based on data for Mandan from the 2011-2015 American Community Survey:

Table 57: Household Size Assumptions

Household Size	Percent of Total Households
1 Person	48%
2 Person	24%
3 Person	18%
4+ Person	10%
Total	100%

To convert square footage of non-residential development to the number of jobs by employment type, the following assumptions were made:

Table 58: Employment Assumptions

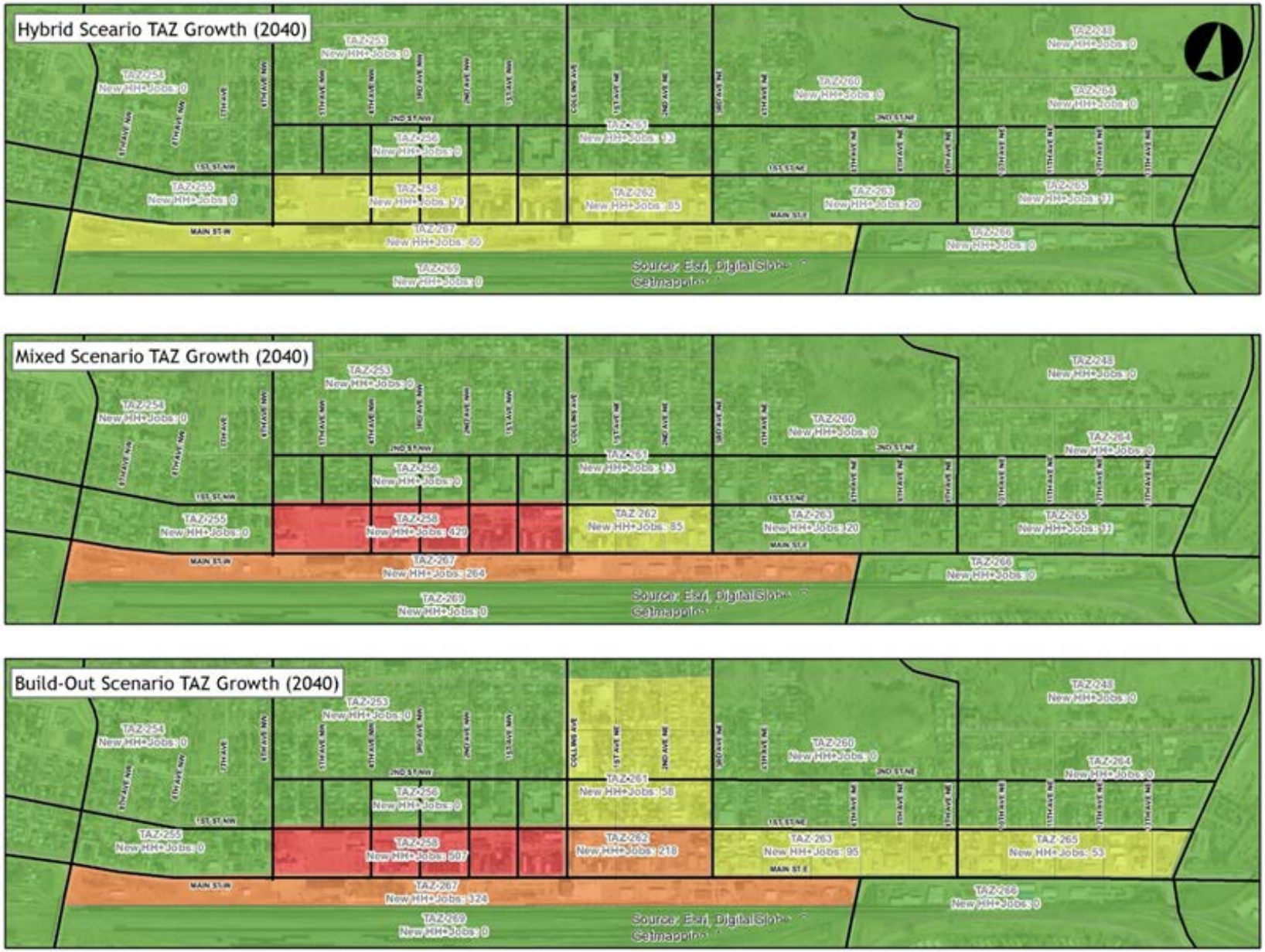
Land Use	Ft² per Employee*	General Employment Category (For Use in TDM)
Retail	500	Retail
Restaurant	120	Service
Service	225	Service
Office	150	Service
Civic/Other	225	Service

**Based on Institute of Transportation Engineers data and professional judgment*

Once household and employment totals from new development were estimated, the change in the number of households and jobs was applied to 2010 base-year TAZ socioeconomic data for TAZs in the study area. For all other TAZs outside the study area, current 2040 demographic projections used in the most recent long range transportation plan were maintained.

Figure 132 shows the change between 2010 and 2040 TAZ socioeconomic data for zones with anticipated redevelopment in downtown Mandan.

Figure 132: TAZ Growth in Downtown Mandan



Travel Modelling Validation

Bismarck-Mandan MPO model has been around for nearly two decades, receiving updates every 5 years that have recently been accompanied by an outside peer review. As part of the 2040 Long Range Transportation Plan (LRTP) Process, travel demand model results were post-processed in some locations using professional judgment. These revisions produced an increased traffic generation of 6,000 – 7,000 more cars onto Main Street and just over 2,000 more cars onto 1st Street east of Collins Avenue.

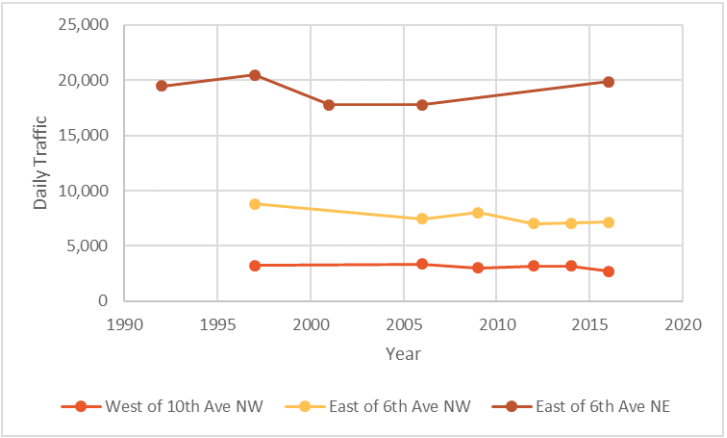
It is important to understand to that a travel demand model is intended to provide regional analysis and often requires detailed refinement when scaling down to a corridor or subarea level. The following key aspects were reviewed;

- Socioeconomic data Internal to the Study Area. Minimal growth was projected within the subarea between 2010 (base model year) and 2040. With growth projected in the near term, multiple growth scenarios were analyzed as part of this study. This is detailed further in the following section.
- Socioeconomic data external to the Study Area. According the MPO's 2012 Monitoring Report, around 0-50 new households and 51-250 new jobs are applied to the areas west and southwest of the study area that directly feed onto Main and 1st Streets. This produces very minimal new traffic. Specifically, this produces between 1,000-3,000 new trips on Main Street and under 1,000 new trips on 1st Street.
- Historic Review of Traffic Data. A review of three locations along Main Street found consistently stagnant traffic growth along the corridor, with volumes prior to 2000, consistently higher than current volumes.
- Review of External Nodes. Traffic can often grow outside of the travel demand model area. A link that exits the model is called an external node and is often given a growth rate to allow for future growth to/from this node. The two external nodes that influence Main Street greatest are Main Street itself to the west and ND Highway 6 to the southwest. A review of these external node locations found minimal to no growth over the past 10 years.

In summary, given the low growth in population and employment along the corridor and onto corridors that feed into the Subarea and a review of historic trends, it was deemed the original travel demand model outputs prior to LRTP post-processing were the best fit for the subarea. These forecasts are further increased via additional socioeconomic additions applied within the study area discussed in the following section. This is an important change to note because the Conditions Assessment Memorandum used Long-Range Transportation Plan 2040 projections as the basis for future analysis.

For more details regarding this forecasting review process, refer to ***Appendix C – Traffic Forecast Memorandum***.

Figure 133: Historic ADT on Main Street



2040 Traffic Projections by Development Scenario

After reviewing the regional travel model, the model was used to help estimate 2040 traffic projections for each of the four development scenarios, with some minor adjustments made using professional judgment. Travel model results were used to develop 2040 daily traffic projections which were then used to estimate 2040 AM and PM peak hour turning movement counts.

2040 daily traffic projections by scenario can be seen in Figure 134.

Multimodal Travel Demand

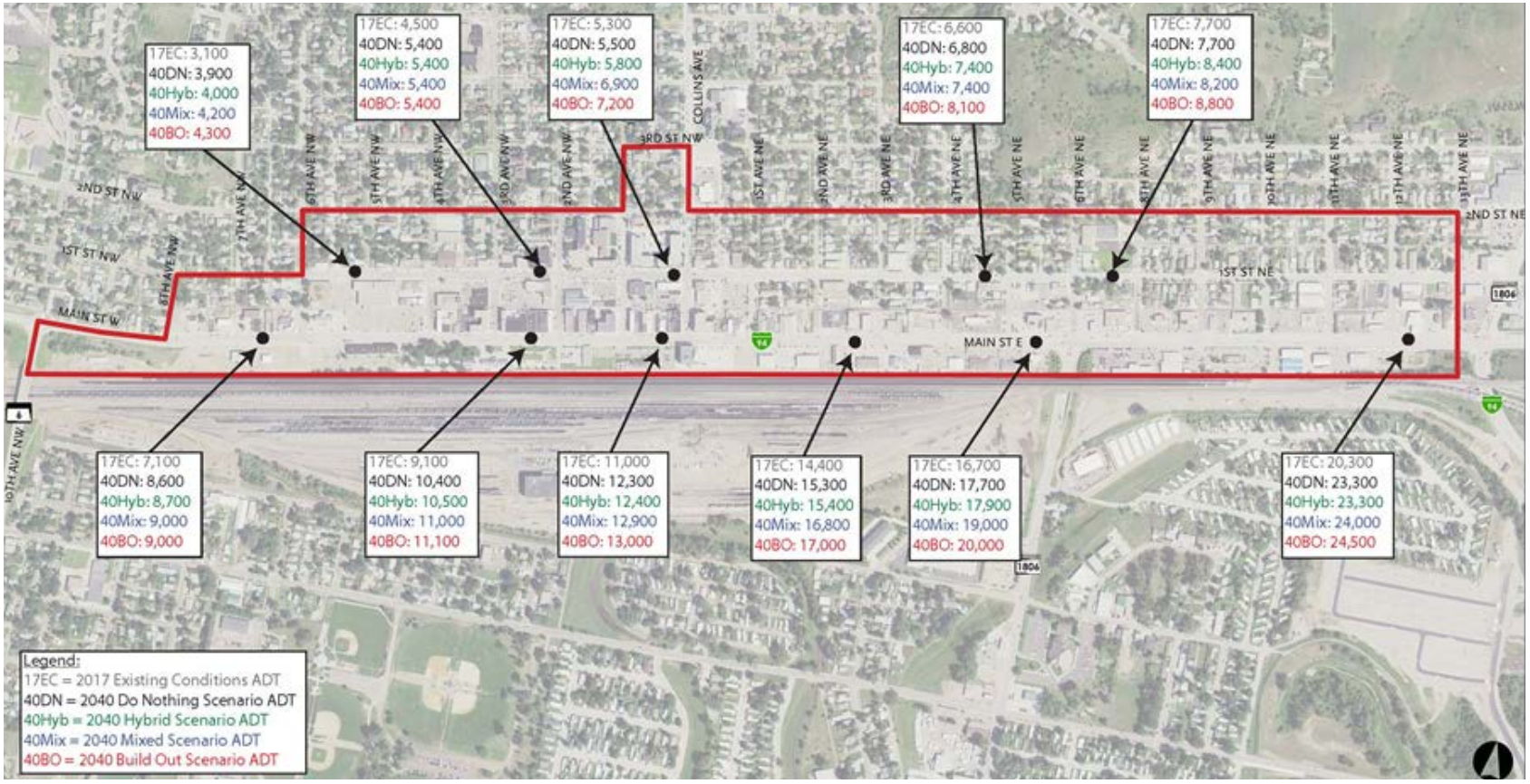
The current Bismarck-Mandan travel demand model does not have a mode choice component to account for travelers using alternative modes such as transit, biking, or walking since these alternative modes make up a very small percentage of all trips in Mandan. Based on available US Census Bureau data (limited to work-related trips) over 97 percent of trips are made by automobile.

Traffic analysis for mixed use development sometimes applies trip generation reductions to estimated trip generation totals to account for multimodal travel demand. The study team however opted not to apply such a reduction in downtown Mandan to have more conservative traffic projections.

Basis For Operations Analysis

The study team opted to use the 2040 Build-Out Scenario as the basis for operations analysis and comparison between roadway alternatives. An evaluation of estimated daily traffic volumes across land use scenarios indicated that build-out scenario volumes are within 10 percent of all scenarios, mainly due to the fact that the downtown grid provides several routes to different destinations rather than requiring all vehicles to use a single route regardless of the destinations.

Figure 134: 2040 ADT by Land Use Scenario



DEVELOPMENT OF ALTERNATIVES

After the completion of existing and future conditions analysis, the study team worked with the project Steering Committee to determine what the improvement priorities were for each segment of the corridor.

Through this process, Steering Committee members were asked to rate the priority of improvements related to four travel modes in different areas in downtown Mandan and to rate the relative importance of various evaluation metrics. Steering committee members were given 100 total points to assign across four travel modes and another 100 points to assign across four different evaluation metrics.

- Travel Mode Preference – 100 total points
  - Pass-Through Traffic and Trucks
  - Local Traffic, Parking and Transit
  - Biking
  - Walking
- Evaluation Metrics – 100 total points
  - Operational Efficiency
  - User Safety
  - Project Cost
  - Project Impacts (to buildings, accesses, etc.)

Travel Mode Preference

Steering Committee polling results indicate travel mode priorities vary for different areas in downtown Mandan, which reflects the evolving and distinct characteristics of different roadway segments in the area.

- Local traffic, parking, transit, and walking were found to be the highest priorities in the downtown core (west Main Street and west 1st Street)
  - Walking was the most important in the West Main Street section. Walking, combined with local traffic, parking, and transit made constituted 70 percent of travel mode priority
  - Pass through traffic was the lowest priority on West 1st Street, receiving just nine percent of travel mode priority
- Both pass-through and local traffic were found to be the highest priorities east of the downtown core (east Main Street and east 1st Street) – however biking and walking are a higher priority on 1st Street than they are on Main Street
  - Biking was viewed to be most acceptable on 1st Street, receiving 20 to 23 percent of the travel mode preference throughout the study area
  - Auto and truck traffic dominated the travel mode preference for east Main Street, where it received 76 percent of the preference

These results were used to develop improvement alternatives that align with local desires while best mitigating deficiencies that were identified during existing and future conditions analyses.

Roadway Design Assumptions

The following principles were used when developing corridor-wide improvement strategies.

Lane Widths

NDDOT prefers to use 12 foot lanes on all state highways, and some level of truck traffic is expected to continue using Main Street into the future. Taking this into consideration, 12 foot lanes were provided for Main Street alternatives whenever possible. It is however important to note that reducing lane width requirements on Main Street provides a valuable opportunity to re-allocate cross-section width for pedestrian and bicycle space. As such, lane width reductions were frequently used on 1st Street, but only used when absolutely necessary on Main Street.

AASHTO design guidance states that at lower travel speeds (35 miles per hour or lower), 11 foot lanes are extensively used in urban areas, and other agencies such as the Minnesota Department of Transportation have found that reducing lane widths to 11 feet have had no operational impact.

Curbline Impacts

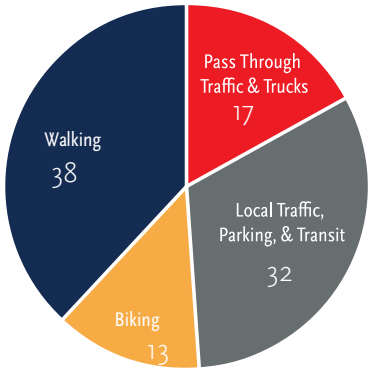
The study team attempted to keep roadway alternatives within existing curblines to minimize project costs. Moving curblines and the subsequent drainage impacts is often the most costly aspect of a roadway project.

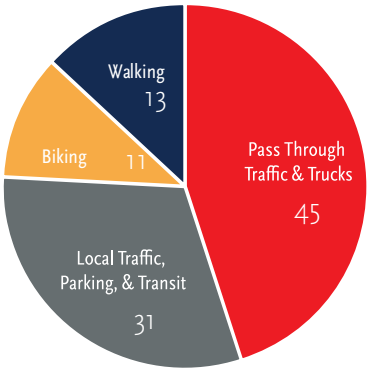
Right-Size Capacity

Alternatives were developed to "right-size" capacity, meaning that excess roadway capacity (i.e. operations at LOS "A" or "B") should be reallocated to better balance needs for other travel modes.

Figure 135: Travel Mode Preference by Roadway Segment

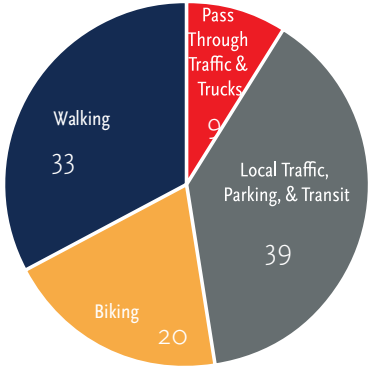
West Main Street

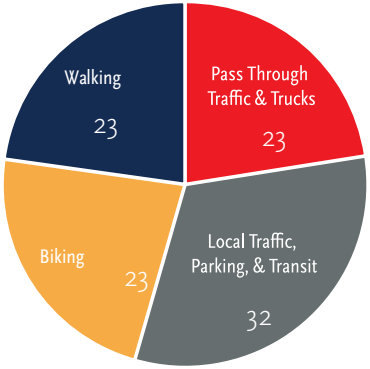




East Main Street

West 1st Street



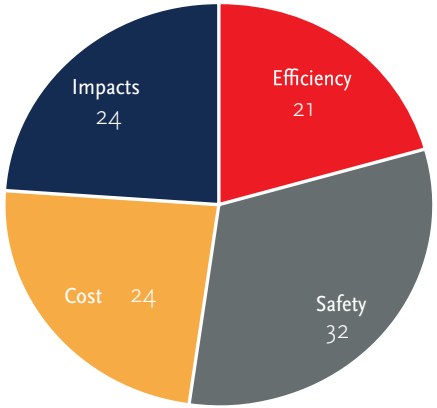


East 1st Street

Evaluation Metrics Priorities

Based on Steering Committee input, safety was the deemed to be the most important metric to consider when evaluating potential improvements (average score of 32 out of 100). However, operational efficiency, project costs, and project impacts each received average scores between 21 and 25, indicating the importance of balancing safety, operations, cost, and impacts to find the best improvement strategy.

Figure 136: Weighted Evaluation Metrics



Alternatives Evaluation Methodology

Each studied alternative was evaluated and ranked by being assigned a total weighted score between zero (○○○○○○○○○○) and ten (●●●●●●●●●●), with this score factoring in both operations and cost. Inputs to this score include a benefits Score and a cost score.

Scoring is presented in terms of ●●●●●●●●●● rather than numerical scores (i.e. 7.4, etc.) to reflect the fact that scores were assigned with some subjectivity, albeit based on research and professional judgment.

Benefits Score

The benefits score is a score between zero and ten that conveys how beneficial an alternative is to efficiency, safety, and impacts, giving consideration to all travel modes. Benefits (or negative impacts) associated with each alternative were evaluated then the alternative was given a sub-score between 0 and 10 for the following modes:

- Pass through and truck traffic
- Local traffic, parking, and transit
- Bicycle facilities
- Pedestrian facilities

An overall benefits score was then calculated based on modal preferences for various segments of the corridor, using Steering Committee input (see Figure 110). For example, if pedestrian traffic was rated as the highest priority, the pedestrian facility score (between zero and ten) would have a higher impact to the overall score than a lesser priority travel mode, such as through traffic.

Cost Score

Each alternative was also assigned a cost score between zero and ten ($$$$$$$$$$) using planning level cost estimates. It is important to note that cost scores were assigned based on relative differences between estimated project costs, not necessarily the actual project cost.

Total Weighted Score

The total weighted score takes into consideration the relative importance given to benefits (efficiency, safety, impacts) and to cost. Based on Steering Committee input the total combined weight of benefits was set at 76/100 and the weight of cost was set at 24/100 (see Figure 136).

For example, if an alternative received a benefits score of 8 (●●●●●●●●○○) and a cost score of 4 ($$$$), the weighted total score was calculated as follows:

Total Weighted Score = (8 x 0.76) - (4 x 0.24) = 5.12

Total Weighted Score = ●●●●●○○○○○ (rounded to closest integer)

The premise behind the total weighted score is to take into consideration the cost of improvements to determine if the extra cost for a particular improvement is justified due to the magnitude of overall benefits.

ROADWAY ALTERNATIVES

This section will present the alternatives developed for each segment of the downtown subarea, discuss expected improvements associated with each alternative, and present scoring/rankings for all alternatives.

For each segment of the subarea, there are overall cross-section alternatives that apply to the entire segment of the subarea (i.e. three-lane section, two-lane section with median, etc.), however in some areas spot-improvements were also considered (i.e. intersection control revisions, improved signing, etc.).

West Main Street

Five alternatives were developed for the West segment of Main Street in the downtown core, which includes a do-nothing scenario. These alternatives have varying levels of emphasis on through traffic, parking, bicycle facilities, and pedestrian facilities.

Figure 137: West Main Street

Do Nothing

This alternative would maintain the existing roadway configuration with four travel lanes, no turn lanes and no improvements to sidewalks.

This option is expected to operate at an acceptable level of service through 2040, but would remain a difficult corridor for bike traffic and would not improve walkability in the downtown core along Main Street. The absence of dedicated left turn lanes also creates the potential for rear-end collisions, especially since the existing four-lane section experiences some speeding issues.

A summary of this alternative is shown in Figure 143.

- Benefits Score: ●●●●●○○○○○
- Cost score: $
- Emphasizes automobile traffic
- Maintains acceptable traffic operations through 2040
- No improvements to multimodal traffic

3-Lane Section: Parking Option

This alternative would remove one travel lane in each direction but add a two-way left turn lane and parallel parking on the south side of Main Street. This option would also add Main Street curb extensions on both sides of the roadway at intersections.

Figure 138: Example of 3-Lane Section with Parking

Robert Street - Saint Paul, MN (Google Earth)

The removal of one through lane in each direction is not anticipated to trigger operational deficiencies through 2040, therefore reallocation of this space for other uses is an acceptable and desirable option. The narrower cross-section in combination with curb extensions will have a traffic calming effect, with some minor impacts to through traffic due to anticipated reductions in travel speeds, however major congestion is not expected. Walkability will be improved with the added curb extensions and associated traffic calming, and on-street parking on the south side will provide a buffer between pedestrians and moving traffic, similar to the existing conditions on the north side.

The two-way left turn lane will mitigate conditions where through traffic is blocked by left turning vehicles. Maximum queue lengths between Collins Avenue and 3rd Avenue east could extend the entire block during peak hours, however average queues are not expected to spill back to adjacent intersections.

A summary of this alternative is shown in Figure 144.

- Benefits Score: ●●●●●●●●○○
- Cost score: $$$$
- Maintains acceptable traffic operations through 2040
- Reallocates travel lane space for parking and two-way left turn lane
- Improves walkability with curb extensions and sidewalks being buffered from moving traffic by parking
- Minor impacts to through traffic from narrower cross section and traffic calming
- Adds parking on the south side of the corridor despite no current demand for parking on this side of the road

3-Lane Section: Cycle Track Option

This alternative would also remove one travel lane in each direction with the addition of a two-way left turn lane and would add a bi-directional cycle track on the south side of the corridor. Main Street curb extensions would also be added on the north side of the corridor at intersections. Note that this alternative would not have south side curb extensions.

Figure 139: Example of Cycle Track

10th Street NE - Atlanta, GA (Google Earth)

While the Steering Committee did not rate bicycle traffic as a major priority on Main Street, the availability of cross section width from removing through lanes in combination with the relatively low number of accesses on the south side of the corridor make this a viable option. The cycle track provides dedicated right-of-way for bicycles, which is desirable compared to other types of bicycle facilities given the need for Main Street to accommodate through traffic as well as truck traffic.

Through and truck traffic will have minor impacts from traffic calming, however no major issues are expected.

The cycle track does limit the ability to widen pedestrian facilities, however the cycle track will buffer the south side sidewalk from moving traffic, improving pedestrian comfort.

In addition to the improvements discussed above, access management opportunities should be explored as part of any reconstruction to improve both safety and traffic flow. More details related to access management and potential strategies are discussed in a later section.

A summary of this alternative is shown in Figure 120.

- Benefits Score: ●●●●●●●●●○
- Cost score: $$$
- Maintains acceptable traffic operations through 2040
- Reallocates travel lane space for cycle track
- Improved walkability from curb extensions and buffer between moving traffic
- Minor impacts to through traffic from narrower cross section and traffic calming

3-Lane Section: Bike Lanes Option

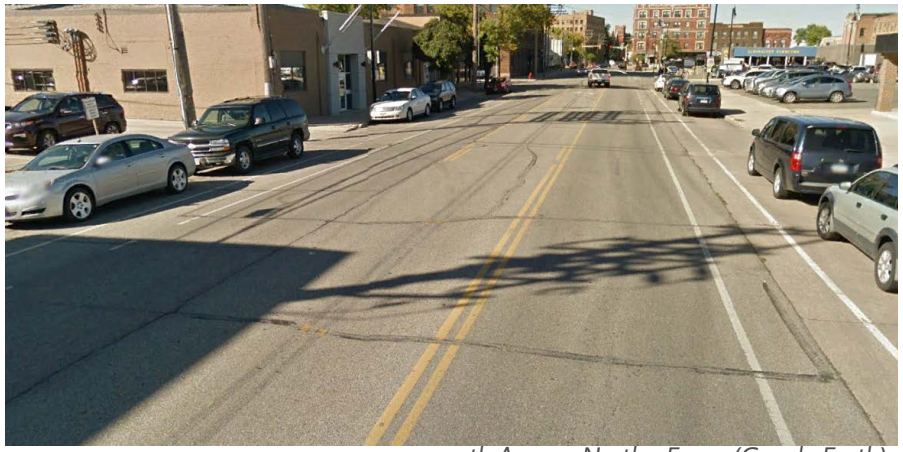
Like the other 3-lane alternatives, this would remove one travel lane and add a two-way left turn lane. This option would however have bike lanes on each side of the corridor instead of the bi-directional cycle track. Main Street curb extensions would be added on the north side, but not on the south side.

Bike lanes would provide dedicated roadway space for cyclists and would provide a buffer between sidewalks and moving traffic, creating a more bikeable and walkable environment, but bike lanes would also introduce potential conflicts between cyclists and parked vehicles (particularly car doors) on the north side of the corridor. The north-side curb extensions would be bisected by the bike lane, which could potentially create conflicts between pedestrians and cyclists.

In addition to the improvements above, access management opportunities should be explored.

A summary of this alternative is shown in Figure 121.

Figure 140: Example of 3-Lane Section with Bike Lanes



4th Avenue North - Fargo (Google Earth)

- Benefits Score: ●●●●●●●●○○
- Cost score: $$$$
- Maintains acceptable traffic operations through 2040
- Reallocates travel lane space for bike lanes
- Improved walkability from buffer provided by bike lane between pedestrians and moving traffic
- Potential conflicts between pedestrians and cyclists on the north side due to bike lanes bisecting curb extensions
- Impacts to through traffic from narrower cross section and traffic calming

2-Lane Section: Wider Sidewalks and Median

This alternative would have one travel lane in each direction, wider sidewalks on Main Street, and a raised median with left turn lanes at key locations instead of a two-way left turn lane. Curb extensions would also be added on both sides of Main Street at intersections.

Figure 141: Example of 2-Lane Section with Median

Old Woodward Avenue - Birmingham, MI (Google Earth)

The raised median in conjunction with reduced capacity can have a traffic calming effect which would have impacts to through traffic, but would improve walkability due to reduced vehicle speeds and would also offer opportunities for raised pedestrian refuge islands. The raised median also offers access management opportunities (discussed in more detail below), primarily converting midblock accesses to right-in/right-out only. Access management would improve traffic flow and reduce crash potential.

The median would however create more significant impacts from parking maneuvers on the north side of the corridor due to the inability for though vehicles to navigate around a parking vehicle.

The raised median and wider sidewalks will also have a considerably higher cost compared to other identified alternatives.

A summary of this alternative is shown in Figure 122.

- Benefits Score: ●●●●●●●○○○
- Cost score: $$$$$$$$
- Maintains acceptable traffic operations through 2040
- Reallocates travel lane space for median and wider sidewalks
- Improved walkability with wider sidewalks, refuge, and ability to relocate lighting to raised median
- Raised median can also provide aesthetic improvements like banners, planters, etc.
- Greatest impact to special events like parades
- Minor impacts to through traffic from narrower cross section

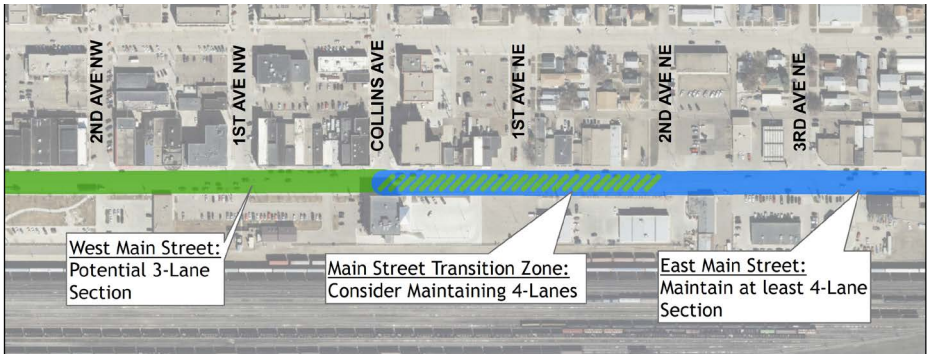
Option: Maintain Four Lanes East of Collins Avenue

This study has defined West Main Street as the segment between 6th Avenue NW and 2nd Avenue NE, and has all improvement options reducing the number of lanes to allocate this space for other purposes. All improvement options for East Main Street (2nd Ave NE to 13th Ave NE) maintain at least four through lanes.

Since Collins Avenue is a major route in Mandan, it may be appropriate to maintain a four-lane section east of Collins Avenue instead of only maintaining it east of 2nd Avenue NE. This would conservatively provide extra roadway capacity and queuing space between 2nd Avenue NE and Collins Avenue, but would limit the ability to provide other multimodal roadway features. It is important to note that every three-lane section alternative includes a westbound right-turn lane at Collins Avenue.

Traffic modelling has not indicated a significant difference in ***vehicle delay*** between a three or four lane section between Collins Avenue and 2nd Avenue NE. A four lane section will mitigate events where queues west of Collins Avenue spill back to adjacent intersections, which would be expected during high volume cycles with a three lane section.

Figure 142: Collins Avenue to 2nd Avenue NE Transition Area



Ranking of West Main Street Cross Section Alternatives

After scoring each West Main Street alternative in terms of operations and score, a weighted total score that considers both operations and costs was determined for each alternative.

Table 59: Ranked Summary of West Main Street Cross Section Alternatives

Alternative	Operational Score	Cost Score	Weighted Total Score
3-Lane Section: Cycle Track	●●●●●●●●●○	$$$	●●●●●●○○○○
3-Lane Section: Bike Lanes	●●●●●●●●○○	$$$$	●●●●●○○○○○
3-Lane Section: Parking Option	●●●●●●●●○○	$$$$	●●●●●○○○○○
2-Lane Section: Wider Sidewalks	●●●●●●●○○○	$$$$$$$$	●●●●○○○○○○
Do Nothing	●●●●●○○○○○	$	●●●●○○○○○○

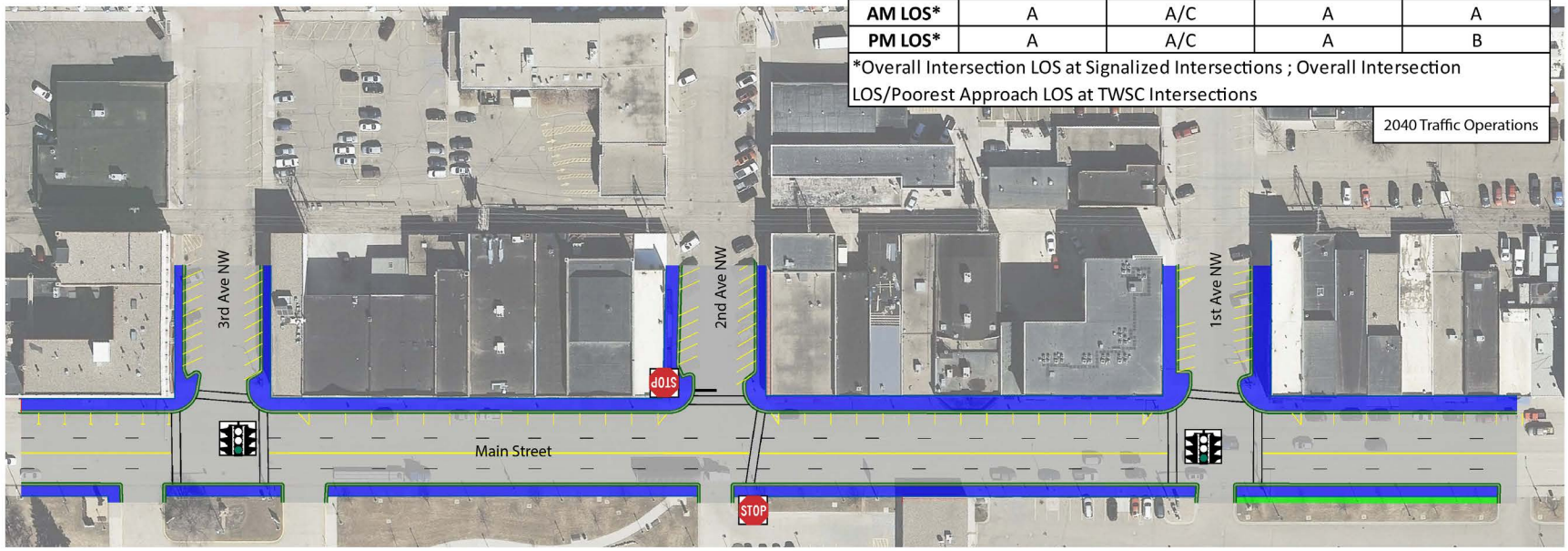
Figure 143: West Main Street Do Nothing Alternative

WEST MAIN STREET
Do Nothing

Intersection	Main St and 3rd Ave W	Main St and 2nd Ave W	Main St and 1st Ave W	Main St and Collins Ave
Control	Signal	TWSC	Signal	Signal
AM LOS*	A	A/C	A	A
PM LOS*	A	A/C	A	B

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



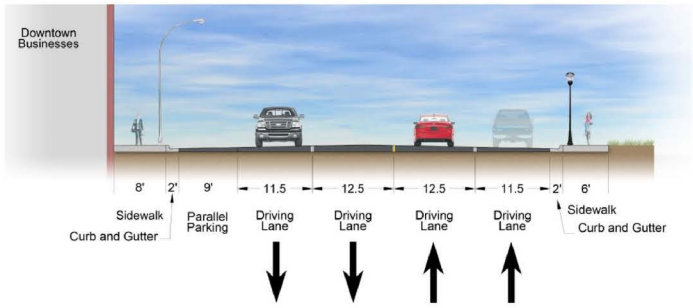
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●●●●●	17	Highest capacity section	●●●●●○○○○○	●●●●○○○○○○
	Local Traffic, Parking, and Transit	●●●●●●○○○○	32	No dedicated left turn lanes increases crash potential. Higher vehicle speeds associated with wider cross section can make on-street parking intimidating.		
	Bicycle Facilities	○○○○○○○○○○	13	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●○○○○○○	38	Higher vehicle speeds associated with wider cross section makes corridor difficult to cross on foot. No buffer between pedestrians and moving traffic on south side.	$	

Figure 144: West Main Street 3-Lane Section - Parking Option

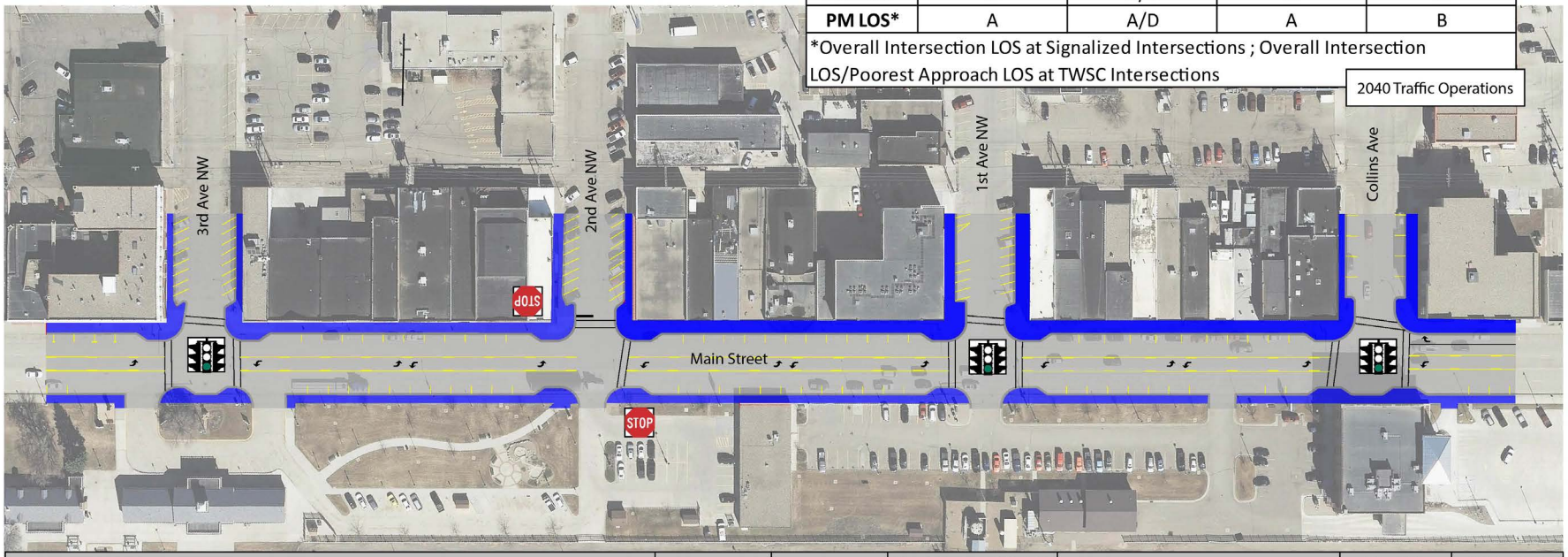
WEST MAIN STREET

3-Lane Section - Parking Option

Intersection	Main St and 3rd Ave W	Main St and 2nd Ave W	Main St and 1st Ave W	Main St and Collins Ave
Control	Signal	TWSC	Signal	Signal
AM LOS*	A	A/C	A	A
PM LOS*	A	A/D	A	B

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



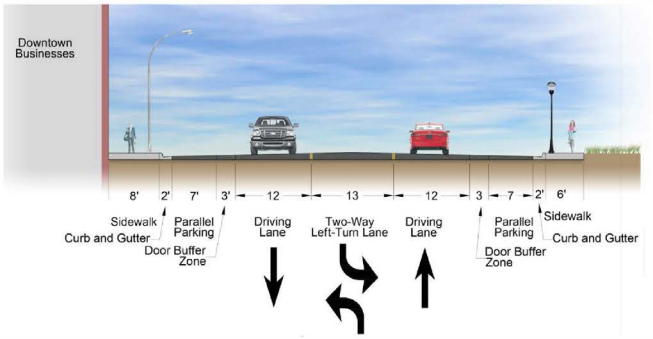
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●●●○○	17	Narrower cross section will impact travel speeds, however LOS "B" or better through the study area is expected.	●●●●●●●●○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●●○	32	Adds dedicated left turn lane and parallel parking on the south side of the corridor. Little demand for parking on south side.		
	Bicycle Facilities	○○○○○○○○○○	13	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●○	38	Wider sidewalks on north side, added curb extensions on north and south side at intersections improve pedestrian visibility and reduce crossing distances.	$$$$	

Figure 145: West Main Street 3-Lane Section - Cycle Track Option

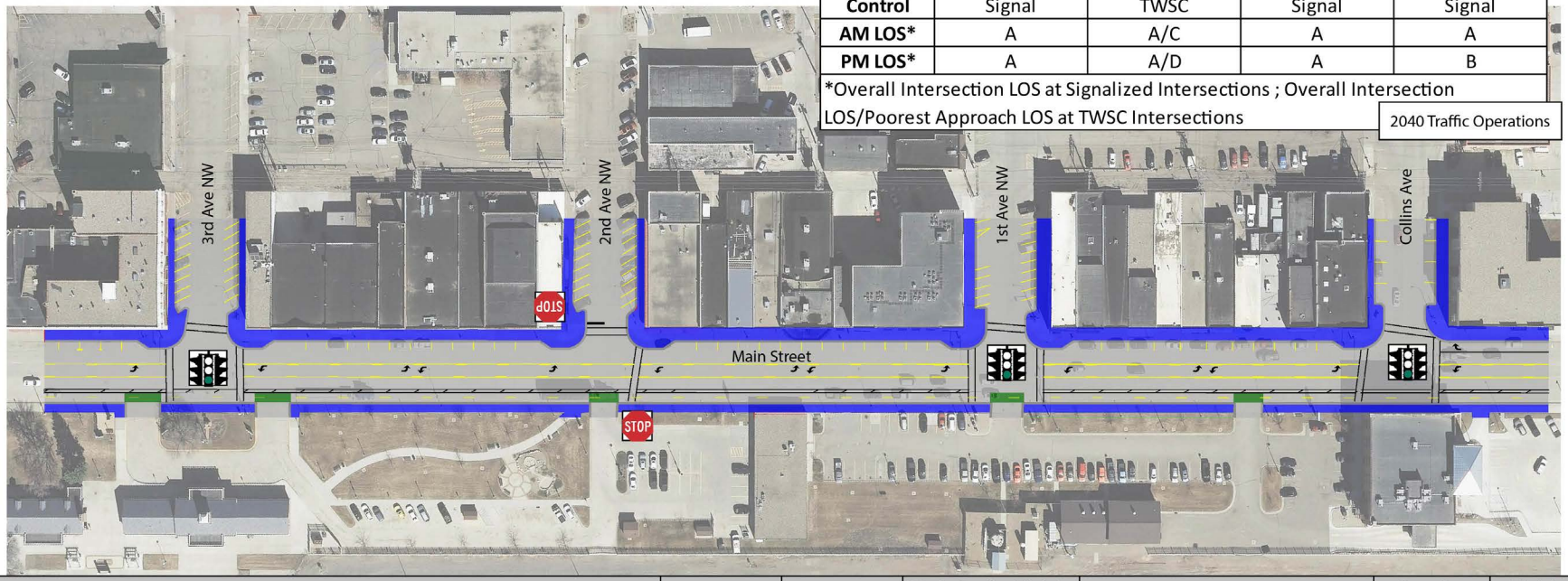
WEST MAIN STREET

3-Lane Section - Cycle Track Option

Intersection	Main St and 3rd Ave W	Main St and 2nd Ave W	Main St and 1st Ave W	Main St and Collins Ave
Control	Signal	TWSC	Signal	Signal
AM LOS*	A	A/C	A	A
PM LOS*	A	A/D	A	B

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



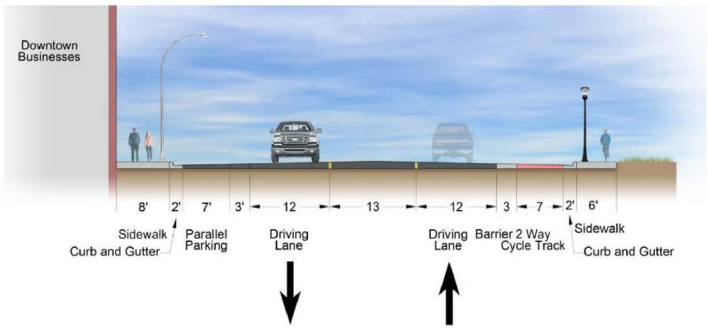
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●●●○○	17	Narrower cross section will impact travel speeds, however LOS "B" or better through the study area is expected.	●●●●●●●●●○	●●●●●●○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●○○	32	Adds dedicated left turn lane and separates bicycles from traffic stream.		
	Bicycle Facilities	●●●●●●●●●●	13	Cycle track provides dedicated bicycle space completely separated from moving traffic.	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●○	38	Added curb extensions on north side at intersections improve pedestrian visibility and reduce crossing distances.	$$$	

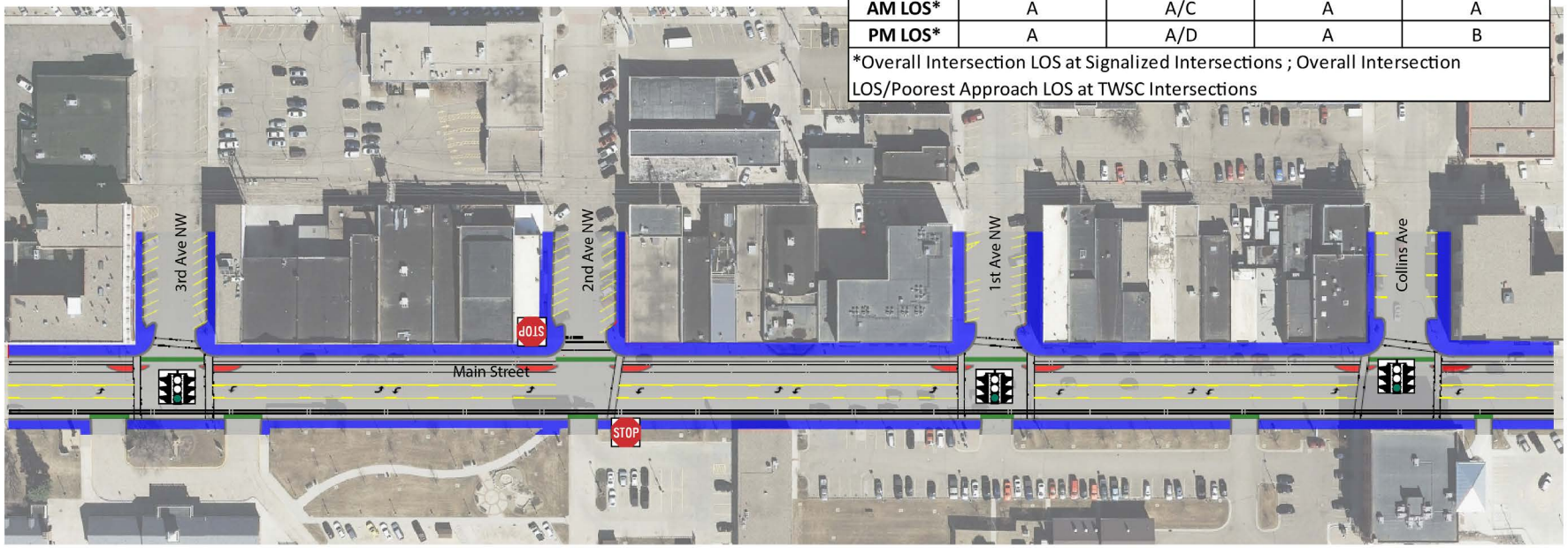
Figure 146: West Main Street 3-Lane Section - Bike Lanes Option

WEST MAIN STREET

3-Lane Section - Bike Lanes Option

Intersection	Main St and 3rd Ave W	Main St and 2nd Ave W	Main St and 1st Ave W	Main St and Collins Ave
Control	Signal	TWSC	Signal	Signal
AM LOS*	A	A/C	A	A
PM LOS*	A	A/D	A	B

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections



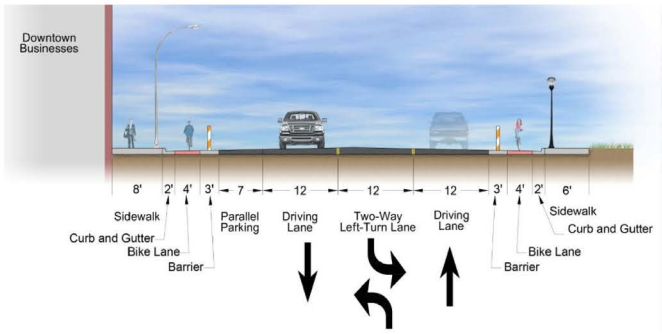
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Operations Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●●●○○	17	Narrower cross section will impact travel speeds, however LOS "B" or better through the study area is expected.	●●●●●●●●○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●○○	32	Adds dedicated left turn lane. Bike lanes separate bicycles from traffic stream.		
	Bicycle Facilities	●●●●●●●●○○	13	Bike lanes separate cyclists from through traffic stream while maintaining high cyclist visibility. Potential conflicts between cyclists and parked cars.	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●○○	38	Bike lanes create added buffer between pedestrians and moving traffic. Bulb outs reduce crossing distance across Main Street.	$$$$	

Figure 147: West Main Street 2-Lane Section - Widen Sidewalks Option

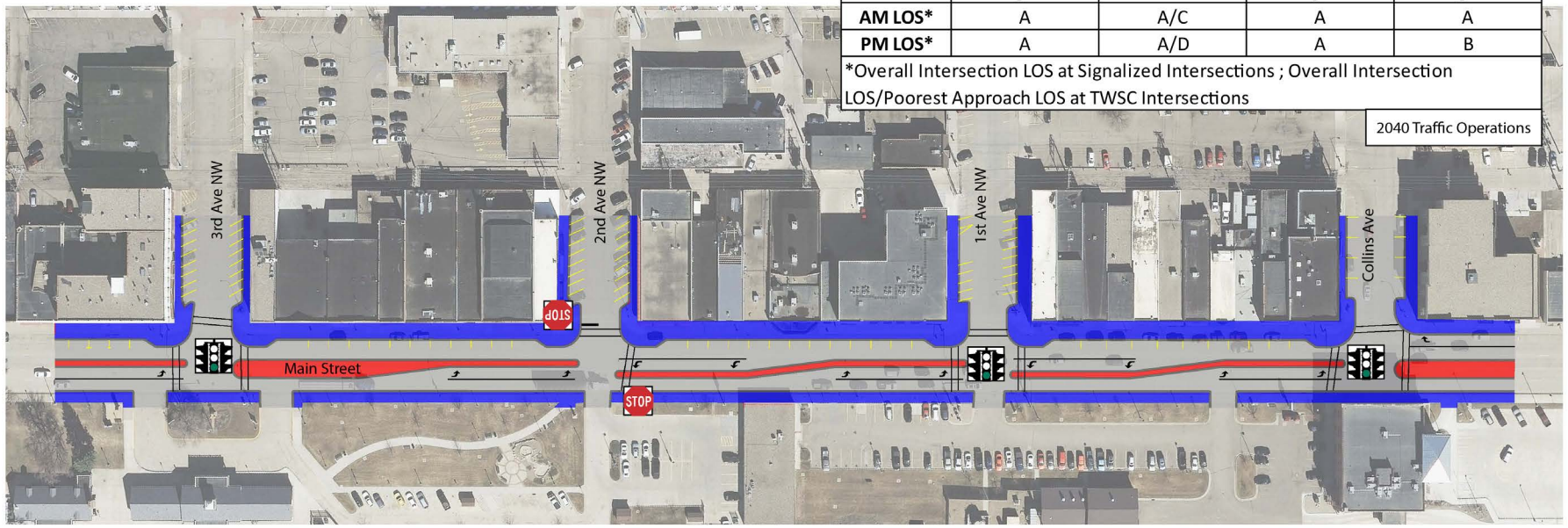
WEST MAIN STREET

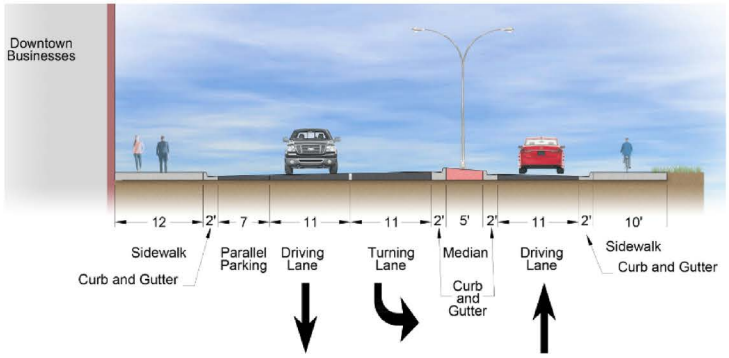
2-Lane Section - Widen Sidewalks Option

Intersection	Main St and 3rd Ave W	Main St and 2nd Ave W	Main St and 1st Ave W	Main St and Collins Ave
Control	Signal	TWSC	Signal	Signal
AM LOS*	A	A/C	A	A
PM LOS*	A	A/D	A	B

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Operations Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●○○○○	17	Narrower cross section can impact travel speeds, however LOS "B" or better through the study area is expected. The raised median can create friction with parking maneuvers. Access management improvements and improved traffic flow can help mitigate increased friction.	●●●●●●●○○○	●●●●○○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●○○	32	Adds dedicated left turn lanes		
	Bicycle Facilities	●●●●●○○○○○	13	Width is available for a shared use path on either side of the corridor, however mixing pedestrians and bicycles on a single facility is undesireable downtown	Cost Score:	
	Pedestrian Facilities	●●●●●●●●●●	38	Added curb extensions on both sides at intersections improve pedestrian visibility and reduce crossing distances. Median provides a pedestrian refuge.	$$$$$$$$	

Access Management and Compatibility With Transition Areas

A key component of cross section selection, especially in areas outside of the downtown core where property accesses are more frequent, is access management.

For example, a raised median will impact property access by converting many accesses to right-in/right-out only accesses, however this access control will benefit traffic flow and reduce crash potential. Given the grid network of downtown Mandan, there are many alternate routes to use to reach destinations, however this will result in additional traffic on side-streets. Restricted access via a raised median is also often controversial with property owners.

If a cross section alternative does not have a raised median, some access revisions should still be considered to improve traffic flow and reduce crash potential, especially at locations where opposing left turn movements overlap and have the potential for head on collisions. Potential access revisions include the removal of redundant accesses, access consolidation with adjacent properties, and the realignment of accesses across the street from one another.

In general, traffic flow and safety improvements from access management will be greater with a raised median, but this will have greater property access impacts due to left turn restrictions at midblock accesses. Implementing access management concepts without a raised median will require relocating/removing accesses, which will require considerable coordination and agreements with property owners, and will still permit left turns into/out of these accesses, therefore having greater traffic flow impacts and safety impacts than a raised median.

Potential access management strategies with and without a raised median for the segment of Main Street between 10th Avenue West and 2nd Avenue East can be seen in Figure 19.

Figure 148: Access Management Strategies for West Main Street

Spot Improvements

In additional to corridor-level improvements to the cross section, some intersection level improvements were considered that could be integrated into the west Main Street cross section improvements discussed above.

Main Street and 10th Avenue West

Based on traffic projections developed for this Alternatives Analysis report, the signal at the intersection of Main Street and 10th Avenue West is not expected to be warranted through 2040. As such, traffic control revisions were considered.

It should be noted that preliminary forecasts developed during the existing conditions report did indicate the signal would be warranted by 2040.

Two-way stop control is expected to operate at LOS "F" under 2040 peak hour conditions, therefore it was not considered as an option.

A ranked summary of spot improvements at 10th Avenue West, including a weighted score that factors in both operations and costs can be seen in Table 62.

Augmented Do Nothing

This would upgrade the traffic signal with vehicle and pedestrian detection and also interconnect the signal with the larger network, which is expected to operate at LOS "B" through 2040.

- Benefits Score: ●●●●●●●○○○
- Cost score: $$$

All-Way Stop Control

All-way stop control is expected to be warranted through 2040 and is expected to operate at LOS "C" during peak 2040 traffic conditions. To implement all-way stop control, reconstruction of the intersection to remove channelized right turn lanes would be required since all considered build alternatives will only have one receiving lane. All-way stop control would require all vehicles to stop, greatly impacting through traffic flow on Main Street. This would however provide pedestrian crossing opportunities.

- Benefits Score: ●●●●●○○○○○
- Cost score: $$$

Roundabout

Roundabout control would provide LOS "B" through 2040, however would require full reconstruction of the intersection, which may have impacts with the nearby railroad grade separation. A roundabout would have minimal impacts to pedestrian traffic, but does require vehicles to yield to pedestrians, as opposed to stop at either a red signal indication or a stop sign. Crash reduction would be expected with a roundabout, however crash rates do not indicate a safety issue.

- Benefits Score: ●●●●●●●○○○
- Cost score: $$$$$

Main Street and 4th Avenue NW

Pedestrian crossing improvement options were identified at Main Street and 4th Avenue South to improve crossing opportunities between Dykshoorn Park and the north side of Main Street. This crossing is critical during major events and will become even more important as the area around this intersection redevelops.

A ranked summary of spot improvements at 4th Avenue NW can be seen in Table 63.

Do Nothing

This would maintain the existing configuration with no pedestrian features beyond crosswalks and northbound-southbound two-way stop control. Traffic signals are located one block away at 3rd Avenue NW and two blocks away at 6th Avenue NW, meaning there are some crossing options to the park, albeit requiring pedestrians to take a longer route. Often pedestrians will choose the most convenient crossing even if pedestrian traffic control is not present.

- Benefits Score: ●●●●●○○○○○
- Cost score: $

Add Flashing Beacon

A flashing beacon could be added to improve driver yielding rates to crossing pedestrians. Flashing beacons are actuated beacons that have been found to have up to 80 percent driver yielding compliance rate. Given the future signal system upgrades planned in downtown Mandan, a flashing beacon can be a cost-effective method of improving pedestrian crossing conditions since they are typically 90 percent less expensive than a new traffic signal. Depending on the cross-section alternative selected, flashing beacons can be post mounted or mounted overhead, depending on sight lines and roadside features. This could be further supplemented by a raised pedestrian refuge. Since there is no south intersection approach, the refuge should be located on the east approach of the intersection since a left turn lane is not required.

- Benefits Score: ●●●●●●●○○○
- Cost score: $$

Figure 149: Flashing Beacon

Source: TAPCO

Main Street and 1st Avenue NW

The existing signal at the intersection of Main Street and 1st Avenue NW is not expected to be warranted through 2040 due to low minor approach volumes.

A ranked summary of spot improvements at 1st Avenue NW can be seen in Table 64.

Augmented Do-Nothing

The intersection is expected to operate at LOS "A" or better through 2040, but the traffic signal is unwarranted. Crash history does not indicate that crash rates are abnormally high at this location, however over half of reported crashes were attributable to red light running, indicating that some drivers do not heed the unwarranted signal.

Compared to a do-nothing scenario, this option would add vehicle and pedestrian detection as well as interconnecting the signal with the Main Street signal system. Pedestrian detection would make the pedestrian phases more responsive to pedestrian demand, but also has the benefit of allocating more green time to Main Street movements when pedestrians are not present. Vehicle detection and interconnect will improve traffic flow and also reduce crash potential.

- Benefits Score: ●●●●●●●○○○
- Cost score: $

Remove Traffic Signal

If the signal is removed, the southbound approach is expected to operate at LOS "B" during peak periods under two-way stop control. Based on 2040 peak hour traffic projections, LOS "B" would be experienced by approximately 100 vehicles. There is a signal one block to the east at Collins Avenue and two blocks to the west at 3rd Avenue NW, so traffic can divert to other locations to access Main Street during peak hour conditions. Also, these signals could potentially improve gap selection by intermittently stopping through traffic on Main Street, which makes up between 90 and 95 percent of traffic between these signals.

FHWA data indicates that the removal of unwarranted traffic signals reduces crashes by 24 percent on average, with a 53 percent reduction in injury crashes.

Removing the traffic signal without providing new pedestrian crossing accommodations (i.e. pedestrian) would require people parking in the parking lot on the south side of Main Street to either cross at other controlled crossings (one block to the east or two blocks to the west) or to cross at the uncontrolled 1st Avenue NW intersection. It is likely many pedestrians would cross at the uncontrolled intersection rather than diverting to another location, which could increase pedestrian safety risks.

- Benefits Score: ●●●●●●○○○○
- Cost score: $

Remove Traffic Signal: Add Flashing Beacon

If the signal is removed, a pedestrian refuge and a flashing beacon could be added to improve pedestrian crossing opportunities.

A flashing beacon is recommended over a pedestrian hybrid beacon (sometimes referred to as a HAWK) since a pedestrian hybrid beacon would require approximately 60 pedestrians in the peak hour to be warranted.

- Benefits Score: ●●●●●●●○○○
- Cost score: $$

Table 60: Summary of Spot Improvements at 10th Avenue NW and Main Street

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Maintain Signal and Add Detection/Interconnect	Pass Through and Truck Traffic	●●●●●●●●○○	17	Signal currently unwarranted	●●●●●●●○○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●○○	32	Signal provides LOS "B" through 2040.		
	Bicycle Facilities	○○○○○○○○○○	13	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●○○	38	No impacts to pedestrian facilities	$$$	

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Roundabout	Pass Through and Truck Traffic	●●●●●●●●●○	17	Provides LOS "B" through 2040. Expected crash reduction.	●●●●●●●○○○	●●●●○○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●●○	32	Provides LOS "B" through 2040. Expected crash reduction.		
	Bicycle Facilities	○○○○○○○○○○	13	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●○○○○	38	Vehicles yield to pedestrians instead of being required to stop at red signal indication or a stop sign	$$$$$	

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Convert to AWSC	Pass Through and Truck Traffic	●●●○○○○○○○	17	All vehicles must stop, but provides LOS "C" through 2040. Significant impacts to through traffic	●●●●●○○○○○	●●●○○○○○○○
	Local Traffic, Parking, and Transit	●●●●●○○○○○	32	All vehicles must stop, but provides LOS "C" through 2040		
	Bicycle Facilities	○○○○○○○○○○	13	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●○○	38	No impacts to pedestrian facilities	$$$	

Table 61: Summary of Spot Improvements at 4th Avenue NW and Main Street

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Add Flashing Pedestrian Beacon	Pass Through and Truck Traffic	●●●●●●●●●○	17	Minor vehicle delays when pedestrians are present	●●●●●●●○○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●○○○○	32	Minimal impacts to local traffic		
	Bicycle Facilities	○○○○○○○○○○	13	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●○	38	Adds pedestrian traffic control	$$	

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Do Nothing	Pass Through and Truck Traffic	●●●●●●●●●●	17	No impact to traffic flow	●●●●●○○○○○	●●●●○○○○○○
	Local Traffic, Parking, and Transit	●●●●●●○○○○	32	No impact to traffic flow		
	Bicycle Facilities	○○○○○○○○○○	13	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●○○○○○○	38	No pedestrian traffic control	$	

Table 62: Summary of Spot Improvements at 1st Avenue NW and Main Street

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Remove Traffic Signal: Add Flashing Pedestrian Beacon	Pass Through and Truck Traffic	●●●●●●●●○	17	Removes unwarranted signal, improving through traffic flow and likely reducing crash rates.	●●●●●●●○○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●○○○	32	Minor approach LOS "B" during peak hours. Likely will reduce crash rates.		
	Bicycle Facilities	○○○○○○○○○○	13	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●○	38	RRFB provides responsive pedestrian traffic control, however less effective than traffic signal.	$$	

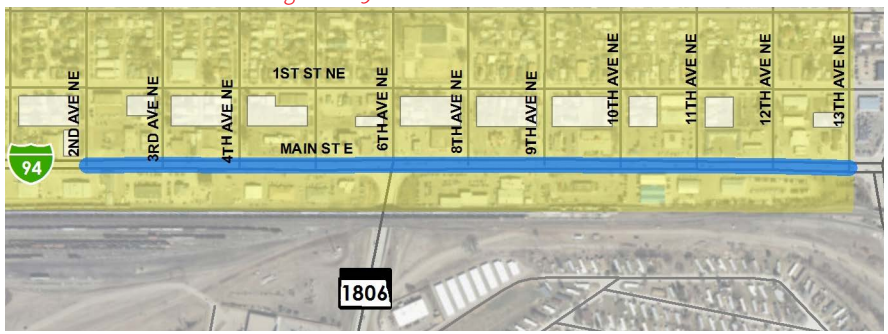
Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Maintain Signal and Add Detection/Interconnect (Augmented Do-Nothing)	Pass Through and Truck Traffic	●●●●●●●●○○	17	Unwarranted signal with LOS "A". Detection/interconnect improves traffic flow, but signal still is an impediment to through traffic. Red-light running is an issue with unwarranted signals.	●●●●●●●○○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●○○○	32	Red-light running is an issue with unwarranted signals.		
	Bicycle Facilities	○○○○○○○○○○	13	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●●	38	Signal provides safer pedestrian crossing opportunities	$$	

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Remove Traffic Signal	Pass Through and Truck Traffic	●●●●●●●●●●	17	Removes unwarranted signal improving through traffic flow.	●●●●●○○○○○	●●●●○○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●○○○	32	Minor approach LOS "B" during peak hours		
	Bicycle Facilities	○○○○○○○○○○	13	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●○○○○○	38	No pedestrian traffic control, nearest controlled intersection is one block to the east	$	

East Main Street

Three alternatives were developed for East Main Street, including a do-nothing scenario.

Figure 150: East Main Street



Do Nothing

This alternative would maintain the existing roadway configuration with four travel lanes, a two-way left turn lane, and no improvements to sidewalks.

This option is expected to operate at an acceptable level of service through 2040, but would remain a difficult corridor for bike traffic and would not improve walkability, including frequent ADA violations related to sidewalk widths and sideslopes.

A summary of this alternative is shown in Figure 153.

- Benefits Score: ●●●●●●●○○○
- Cost score: $
- Maintains acceptable traffic operations through 2040
- No improvements to multimodal traffic

5-Lane Section With Shared Use Path

This alternative would maintain a five-lane section, but would convert the south sidewalk into a shared use path. The north sidewalk would maintain its existing width.

Maintaining the 5-lane section minimizes turning vehicles impeding through traffic, which is beneficial from both a traffic flow and safety perspective.

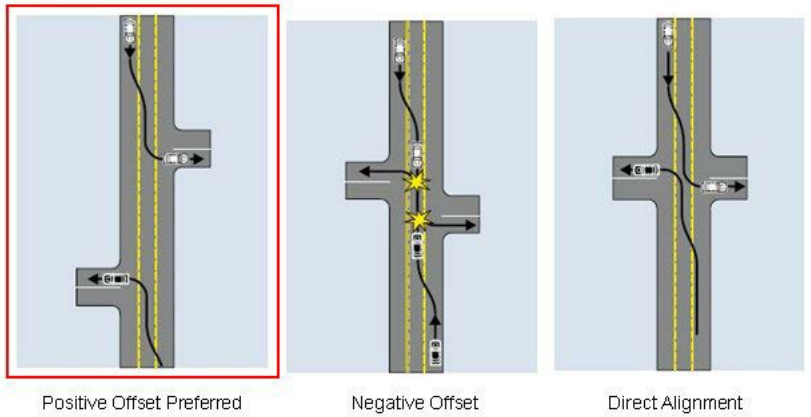
The shared use path can be accommodated by removing on-street parking where it currently is in place on the north side of the corridor and by reallocating space on wide existing lanes on the south side of the corridor. The shared use path will provide a bicycle facility, removing bicycles from narrower sidewalks or the traffic stream, which is beneficial for all users.

Beyond the south side shared use path, this alternative would also relocate existing roadway lighting outside of the walking/biking path, and would place special emphasis on access management strategies that are discussed in greater detail below. Access management is important for this alternative with a two-way left turn lane since some accesses are negatively offset, which has head-on collision potential.

A summary of this alternative is shown in Figure 154.

- Benefits Score: ●●●●●●●●○○
- Cost score: $$$

Figure 151: Access Offset Examples



Source: FHWA

- Maintains acceptable traffic operations through 2040
- Shared use path removes bikes from narrower sidewalks or moving traffic, which benefits all users
- Maintaining two-way left turn lane is beneficial for through traffic

4-Lane Section With Median

This alternative would replace the two-way left turn lane with a raised median and turn lanes at key intersections. The raised median will improve walkability with opportunities for raised pedestrian refuges on the median.

A raised median also offers the ability for greater access control without significant impacts to existing access locations. Greater access control will improve traffic flow and reduce crash potential. The median would convert many mid-block accesses to right-in/right-out only accesses, however the existing grid structure on downtown Mandan provides many route options to reach Main Street destinations.

Another benefit of a raised median is the ability to relocate roadway lighting to the median, mitigating ADA deficiencies associated with light standards being located on the sidewalk. Additional ADA violations that need mitigation are steep sideslopes, which would require sidewalk rerouting at steep driveways.

A summary of this alternative is shown in Figure 154.

- Benefits Score: ●●●●●●●●○○
- Cost score: $$$$$$
- Maintains acceptable traffic operations through 2040
- Raised median and associated access management improves traffic flow
- Raised median offers pedestrian refuge
- Does not provide bike facilities
- Requires spot improvements at steep driveways to meet ADA requirements

Figure 152: 4-Lane Section With Median Example

East Century Avenue - Bismarck (Google Earth)

4-Lane Section With Wider Sidewalks

This alternative would remove the existing two-way left turn lane and reallocate this space for wider sidewalks. This creates a more walkable environment that can also accommodate bicycle traffic, however the removal of the left turn lane at most locations can increase rear-end crash potential and impact traffic flow due to disruptions from turning vehicles.

The absence of a raised median in this alternative make access management more difficult, but can still be accomplished by removing redundant accesses, sharing accesses between properties, or realigning accesses to be aligned with accesses across the road.

Operational analysis for this alternative assumes left turn lanes are present at signalized intersections at 6th Avenue East and Mandan Avenue. Additional right-of-way will need to be acquired at these locations to accommodate left turn lanes with this alternative.

A summary of this alternative is shown in Figure 155.

- Benefits Score: ●●●●●●○○○
- Cost score: $$$$$$$$
- Maintains acceptable traffic operations through 2040
- Wider sidewalks improve walkability and support ADA improvements

Ranking of East Main Street Alternatives

After scoring each East Main Street alternative in terms of operations and score, a weighted total score that considers both operations and costs was determined for each alternative. Table 63 shows the alternatives by rank, ranked by weighted total score.

Table 63: Ranked Summary of East Main Street Cross Section Alternatives

Alternative	Operational Score	Cost Score	Weighted Total Score
5-Lane Section With Wider Sidewalks	●●●●●●●●○○	$$$	●●●●●○○○○○
Do Nothing	●●●●●●●○○○	$	●●●●●○○○○○
4-Lane Section With Median	●●●●●●●●○○	$$$$$$	●●●●○○○○○○
4-Lane Section With Wider Sidewalks	●●●●●●●○○○	$$$$$$$$	●●●○○○○○○○

Figure 153: East Main Street Do Nothing

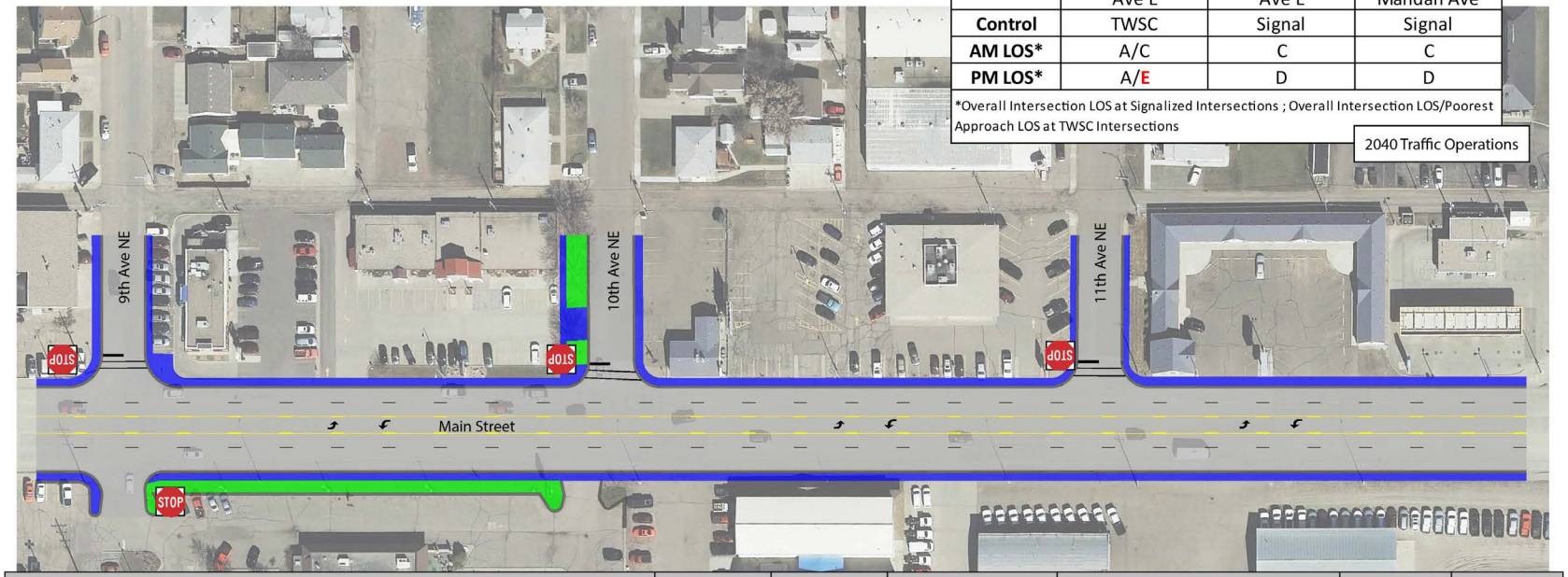
EAST MAIN STREET

Do Nothing

Intersection	Main St and 3rd Ave E	Main St and 6th Ave E	Main St and Mandan Ave
Control	TWSC	Signal	Signal
AM LOS*	A/C	C	C
PM LOS*	A/E	D	D

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



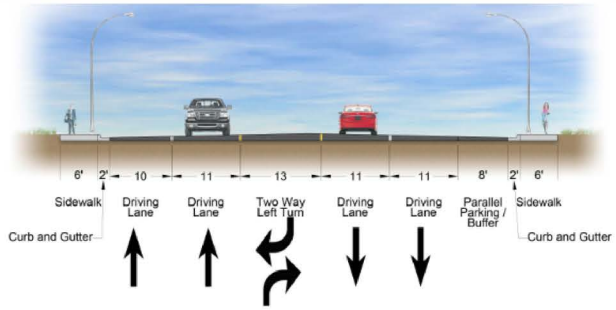
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●●●○○	45	No impacts to through traffic. Maintains acceptable level of service (LOS "D" or better).	●●●●●●●○○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●●●	31	Maintains existing roadway capacity and parking supply		
	Bicycle Facilities	○○○○○○○○○○	11	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●○○○○○○○○	13	Difficult pedestrian crossing conditions, many ADA violations associated with driveways and roadway lighting in walking space.	$	

Figure 154: East Main Street 5-Lane Section With Shared Use Path

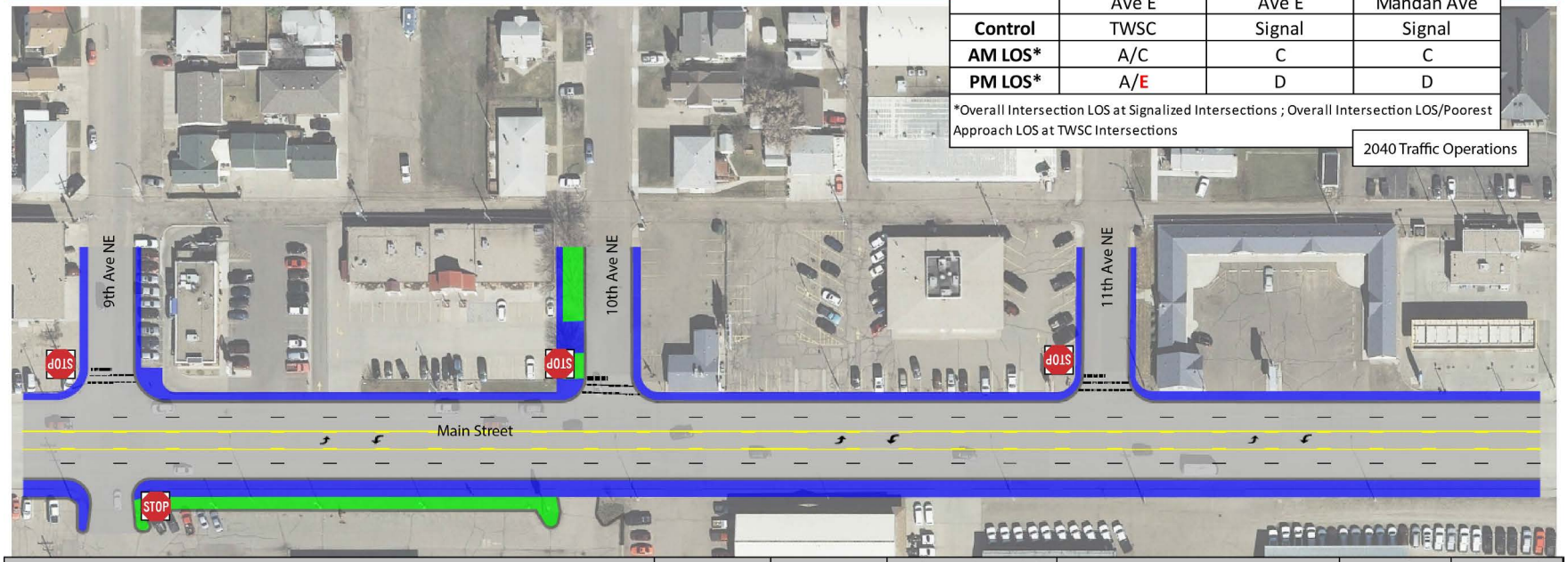
EAST MAIN STREET

5-Lane Section With Shared Use Path

Intersection	Main St and 3rd Ave E	Main St and 6th Ave E	Main St and Mandan Ave
Control	TWSC	Signal	Signal
AM LOS*	A/C	C	C
PM LOS*	A/E	D	D

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



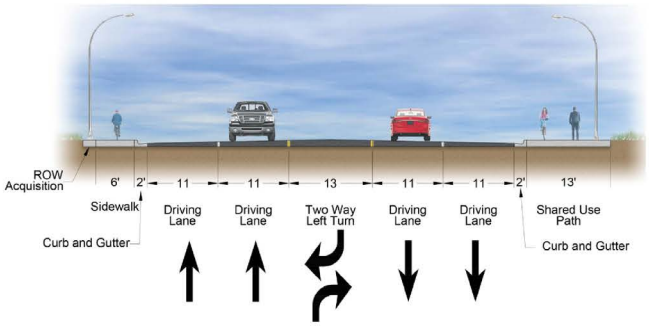
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●●●●○	45	Maintains existing roadway capacity, traffic flow can be improved with access management.	●●●●●●●●○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●●○	31	Maintains existing roadway capacity		
	Bicycle Facilities	●●●●●○○○○○	11	Widened south sidewalk (now a shared use path) provides bicycle facility.	Cost Score:	
	Pedestrian Facilities	●●●●●○○○○○	13	Pedestrians required to share space with cyclists on the south side.	$$$	

Figure 155: East Main Street 4-Lane Section with Wider Sidewalks

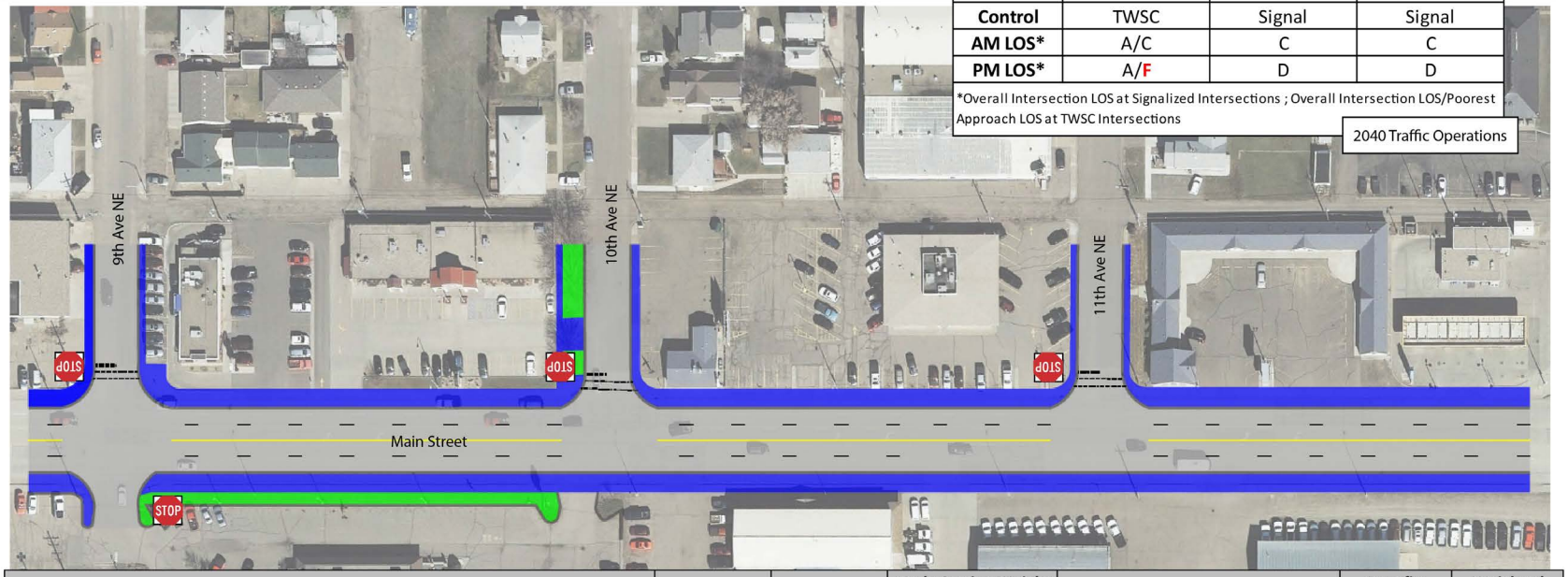
EAST MAIN STREET

4-Lane Section With Wider Sidewalks

Intersection	Main St and 3rd Ave E	Main St and 6th Ave E	Main St and Mandan Ave
Control	TWSC	Signal	Signal
AM LOS*	A/C	C	C
PM LOS*	A/F	D	D

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



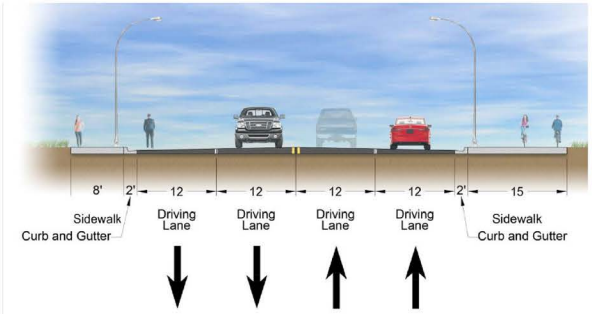
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●○○○○	45	Potential for through lane blockage by turning vehicles due to lack of turn lanes. Maintains acceptable level of service (LOS "D" or better).	●●●●●●●○○○	●●●○○○○○○○
	Local Traffic, Parking, and Transit	●●●●●●○○○○	31	Potential for through lane blockage and increased crash potential with removal of two-way left turn, removes some on-street parking.		
	Bicycle Facilities	●●●●●●●○○○	11	Shared use path offers opportunities for bicycles	Cost Score:	
	Pedestrian Facilities	●●●●●●●●○○	13	Wider sidewalks improve user comfort	$$$$$$$$$	

Figure 156: East Main Street 4-Lane Section with Raised Median

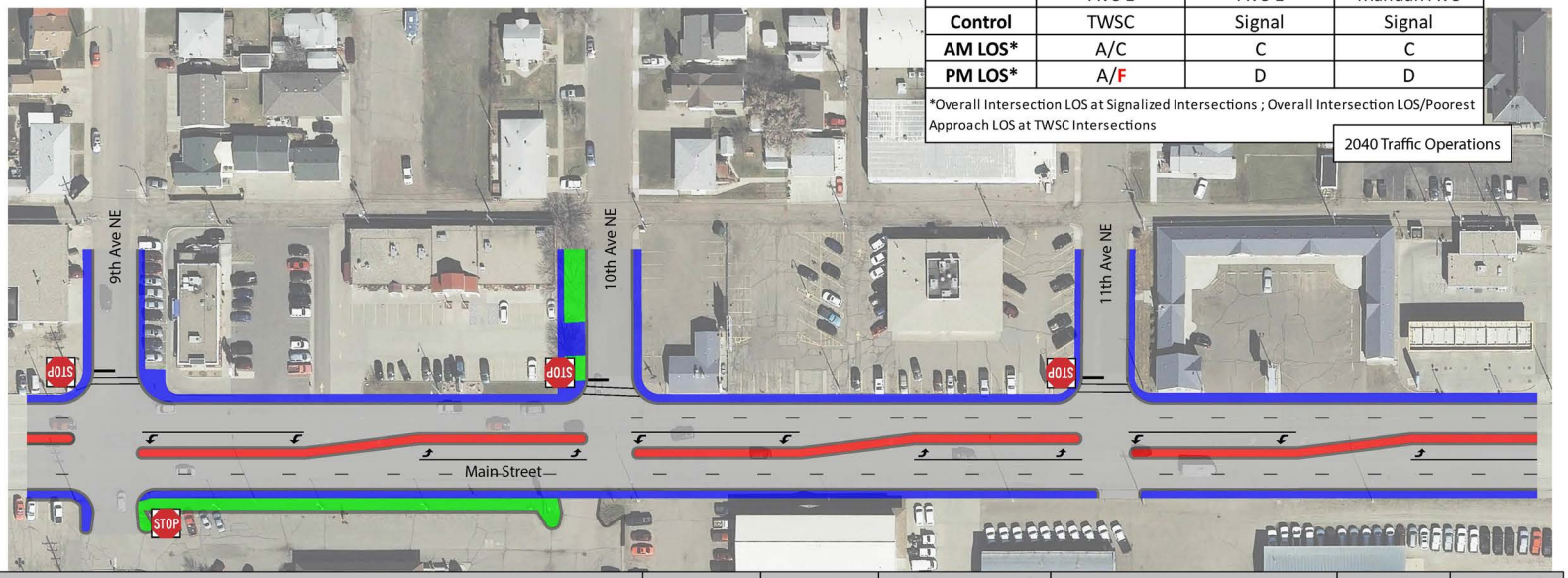
EAST MAIN STREET

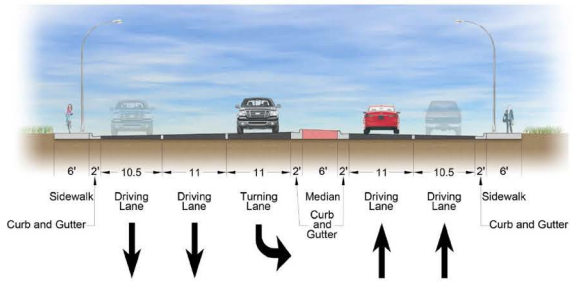
4-Lane Section With Raised Median

Intersection	Main St and 3rd Ave E	Main St and 6th Ave E	Main St and Mandan Ave
Control	TWSC	Signal	Signal
AM LOS*	A/C	C	C
PM LOS*	A/F	D	D

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●●●●●	45	Raised median can improve traffic flow with access management on Main Street. Maintains acceptable level of service (LOS "D" or better).	●●●●●●●●○○	●●●●○○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●○○	31	Traffic flow improvement from raised median and associated access management, but removes some on-street parking, and median could restrict some property access. Left turn lanes would be negatively offset, creating potential sight distance issues.		
	Bicycle Facilities	○○○○○○○○○○	11	No bicycle facilities	Cost Score:	
	Pedestrian Facilities	●●●●●●○○○○	13	Opportunities for refuge island with raised median. Moves lighting to median to increase walking space.	$$$$$$	

Spot Improvements at Main Street and 6th Avenue East

The intersection of Main Street and 6th Avenue East is expected to experience congestion by 2040, with overall intersection LOS "D" under forecast volumes. These delays are attributable to high left turning volumes on the northbound and westbound approaches, and not capacity deficiencies on the overall cross section.

Since 6th Avenue East is a major route in Mandan, consideration should be given to spot improvements at this intersection to maintain mobility between downtown and other parts of the city.

Signal Phasing/Timing Improvements

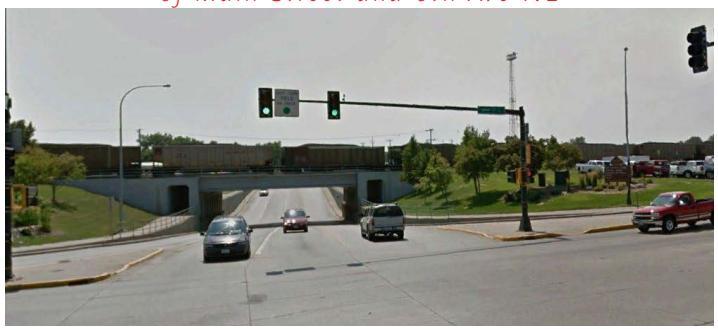
Signal phasing and timing improvements can maximize intersection capacity. Based on estimated turning volumes, protected-permitted phasing is appropriate on all approaches, which would require compatible signal heads on all approaches. Signal timing improvements can reduce rear-end crash rates, which are the most common type of crash reported at this intersection. Additionally, dedicated left turn phases can reduce left turn related crashes.

Future Westbound Double Left Turn Lane

A future double left turn lane may be required to provide acceptable operations by 2040 since 450 peak hour westbound left turns are forecast by this time.

Due to the railroad overpass on the south approach of the intersection, such an improvement would be very costly if the south approach required widening to accommodate an additional receiving lane associated with a westbound double left. This could however be mitigated by converting the northbound approach to have a shared left/through lane with split phasing (maintain existing northbound right turn), then reallocating the current northbound left turn lane space for an additional receiving lane (see Figure 158) . Traffic modelling indicates the intersection would still operate at LOS "D" under this configuration, but this could reduce intersection delay by approximately 20 percent.

Figure 157: Railroad Overpass on South Approach of Main Street and 6th Ave NE



Source: Google Earth

Figure 158: Potential Intersection Reconfiguration at Main Street and 6th Avenue East

Phasing of Spot Improvement Alternatives

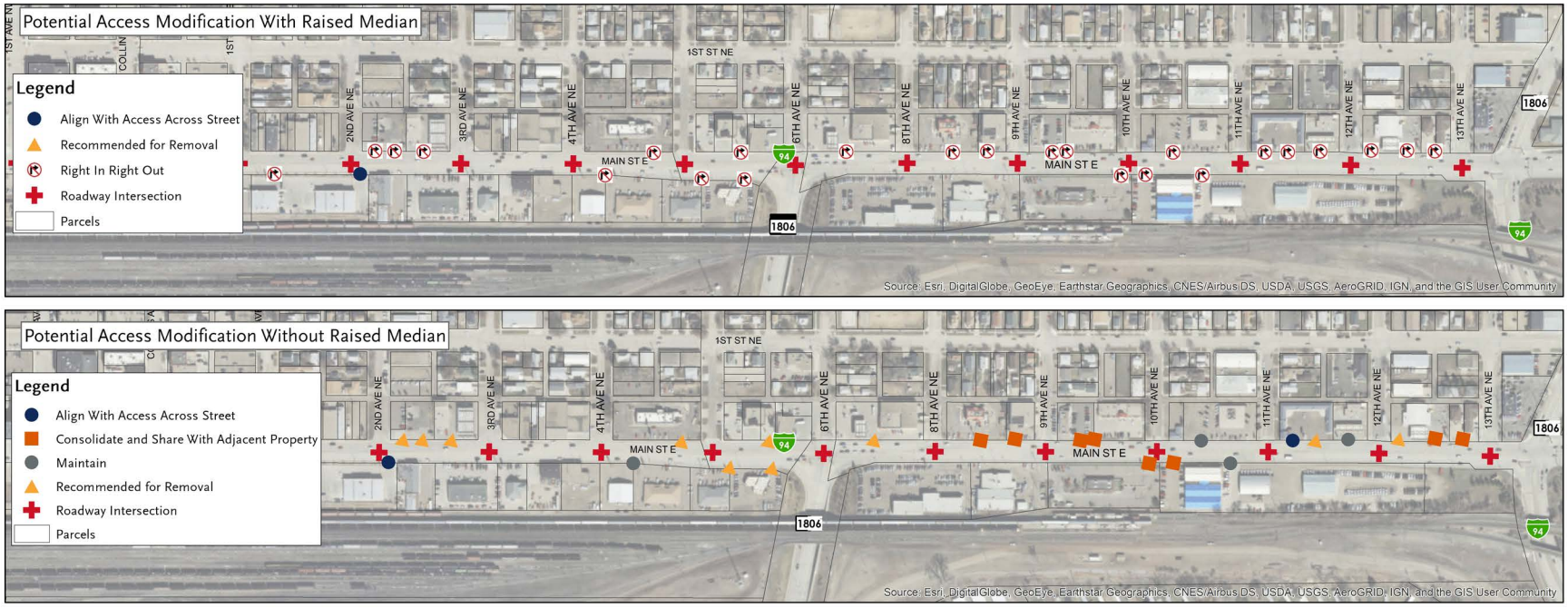
Spot improvements were not ranked at Main Street and 6th Avenue East. Signal phasing/timing improvements and a future double westbound left turn lane can be implemented without conflicting one another. Instead, a potential improvement plan for intersection improvements has been identified:

- Phase 1 (short-term): Signal timing/phasing improvements
- Phase 2 (mid-term): Reconfigure intersection to have westbound double left turn lane and convert north approach to shared through/left with split phasing. Reallocate existing northbound left turn lane space to second receiving lane for double left.
- Phase 3 (long term): Full intersection reconstruction with double westbound left turn lane after proper railroad coordination.

Access Management

Like west Main Street, access management opportunities are available on east Main Street with and without a raised median. Potential access management strategies between 2nd Avenue East and 13th Avenue east can be seen in Figure 159.

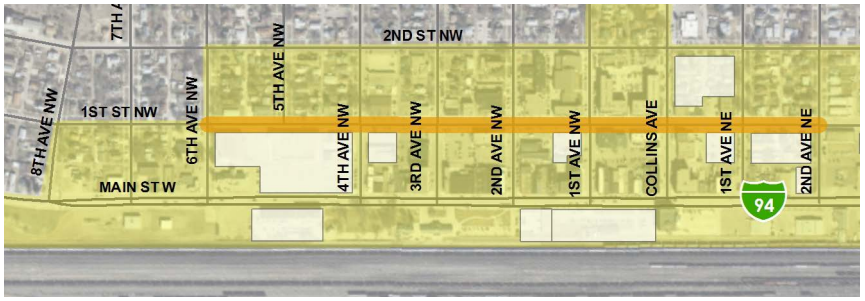
Figure 159: Access Management for East Main Street Segment



West 1st Street

Five alternatives were developed for west 1st Street, between 6th Avenue NW and 2nd Avenue NE, including a do-nothing alternative. These alternatives are intended to improve multimodal conditions on 1st Street as the Steering Committee has indicated through traffic is not a major priority on this corridor. All options maintain one through lane in each direction.

Figure 160: West 1st Street



Do Nothing

This would maintain the existing two-lane section with angle parking on each side of the roadway. No improvements would be made for pedestrian or bicycle travel. With some traffic control revisions at existing all-way stop controlled intersections, acceptable traffic operations are expected through 2040. More detailed discussion related to potential traffic control revisions is discussed in the next section.

A summary of this alternative is shown in Figure 162.

- Benefits Score: ●●●●●●●○○○
- Cost score: $
- Maintains acceptable traffic operations through 2040
- No improvements to bike traffic
- Walkable corridor under existing conditions

Cycle Track

This would add a bi-directional cycle track on the south side of the corridor and add curb extensions or increase the size of existing curb extensions at intersections. The cycle track would place bicycles on dedicated right-of-way, minimizing delays to automobile traffic, however this can create some sight line issues between vehicles and cyclists since the cyclists are outside of the typical vision range of drivers.

To accommodate the cycle track, existing angle parking on the south side of the corridor would be converted to parallel parking, reducing the 1st Street on-street parking supply by approximately 25 percent per block. On average, existing parking occupancy is around 30 percent throughout the area that would be converted into the cycle track.

A summary of this alternative is shown in Figure 163.

- Benefits Score: ●●●●●●●●●○
- Cost score: $$$
- Maintains acceptable traffic operations through 2040
- Cycle track separates bicycles from vehicle traffic, improving traffic flow
- Cycle track requires conversion to from angle parking to parallel parking on the south side of 1st Street, reducing parking supply by approximately 25% per block where parking is converted
- Larger curb extensions will improve sight lines for all users

Shared Lanes and Forward Angle Parking

This would add shared lane markings and add curb extensions or increase the size of existing curb extensions to improve sight lines. Existing angle parking would be maintained.

Shared lanes on 1st Street will emphasize the desired multimodal nature of the corridor, however could cause some traffic congestion in peak hours due to sharing space with automobile traffic. Additionally, drivers backing out of parking spaces would have difficulty seeing cyclists, increased safety risks.

A summary of this alternative is shown in Figure 164.

- Benefits Score: ●●●●●●●○○○
- Cost score: $$
- Maintains acceptable traffic operations through 2040
- Curb extensions improve sight lines
- Shared lane markings emphasize desired multimodal nature of corridor, but could create delays to vehicles in peak periods and create sight line issues between backing vehicles and cyclists

Figure 161: Shared Lanes and Angle Parking

Broadway - Fargo (Google Earth)

Shared Lanes and Reverse Angle Parking

This would add shared lane markings and convert parking to reverse angle parking. The conversion to reverse angle parking would improve sight lines for exiting vehicles, especially sight lines with on-street bicycles using the shared lanes.

A summary of this alternative is shown in Figure 165.

- Benefits Score: ●●●●●●●●○○
- Cost score: $$
- Maintains acceptable traffic operations through 2040
- Reverse angle parking improves sight lines, especially with on-street bicycles
- Curb extensions improve walkability and have a traffic calming effect
- Shared lane markings emphasize desired multimodal nature of corridor, but could create delays to vehicles in peak periods

Ranking of West 1st Street Cross Section Alternatives

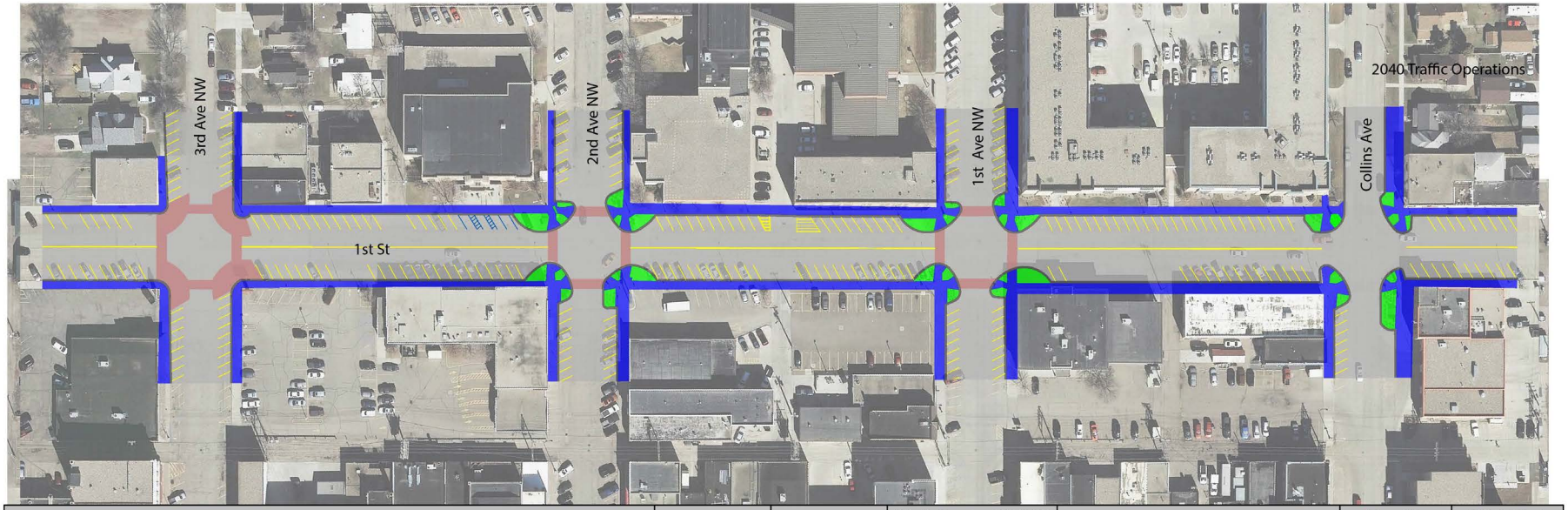
After scoring each West 1st Street alternative in terms of operations and score, a weighted total score that considers both operations and costs was determined for each alternative. Table 64 shows the alternatives by rank, ranked by weighted total score.

Table 64: Ranked Summary of West 1st Street Cross Section Alternatives

Alternative	Operational Score	Cost Score	Weighted Total Score
Cycle Track	●●●●●●●●●○	$$$	●●●●●●○○○○
Shared Lanes: Reverse Angle Parking	●●●●●●●●○○	$$	●●●●●●○○○○
Do Nothing	●●●●●●●○○○	$	●●●●●○○○○○
Shared Lane: Forward Angle Parking	●●●●●●●○○○	$$	●●●●●○○○○○

Figure 162: West 1st Street - Do Nothing

WEST 1ST STREET
Do Nothing



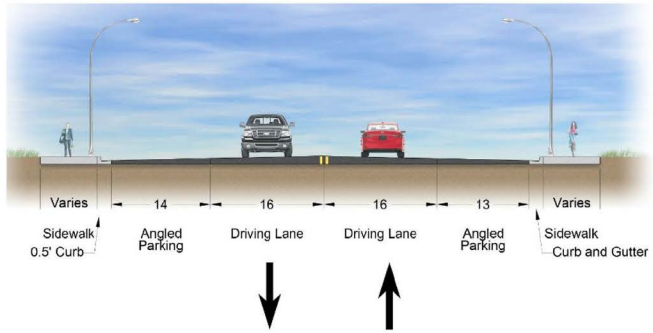
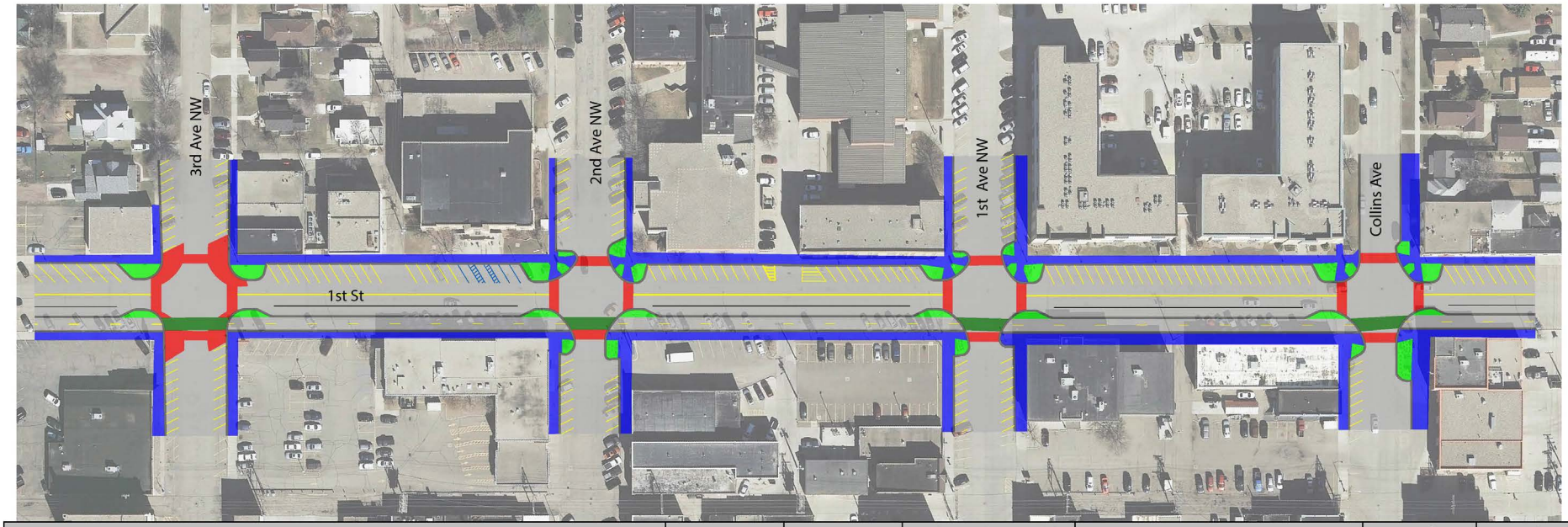
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●○○○○○○	9	No impacts to through traffic. Maintains acceptable level of service with appropriate traffic control revisions (LOS "C" or better).	●●●●●●●○○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●○○○	39	Maintains existing roadway capacity and parking supply.		
	Bicycle Facilities	●○○○○○○○○○	20	No bicycle facilities. Traffic is slow enough to bike on-street, but sight lines for drivers create safety issues	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●●	33	Maintains existing sidewalks on both sides that are buffered by on-street parking	$	

Figure 163: West 1st Street - Cycle Track

WEST 1ST STREET
Cycle Track



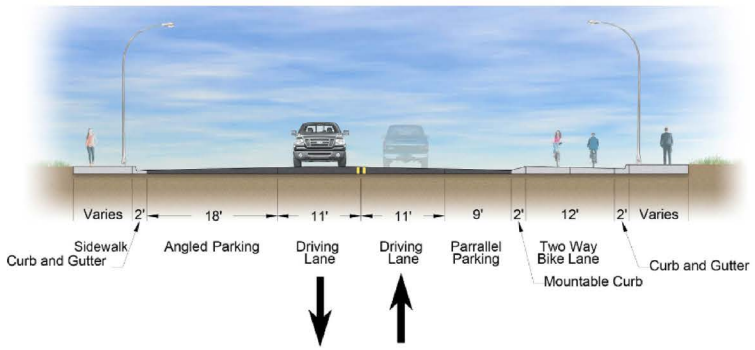
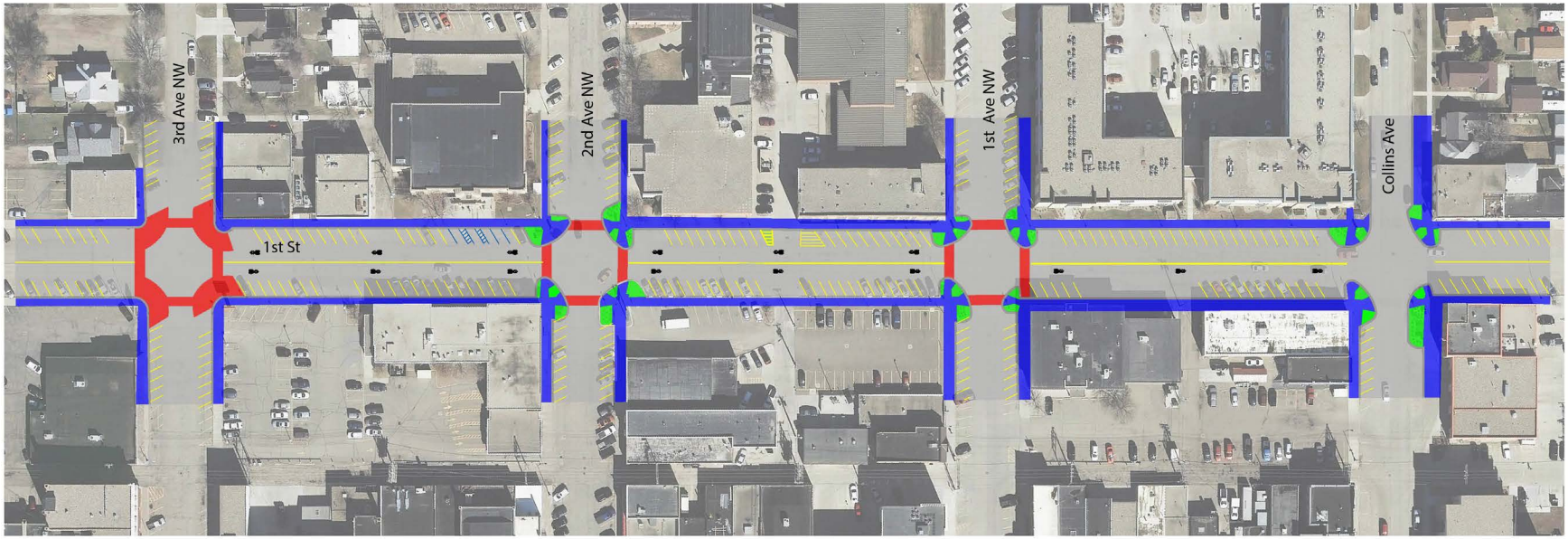
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●○○○○○	9	No impacts to through traffic. Maintains acceptable level of service with appropriate traffic control revisions (LOS "C" or better). Separates bikes from through traffic.	●●●●●●●●●○	●●●●●●○○○○
	Local Traffic, Parking, and Transit	●●●●●●●○○○	39	Cycle tracks separate bicycles from moving traffic. Larger curb extensions on 1st Street improve sight lines. Reduces on-street parking by 25%		
	Bicycle Facilities	●●●●●●●●●●	20	Cycle track provides dedicated bicycle space completely separated from moving traffic.	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●●	33	Larger curb extensions on 1st Street improve pedestrian visibility and calms traffic speeds. Maintains sidewalks on both sides that are buffered by on-street parking and/or cycle track.	$$$	

Figure 164: West 1st Street - Shared Lanes

WEST 1ST STREET
Shared Lanes



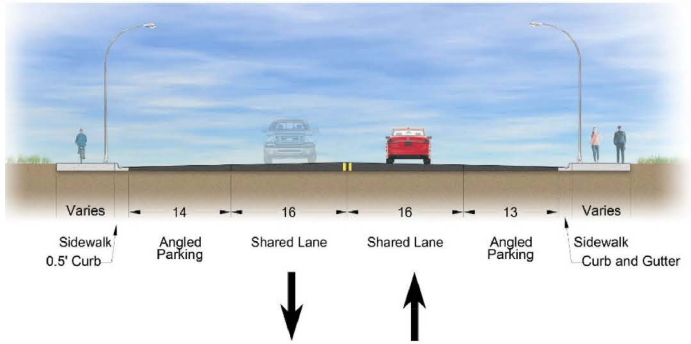
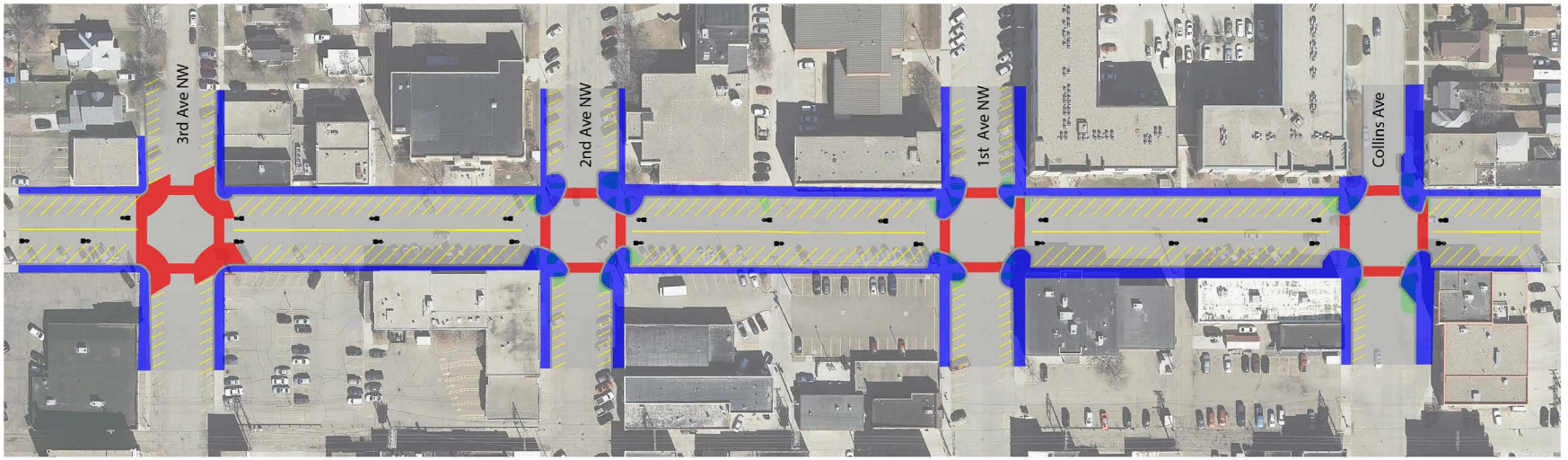
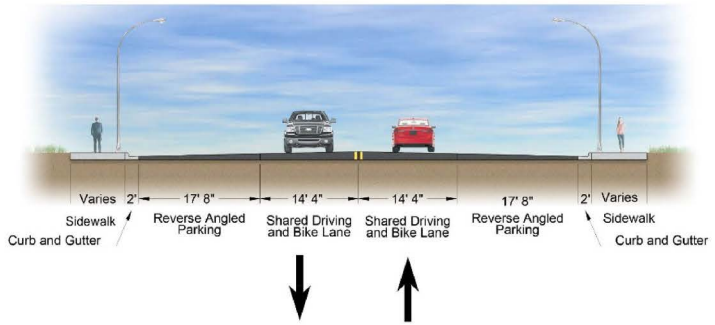
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●○○○○○○	9	No impacts to through traffic. Maintains acceptable level of service with appropriate traffic control revisions (LOS "C" or better).	●●●●●●●○○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●○○	39	Larger curb extensions on 1st Street improve sight lines.		
	Bicycle Facilities	●●●○○○○○○○	20	Shared lanes and angle parking create sight line issues between drivers and cyclists	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●●	33	Increases curb extension size on 1st Street that improves pedestrian visibility and calms traffic speeds. Maintains sidewalks on both sides that are buffered by on-street parking.	$$	

Figure 165: West 1st Street - Shared Lanes and Reverse Angle Parking

WEST 1ST STREET
Shared Lanes and Reverse Angle Parking



Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●○○○○○○	9	No impacts to through traffic. Maintains acceptable level of service with appropriate traffic control revisions (LOS "C" or better).	●●●●●●●●○○	●●●●●●○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●○○	39	Reverse angle parking improves sight lines for vehicles exiting parking stalls. Larger curb extensions on 1st Street also improve sight lines.		
	Bicycle Facilities	●●●●●●○○○○	20	Improved cyclist visibility from reverse angle parking, shared lanes emphasize and encourage multimodal nature of corridor.	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●●	33	Larger curb extensions on 1st Street improve pedestrian visibility and calms traffic speeds. Maintains sidewalks on both sides that are buffered by on-street parking	$$	

Traffic Control Options

The study team analyzed the potential to revise traffic control at locations on 1st Street to improve traffic flow. Any traffic control revisions that are made should consider traffic control at adjacent intersections to ensure continuity in traffic control and traffic flow. For example, if roundabout control is selected as a preferred option, it would be desirable to implement a series of roundabouts rather than having a roundabout at one location, all-way stop control at another location, and a signal at another location.

Intersection level of service information for traffic control alternatives discussed below can be seen in Figure 169.

The alternatives are discussed below, and summarized by rank in Table 65.

Do Nothing

This would maintain the existing traffic control on the 1st Street corridor, which includes all-way stop control at 6th Avenue West, 4th Avenue West, 2nd Avenue West and Collins Avenue.

The existing all-way stop control at 6th Avenue West is expected to be warranted and operate at LOS "C" through 2040.

Based on projected 2040 traffic volumes, all-way stop control is not warranted at 4th Avenue West or 2nd Avenue West. Research indicates that unwarranted all-way stop control results in compliance issues, impacting intersection safety, especially pedestrian safety. Additional research has found that a series of unwarranted all-way stop controlled intersections tends to increase vehicle speeds since drivers are attempting to compensate for delays attributable to unwarranted traffic control.

At Collins Avenue, all-way stop control is expected to operate at LOS “F” by 2040. Eastbound and westbound queuing is expected to spill back to adjacent intersections during peak hours.

- Benefits Score: ●●●●●○○○○○
- Cost score: $

Revise to Two-Way Stop Control or Signal Control

This option would convert the 2nd Avenue NW and 4th Avenue NW intersections to northbound/southbound two-way stop control and the Collins Avenue intersection to a signal.

The 2nd Avenue NW and 4th Avenue NW intersections would operate with minor approach LOS “C” or better though 2040 under north/south two-way stop control. Conversion to two-way stop control can impact pedestrian crossing opportunities, however this can be mitigated by the installation of in-roadway pedestrian crossing signs. These signs reinforce the requirement to yield to pedestrians and have been found to have driver compliance rates of nearly 90 percent on roadways similar to 1st Street.

The Collins Avenue intersection would operate at LOS “C” through 2040. 95th percentile queuing events may extend nearly back to adjacent blocks, however a signal will dissipate these queues during high volumes cycles more quickly compared to all-way stop control.

At 6th Avenue NW, signal control is not expected to be warranted through 2040, but eastbound/westbound two-way stop control is expected to operate with minor approach LOS "F".

- Benefits Score: ●●●●●●●○○○
- Cost score: $$

Figure 166: In-Roadway Pedestrian Crossing Sign

Roundabout Corridor

This option would replace existing all-way stop control with roundabouts. Roundabouts are expected to operate at LOS "B" or better through 2040. Roundabouts also reduce crash rates, especially injury crash rates. Crash benefits would be most beneficial at the 1st Street and 6th Avenue West as this location has crash history associated with non-compliance under all-way stop control.

Roundabout control at both 6th Avenue NW and Collins Avenue would improve traffic flow on these major routes, mitigating some queuing concerns that could arise under peak hour traffic flow with signal control or all-way stop control.

Mini-roundabouts could be used at 6th Avenue West, 4th Avenue West, and 2nd Avenue West, and a standard roundabout should be used at Collins Avenue.

Mini-roundabouts have the benefit of being able to be constructed in the existing intersection footprint to minimize impacts. To accommodate occasional truck traffic, the central island is traversable. Standard automobiles would circulate as in a standard roundabout.

- Operations score: ●●●●●●●●○○
- Cost score: $$$

Figure 167: Example of Mini-Roundabout

Vierling Drive and Spencer Street - Shakopee, MN (Google Earth)

Figure 168: 1st Street Roundabout Corridor Concept

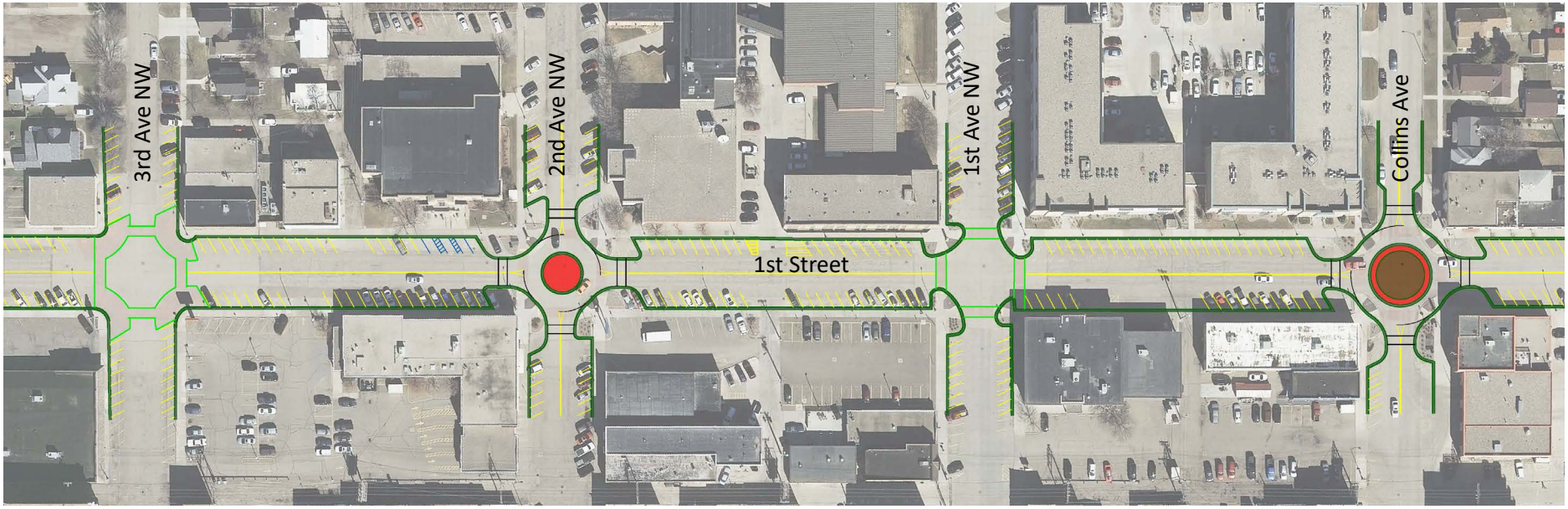
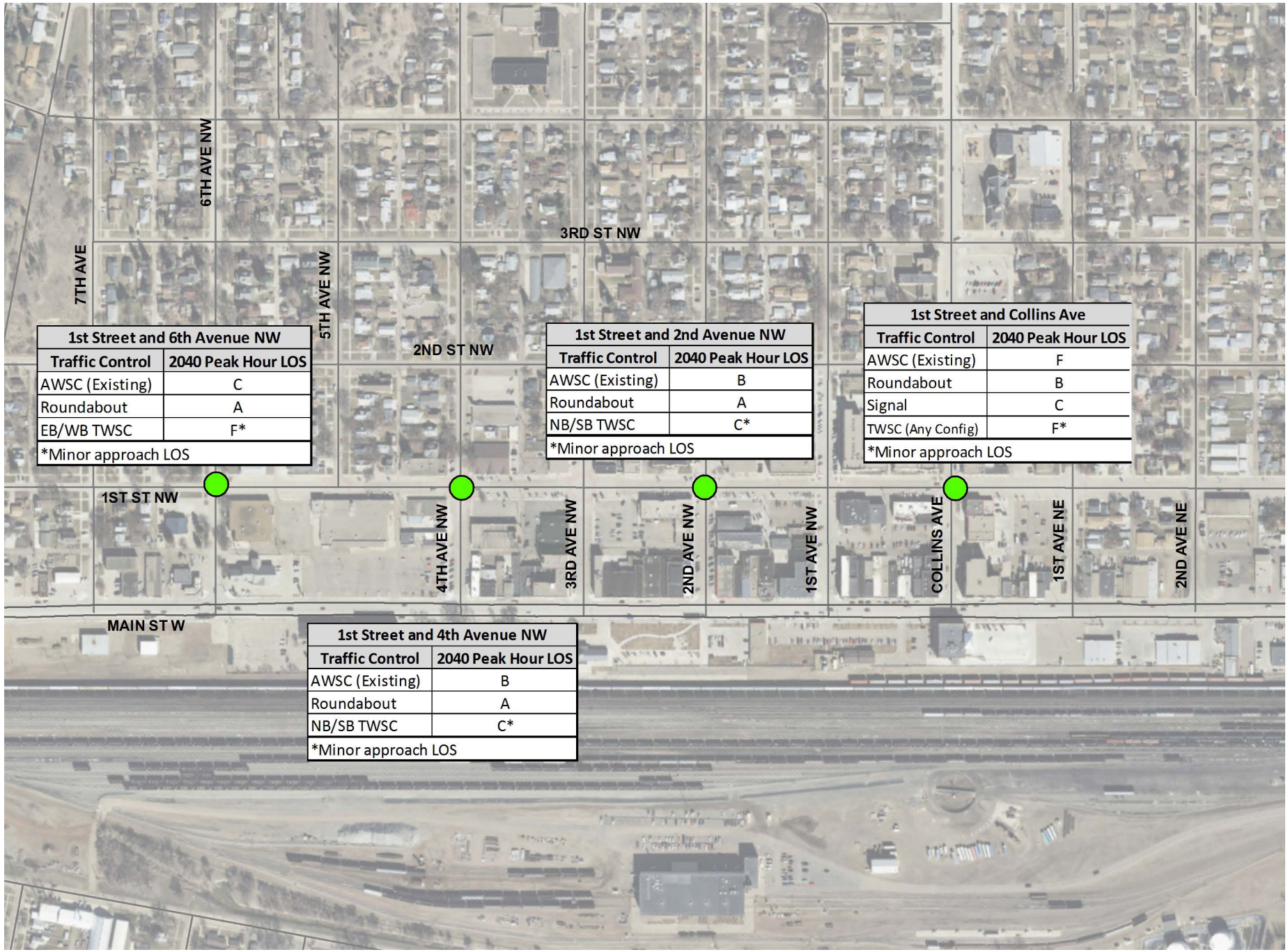


Figure 169: Level of Service Information for West 1st Street Traffic Control Options



1st Street and 6th Avenue NW	
Traffic Control	2040 Peak Hour LOS
AWSC (Existing)	C
Roundabout	A
EB/WB TWSC	F*
*Minor approach LOS	

1st Street and 2nd Avenue NW	
Traffic Control	2040 Peak Hour LOS
AWSC (Existing)	B
Roundabout	A
NB/SB TWSC	C*
*Minor approach LOS	

1st Street and Collins Ave	
Traffic Control	2040 Peak Hour LOS
AWSC (Existing)	F
Roundabout	B
Signal	C
TWSC (Any Config)	F*
*Minor approach LOS	

1st Street and 4th Avenue NW	
Traffic Control	2040 Peak Hour LOS
AWSC (Existing)	B
Roundabout	A
NB/SB TWSC	C*
*Minor approach LOS	

Table 65: Summary of Traffic Control Options for West 1st Street

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Roundabout Corridor	Pass Through and Truck Traffic	●●●●●●●○○○	9	Roundabouts mitigate queuing issues at Collins Ave and 6th Ave NW with AWSC or signal control.	●●●●●●●●○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●●●	39	Traffic control revisions improve traffic flow and provide safety benefits.		
	Bicycle Facilities	●○○○○○○○○○	20	Traffic calming benefit, but requires careful design to carry bikes effectively	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●●	33	Traffic calming benefit	$$$	

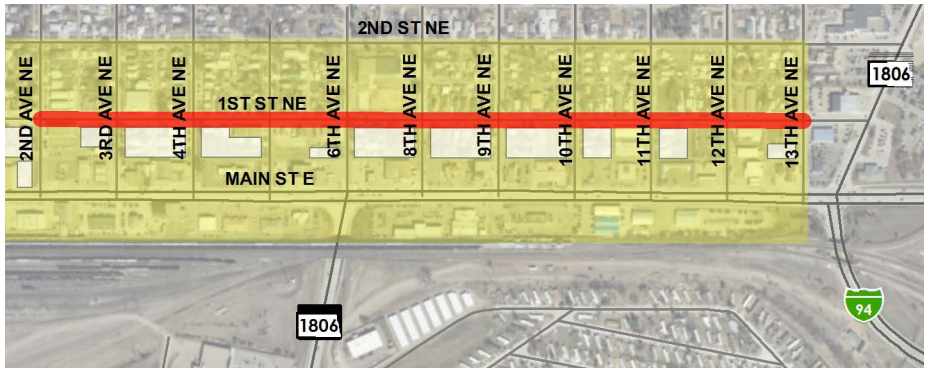
Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Traffic Control Revisions to TWSC or Signal Control	Pass Through and Truck Traffic	●●●●●●●●●○	9	Traffic control revisions improve traffic flow	●●●●●●●○○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●○○	39	Traffic control revisions improve traffic flow		
	Bicycle Facilities	●○○○○○○○○○	20	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●●	33	In roadway signs mitigate pedestrian crossing issues under TWSC	$$	

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Existing Traffic Control (Do-Nothing)	Pass Through and Truck Traffic	●●●●○○○○○○	9	AWSC unnecessarily impacts through traffic when unwarranted, queue spillback issues	●●●●●○○○○○	●●●●○○○○○○
	Local Traffic, Parking, and Transit	●●●●○○○○○○	39	AWSC unnecessarily impacts through traffic when unwarranted, LOS "F" at Collins Ave, existing crash issues at 6th Ave NW		
	Bicycle Facilities	●○○○○○○○○○	20	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●●	33	All-way stop control non-compliance is a concern for pedestrians	$	

East 1st Street

Currently East 1st Street serves two purposes 1.) Providing direct property access to residential areas and 2.) Serving as a reliever route for drivers looking to avoid congestion on Main Street. These two purposes are in conflict with one another. Since right-of-way is limited, improvement options seek to improve one purpose or the other (i.e. improving mobility or emphasizing the residential nature of the area).

Figure 170: East 1st Street Study Segment



Do Nothing

This would maintain the existing one lane in each travel direction with parallel parking on each side of the roadway.

This is expected to maintain acceptable operations thorough 2040, however the absence of turn lanes throughout most of the area is an impediment to through traffic. This also does nothing to improve multimodal conditions in the area.

A summary of this alternative is shown in Figure 173.

- Benefits Score: ●●●●●●○○○○
- Cost score: $
- Maintains acceptable traffic operations through 2040
- Cross section is not designed for through traffic
- No bike facilities

Through Corridor

This would add a two-way left turn lane and add shared lane markings to the corridor. To accommodate the two-way left turn lane, existing parallel parking will be removed from both sides of the roadway.

The two-way left turn lane will mitigate impacts to through traffic from turning vehicles, improving traffic flow.

Shared lanes on 1st Street will provide bicycle awareness to the corridor. In some circumstances, shared lanes can be a reasonable alternative to dedicated bike lanes where space is limited (generally on low speed, low volume roadways). The National Association of City Transportation Officials provides guidance for shared lanes which recommends speeds 35 miles per hour or less with 3,000 vehicles per day or less. However, projected daily traffic volumes (over 8,000 ADT) could result in on-street bicyclists impacting traffic flow and could also discourage cyclists from using this route. The two-way left turn lane can however mitigate congestion from bicycle traffic if a level of encroachment into the two-way left turn lane while passing bicycles is permitted.

Parking removal should not be a major issue since a review of parking demand indicates this parking is underutilized, with 50 percent or more of parking usually available.

A summary of this alternative is shown in Figure 174.

- Benefits Score: ●●●●●●●○○○
- Cost score: $$
- Maintains acceptable traffic operations through 2040
- Two-way left turn lane mitigates impediments to through traffic
- Shared lane markings improve awareness of bicycles, but with expected traffic volumes may not attract as much bicycle activity as dedicated bike facilities.
- Parking removal is not anticipated to create parking supply issues

Quiet Corridor

The quiet corridor would implement traffic calming measures and add bike lanes to reduce vehicle speeds and create a more inviting environment for pedestrian and bicycle traffic. Traffic calming improvements include reduced lane widths and raised intersections.

Raised intersections can be implemented at 6th Avenue NE and 8th Avenue NE to promote low vehicle travel speeds. The raised intersections/crosswalks will also place increased emphasis on key pedestrian crossings for Custer Elementary School. Physical traffic calming measure such as raised intersections can be supplemented with dynamic speed display signs (DSDS) to further encourage lower vehicle speeds. Raised intersections may however have significant impacts on traffic flow and will likely divert through traffic to parallel roadways.

This option would also remove on-street parking on one-side of 1st Street, however parking demand does not indicate this will create supply issues.

A summary of this alternative is shown in Figure 175.

- Benefits Score: ●●●●●●●○○○
- Cost score: $$$$
- Reduced speeds from traffic calming can discourage drivers from using this as a through-traffic route. This can divert traffic to other routes, primarily Main Street.
- Traffic calming and bike lanes greatly improve biking and walking environment
- Reduced parking demand not anticipated to create issues

Figure 171: Example of Raised Intersection

Source: NACTO

Ranking of East 1st Street Alternatives

After scoring each East 1st Street alternative in terms of operations and score, a weighted total score that considers both operations and costs was determined for each alternative. Table 66 shows the alternatives by rank, ranked by weighted total score.

Table 66: Summary of Traffic Control Options for East 1st Street

Alternative	Operational Score	Cost Score	Weighted Total Score
Through Corridor	●●●●●●●○○○	$$$	●●●●●○○○○○
Do Nothing	●●●●●●○○○○	$	●●●●○○○○○○
Quiet Corridor	●●●●●●●○○○	$$$$$	●●●○○○○○○○

Compatibility with West 1st Street Cross Section

The character of 1st Street begins to transition from downtown to residential between Collins Avenue and 3rd Avenue NE. As such, mobility and property access need to be balanced more in this area compared to areas east of 3rd Avenue NE.

If a quiet corridor is selected for east 1st Street, it may be appropriate to maintain the west 1st Street cross-section through 3rd Avenue NE to better balance the mobility and access needs on this segment.

If a through corridor is selected for east 1st Street, this will be more congruent with West 1st Street mobility needs, therefore the east 1st Street cross-section could be started east of Collins Avenue.

Figure 172: 1st Street Transition Area

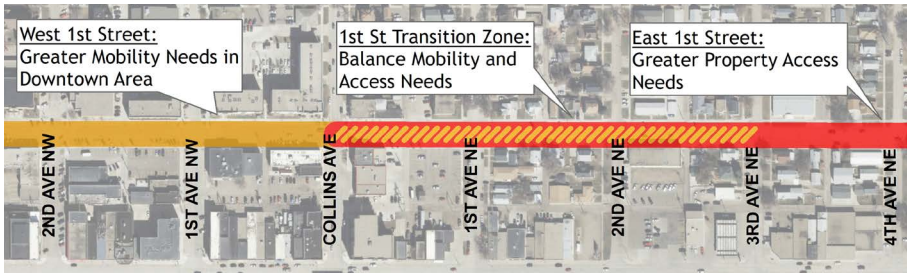


Figure 173: East 1st Street - Do Nothing

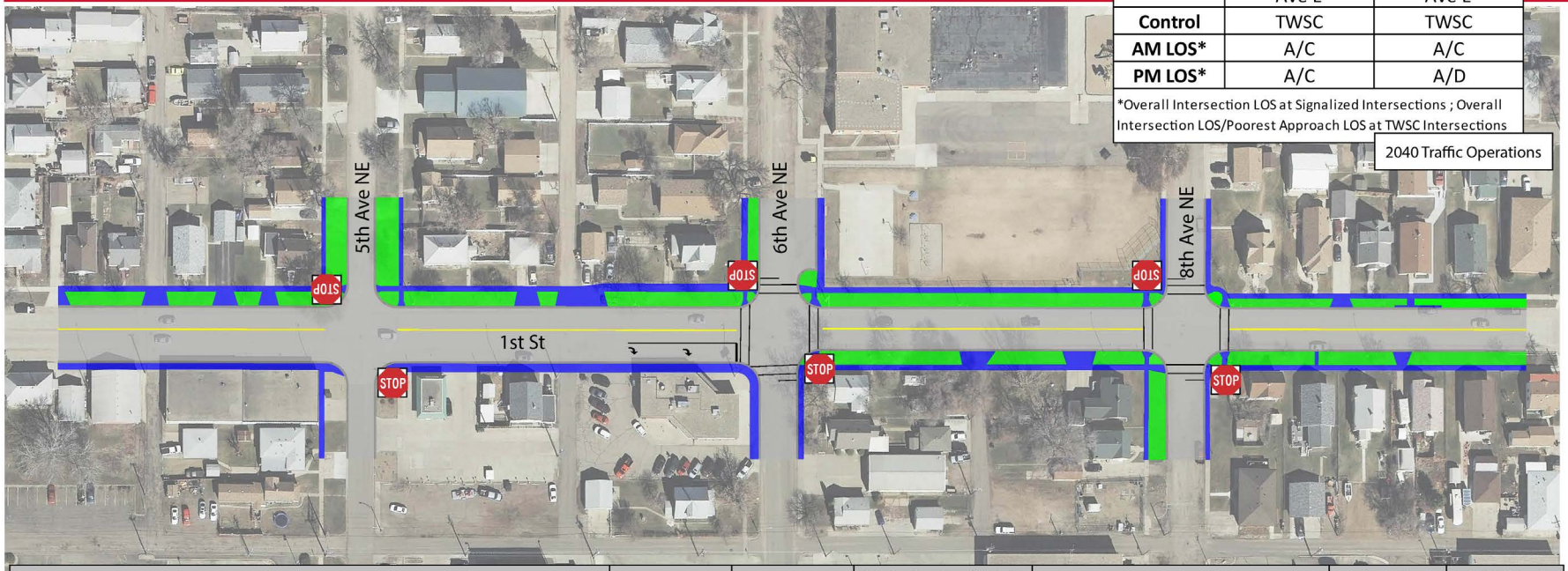
EAST 1ST STREET

Do Nothing

Intersection	1st St and 3rd Ave E	1st St and 6th Ave E
Control	TWSC	TWSC
AM LOS*	A/C	A/C
PM LOS*	A/C	A/D

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



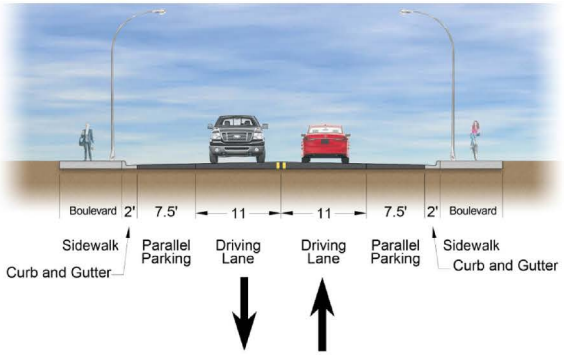
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●●○○○	23	No impacts to through traffic. Maintains acceptable level of service (Overall intersection LOS "A", minor approach LOS "D" or better)	●●●●●●○○○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●○○○○	32	Maintains existing roadway capacity and parking supply		
	Bicycle Facilities	●●○○○○○○○○	23	No bicycle facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●○○○	23	Few controlled pedestrian crossings	$	

Figure 174: East 1st Street - 3-Lane Section with Two-Way Left-Turn Lane

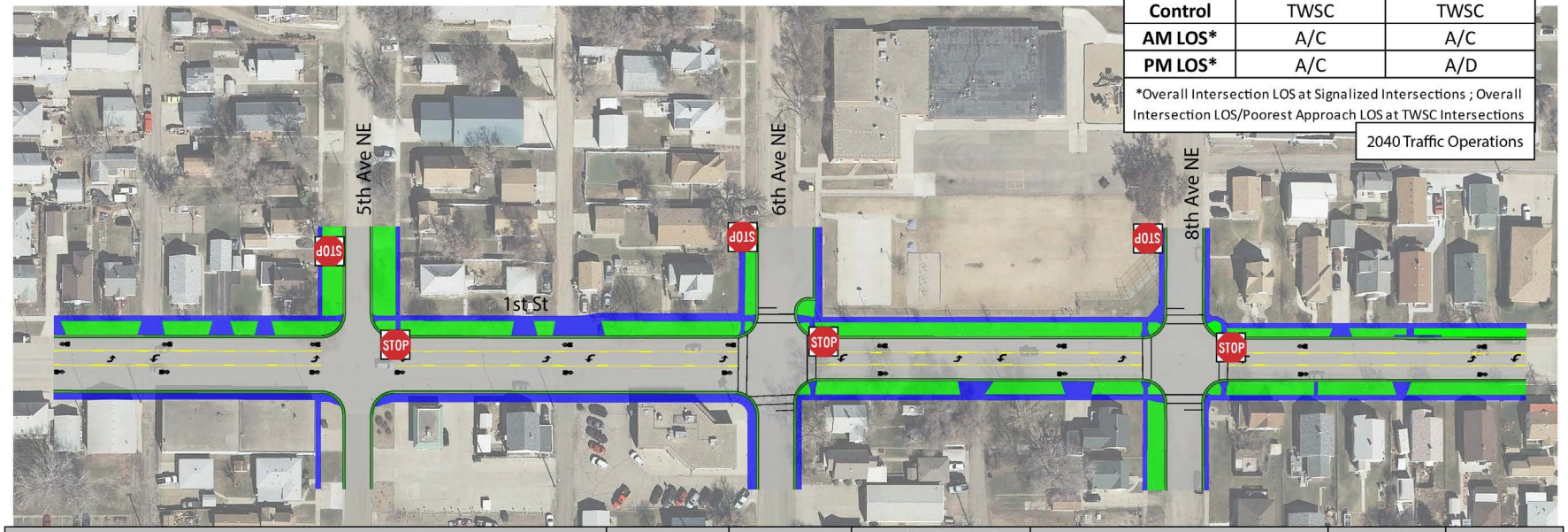
EAST 1ST STREET

Through Corridor

Intersection	1st St and 3rd Ave E	1st St and 6th Ave E
Control	TWSC	TWSC
AM LOS*	A/C	A/C
PM LOS*	A/C	A/D

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



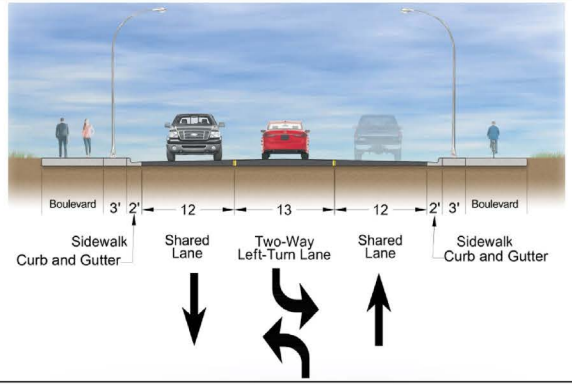
Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●●●●●●●●●	23	Two way left turn lane reduces impediments to through traffic. Maintains acceptable level of service (Overall intersection LOS "A", minor approach LOS "D" or better)	●●●●●●●○○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●○○○○	32	Reduced queuing from two-way left turn lane, however removes on-street parking (not expected to create parking supply issues)		
	Bicycle Facilities	●●●●●○○○○○	23	Shared lanes increase bicycle awareness	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●○○○	23	Little impact to pedestrian conditions, but few controlled pedestrian crossings	$$$	

Figure 175: East 1st Street - Quiet Corridor

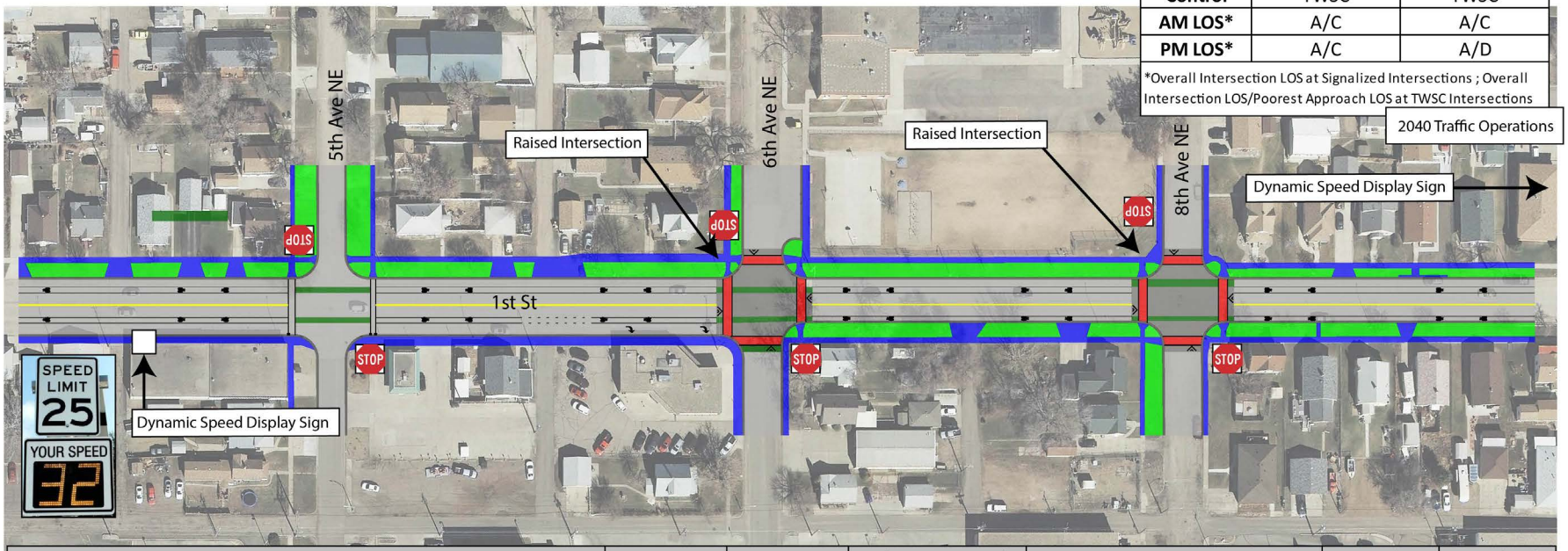
EAST 1ST STREET

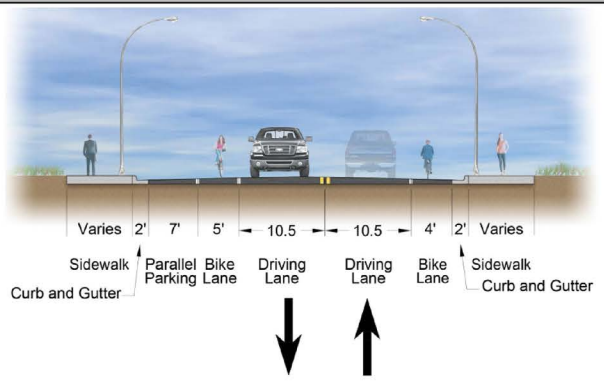
Quiet Corridor

Intersection	1st St and 3rd Ave E	1st St and 6th Ave E
Control	TWSC	TWSC
AM LOS*	A/C	A/C
PM LOS*	A/C	A/D

*Overall Intersection LOS at Signalized Intersections ; Overall Intersection LOS/Poorest Approach LOS at TWSC Intersections

2040 Traffic Operations



Concept Drawing	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
	Pass Through and Truck Traffic	●●○○○○○○○○	23	Raised intersections, narrowed travel lane, and DSDS greatly reduce vehicle speeds, but operations are expected to remain acceptable (Overall intersection LOS "A", minor approach LOS "D" or better)	●●●●●●●○○○	●●●●○○○○○○
	Local Traffic, Parking, and Transit	●●●●○○○○○○	32	Access unchanged, but slower speeds and greater emphasis on multimodal traffic. Removes parking on one side, but no supply issues are anticipated.		
	Bicycle Facilities	●●●●●●●●●●	23	Greatly increased emphasis on biking with traffic calming and bike lanes.	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●●	23	Reduced travel speeds greatly increase walkability, particularly for school crossings near Custer Elementary.	$$$$$	

Spot Improvements at 1st Street and 6th Avenue NE

A set of improvement options for the intersection of 1st Street and 6th Avenue NE was developed that can be applied to any of the east 1st Street cross section alternatives discussed above.

The alternatives are discussed below, and summarized by rank in Table 67.

Do Nothing

This would maintain the existing north-south two-way stop control that is expected to operate with peak hour minor approach LOS "D" or better through 2040. The existing pedestrian helps mitigate peak hour crossing issues during heavy traffic periods. This is however outdated and inconsistent with modern pedestrian beacons such as flashing beacons or pedestrian hybrid beacons. Modern beacons have been found to have higher driver compliance rates.

- Benefits Score: ●●●●●●○○○○
- Cost score: $

Figure 176: Existing Pedestrian at 1st Street and 6th Avenue NE

Roundabout

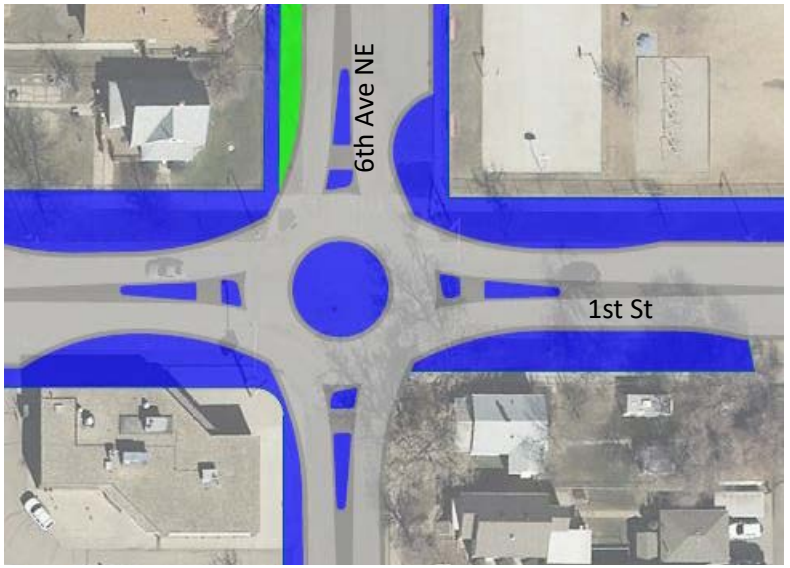
A single lane roundabout is expected to operate at LOS "A" through 2040, and would also have a traffic calming effect, which would benefit multimodal conditions on the corridor. While crash history does not indicate a safety issue at this location, single lane roundabouts typically reduce crash rates, especially injury crash rates. Roundabouts can be effective for bicycle traffic, however it requires careful design for sight lines, sometimes requiring off-street facilities within the roundabout to minimize conflicts.

While improving operations and having a safety benefit, a roundabout would incur additional costs compared to maintaining stop control.

A traffic signal was considered at this location, however 2040 traffic volumes are not expected to meet signal warrants.

- Benefits Score: ●●●●●●●●○○
- Cost score: $$$

Figure 177: Roundabout Concept at 1st Street and 6th Avenue NE



Convert Pedestrian Beacon to Flashing Beacon

Converting the existing overhead beacon to a flashing beacon would increase driver compliance at the pedestrian crossing, which is critical given the proximity to Custer Elementary. Research has found that standard overhead flashing beacons like the existing beacon have compliance rates around 50 percent, where modern flashing beacons have compliance rates around 80 percent.

Flashing beacons are typically post-mounted on the side of the roadway, however they can also be mounted overhead.

In addition to compliance benefits, this can create more uniformity in the application of pedestrians if other flashing beacons are installed across the city in the future.

- Benefits Score: ●●●●●●○○○○
- Cost score: $$

Figure 178: Overhead Flashing Beacon

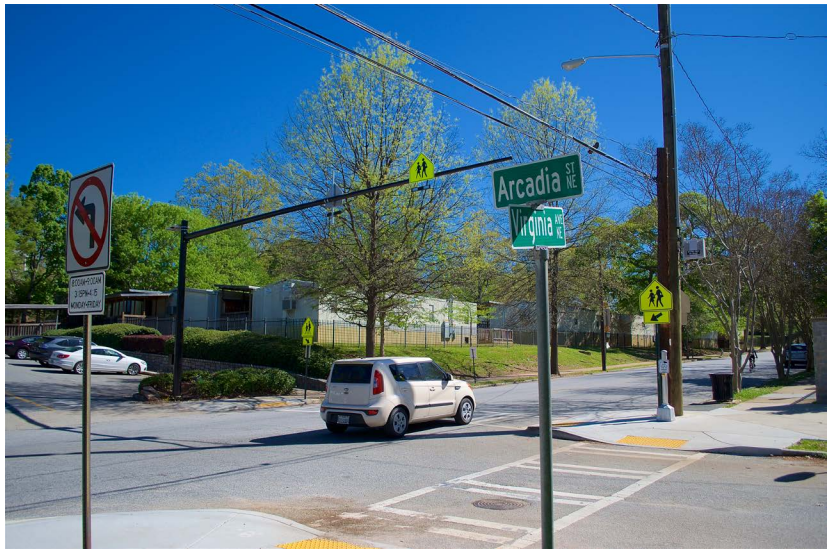


Table 67: Summary of Spot Improvements at 6th Avenue NE and 1st Street

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Roundabout	Pass Through and Truck Traffic	●●●●●●●●○○	23	Roundabout slows down traffic on 1st Street, but improves traffic flow on 6th Avenue	●●●●●●●●○○	●●●●●○○○○○
	Local Traffic, Parking, and Transit	●●●●●●●●●●	32	Operates at LOS "A", traffic calming effect		
	Bicycle Facilities	●●●●○○○○○○	23	Traffic calming benefit, but requires careful design to carry bikes effectively	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●○○	23	Traffic calming benefit	$$$	

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
Replace Existing Beacon With New Pedestrian Flashing Beacon	Pass Through and Truck Traffic	●●●●●●○○○○	23	No impact compared to do nothing. Maintains free-flow on 1st Street, but operates at LOS "D" on 6th Avenue approach in peak hour.	●●●●●●○○○○	●●●●○○○○○○
	Local Traffic, Parking, and Transit	●●●●●○○○○○	32	No impact compared to do nothing. LOS "D" on 6th Avenue approach in peak hour		
	Bicycle Facilities	●●●●○○○○○○	23	No bike facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●●●	23	RRFBs have higher compliance rates and are more consistent with modern practice	$$	

Alternative	Mode Category	Mode Score	Mode Scoring Weight (Sums to 100)	Notes	Benefits Score	Weighted Final Score
NB/SB TWSC (Do Nothing)	Pass Through and Truck Traffic	●●●●●●○○○○	23	Maintains free-flow on 1st Street, but operates at LOS "D" on 6th Avenue approach in peak hour	●●●●●●○○○○	●●●●○○○○○○
	Local Traffic, Parking, and Transit	●●●●●○○○○○	32	LOS "D" on 6th Avenue approach in peak hour		
	Bicycle Facilities	●●●●○○○○○○	23	No bike facilities	**Cost Score:**	
	Pedestrian Facilities	●●●●●●●●○○	23	Existing pedestrian beacon mitigates crossing issues across 1st Street	$	

Downtown Sidestreets

Improvements along Main Street and 1st Street offer opportunities for the sidestreets in the downtown subarea as well. Options were developed to improve walking and biking infrastructure, to provide other features to encourage increased biking and walking in the downtown subarea, and to provide opportunities for downtown development. These are all options that can be implemented as needed as other roadway improvements or developments occur. The goal with these options is to provide a set of concepts that can be implemented when opportunities arise.

These concepts are summarized in Figure 186.

2nd Avenue NW Closure

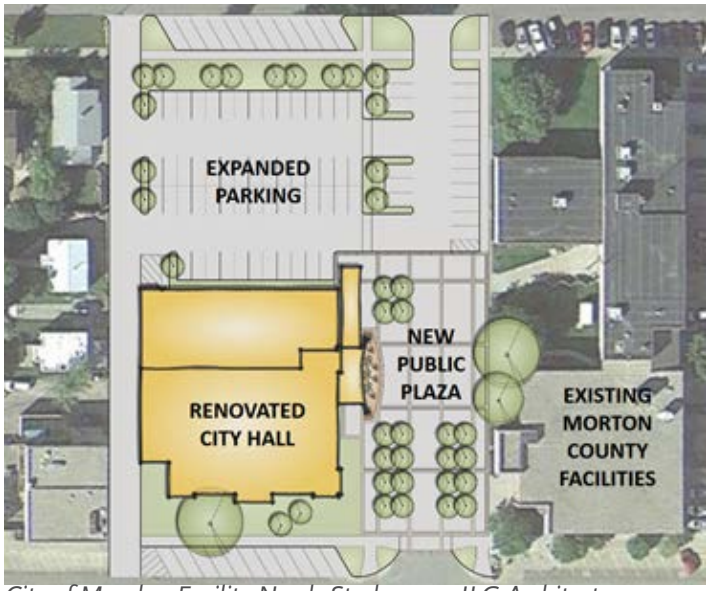
The City of Mandan recently completed a facility needs study which considered expanding and renovating City Hall in downtown Mandan. In conjunction with potential City Hall renovations that could expand the footprint and close 2nd Avenue NW between 1st and 2nd Streets, 2nd Avenue NW could become a pedestrian mall (also permitting bike activity), prohibiting automobile access. 2nd Avenue bisects the east and west sides of the downtown core, making this a desirable north/south nonmotorized corridor that could connect to a planned east/west bicycle facility along 4th Street. This concept is shown in Figure 179.

Another option is to completely close 2nd Avenue NW north of Main Street and utilize this space for future development. If a development opportunity utilizing the current space 2nd Avenue NW occupies arises, the roadway could be closed whether or not potential City Hall footprint modifications occur.

2nd Avenue NW carries approximately 2,000 vehicles per day at its highest volume section just north of Main Street, therefore the surrounding grid network will support the re-routing of traffic

Figure 181: 2nd Avenue NW (Facing North)

Figure 179: City Hall Renovation Concept



City of Mandan Facility Needs Study, 2015; JLG Architects

Figure 180: Pedestrian Mall Example

Nicollet Mall - Minneapolis, MN

Close 2nd Avenue NE to Support Redevelopment

If development is pursued in the vicinity of 2nd Avenue NE, this route could be closed between Main Street and the alley. Like other roadway closure alternatives, the grid network supports alternative routes, however too many road closures should not occur simultaneously to avoid overly impacting the grid and minimizing the effectiveness of dispersing traffic.

Close 4th Avenue NW for Redevelopment

As part of the Central Market site redevelopment, an option is to close 4th Avenue NW to through traffic between Main and 1st Streets and convert it into a development access to promote larger scale development on the site. 4th Avenue NW carries about 1,000 vehicles per day, meaning the grid network can support this closure.

4th Avenue NW could also function as a parking aisle between Main and 1st Streets, therefore not completely blocking traffic from using this roadway, however this will become a much lower speed route, not intended for through traffic.

Figure 182: 4th Avenue Redevelopment Concepts

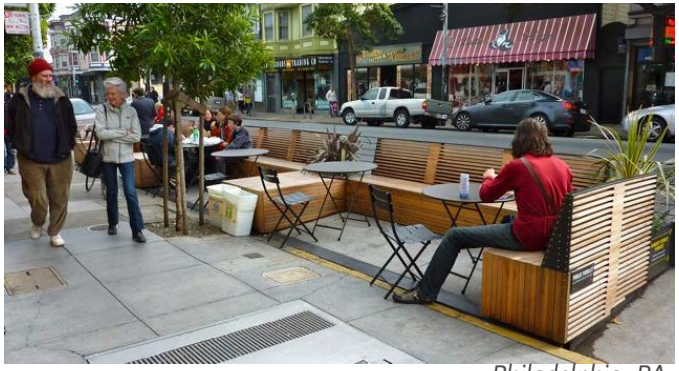
Parklets

Parklets are extensions of sidewalk space that can provide aesthetic benefits and provide community gathering space. Parklets are often developed by reallocating existing on-street parking stalls for community space.

Based on experience across the country, parklets typically cost between $10,000 and $30,000 depending on the impacts. Case studies have however shown that parklets can increase economic activity, particularly on retail streets or near restaurants. Coordination with the downtown business community is encouraged so both businesses and non-motorized travelers can both benefit from such an improvement.

Parklets would be most appropriate on sidestreets since traffic volumes and speeds are relatively high on Main Street and few businesses abut the curb on 1st Street.

Figure 183: Parklet Example



Philadelphia, PA

Bike Corrals

Bike corrals offer cyclists a secure place to store their bikes while visiting downtown destinations. Bike corrals can be located on-street, utilizing the space of some existing on street parking, or they could also be installed on wide sidewalks. Curb extensions offer a larger sidewalk space that could accommodate bike corrals.

Specific locations that could benefit from bike corrals include Dykshoorn Park, the library, and government services buildings. Bike corrals located in the center of the downtown core, near both retail and restaurants would also be beneficial.

New residential developments can also provide bike storage to further encourage new downtown residents to utilized an improved and expanded downtown bicycle network.

Figure 184: Bike Corrals

Minneapolis, MN (City of Minneapolis)

Alleyway Concepts

The alleyway network in downtown Mandan provides opportunities for both businesses and multimodal traffic.

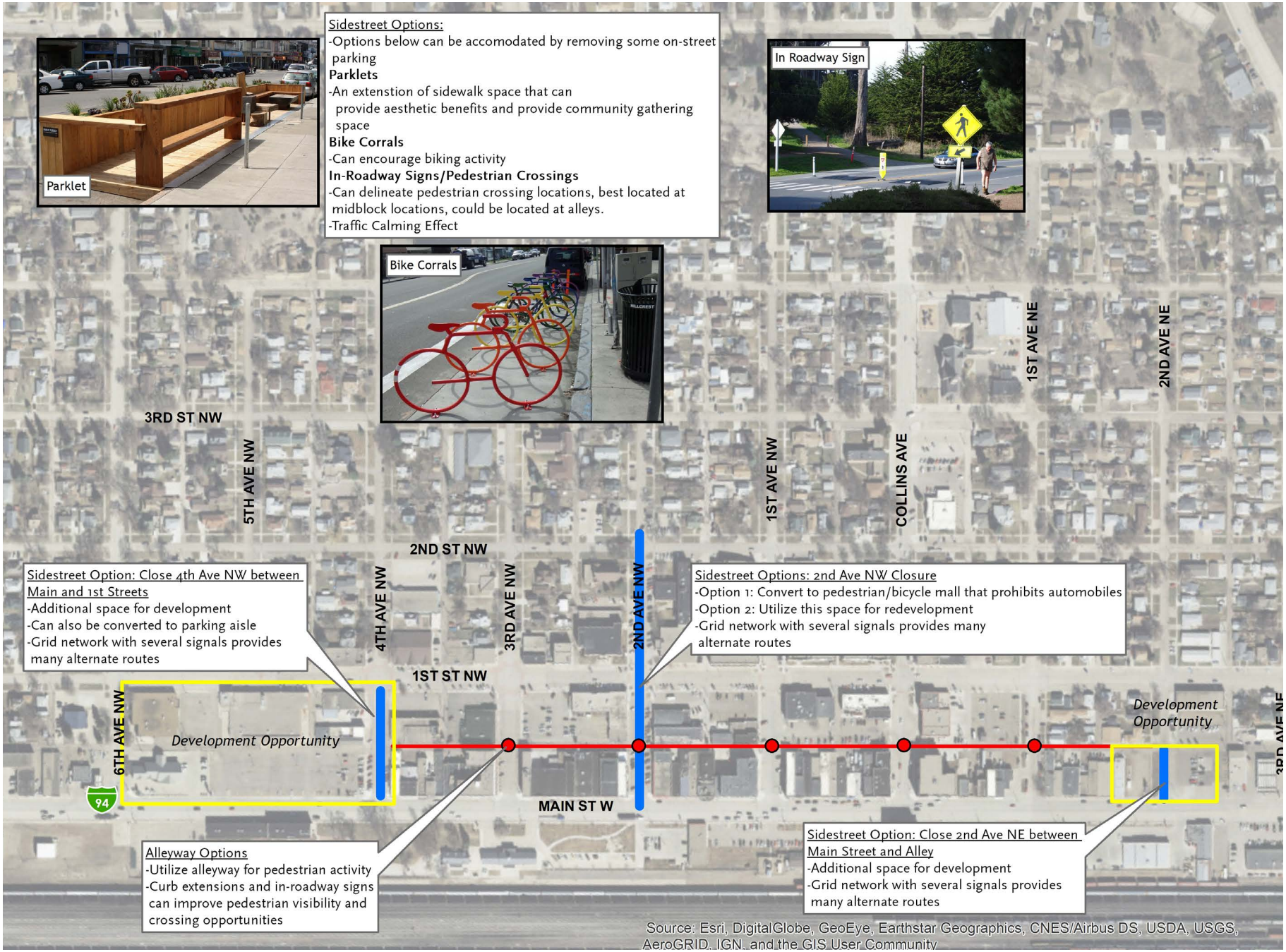
The Main Street alleyway on the north side could be an opportunity for an alternate pedestrian route other than Main Street or 1st Street. See Figure 186 for an illustration of this concept.

Curb extensions could be located at alleyways to reduce sidestreet vehicles speeds and improve pedestrian visibility. This would create a de-facto mid-block pedestrian crossing. This can be supplemented with in-roadway signs between curb extensions to further enforce the requirement for drivers to yield for crossing pedestrians.

Figure 185: Example of Midblock Curb Extension and In-Roadway Sign

San Francisco, CA (City of San Francisco)

Figure 186: Summary of Sidestreet Improvement Opportunities



SUBAREA-WIDE IMPROVEMENTS

This section provides discussion related to strategies/improvements that can be considered for the entire downtown Mandan area. This also provides more detail related to some strategies that were recommended for specific areas in preceding sections of this document.

Sidewalk Improvement Plan

The Existing and Future Conditions report identified downtown-wide sidewalk deficiencies including numerous ADA violations:

- 55 instances of missing curb ramps
- 53 instances of width restrictions
- 95 instances of missing detectable warning panels

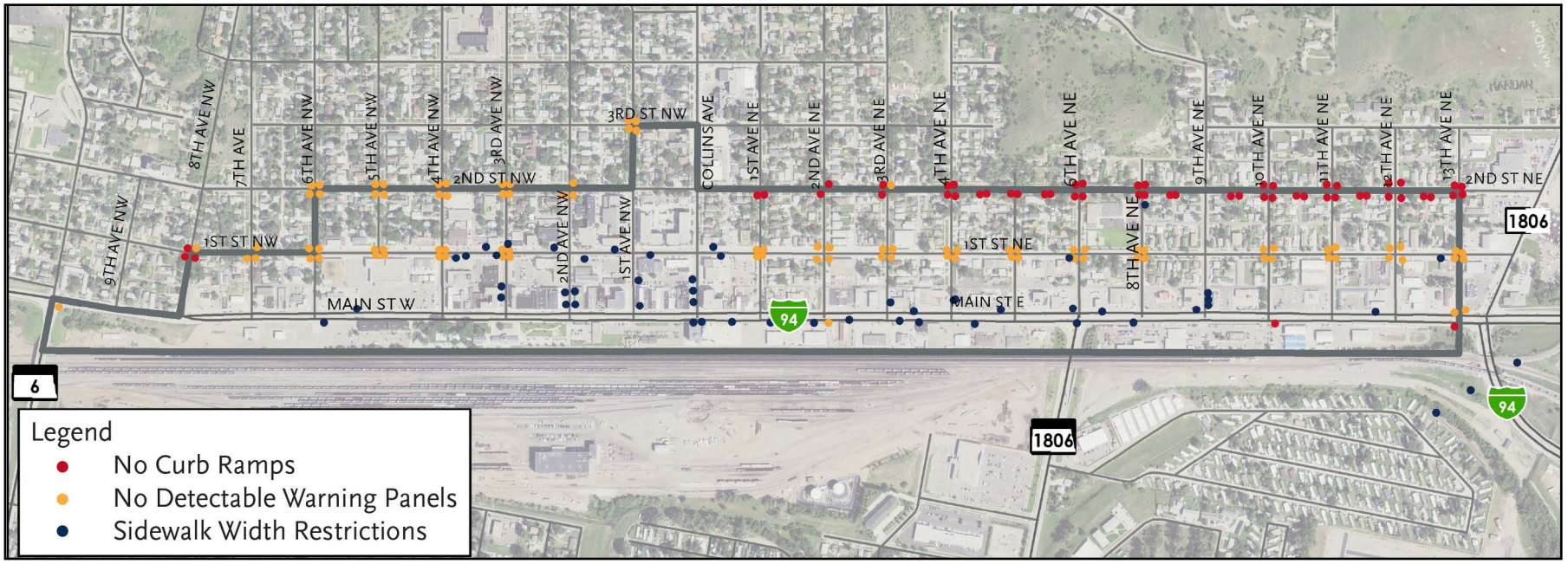
In addition to these specific instances of ADA violations there are other concerns including sidewalk pavement maintenance and lighting.

Figure 187 shows existing ADA violations, illustrating the need for downtown-wide sidewalk improvements. Addressing these deficiencies should be coordinated with planned and programmed roadway reconstruction or rehabilitation projects. The City of Mandan will be improving side streets in the next five to 10 years. Many of the sidewalk deficiencies can be addressed at that time.

In addition to incorporating sidewalk improvements into roadway projects, the following activities can support a continuous program to improve the pedestrian environment.

- **Complete a City-Wide ADA Transition Plan:** The completion of an ADA Transition Plan is a federal requirement and can help in identifying and mitigating ADA-related issues throughout Mandan. The City of Mandan could begin this process in downtown since this is where pedestrian activity is greatest and is likely to increase.
- **Develop a Sidewalk Capital Improvement Plan** to address sidewalk deficiencies through stand-alone sidewalk projects. The combination of a citywide ADA Transition Plan combined with a roadway and sidewalk Capital Improvement Plan can help mitigate future large-scale deficiencies from developing.

Figure 187: Pedestrian Deficiencies



Parking Policies

For many years, the City of Mandan has not required parking for new developments in downtown. Instead, the City has taken on the responsibility for providing parking for the entire area. However, based on the parking study completed for this subarea study, there is a large parking surplus, with supply approximately doubling demand. As new developments are completed, parking demand will most certainly increase, especially nearest new developments.

While analysis in this report indicates that existing parking supply should be sufficient even under higher intensity development scenarios, the following should still be considered.

City Provided Parking

The 2009 Downtown Parking Study provided four scenarios for parking provision in downtown Mandan that ranged from a scenario where the city completely provides all parking in downtown to a scenario where the city is not involved in the provision or maintenance of any off-street parking. The study ultimately recommended a blend of private development of public parking and city management of public parking.

Figure 188: Off Street Parking

The City currently manages about half of the available parking in the downtown core (295 off-street parking spaces and nearly 950 on-street parking spaces). The previous Downtown Parking Study recommended discouraging any new parking lots, excluding residential developments, and instead encouraged the City of Mandan to own and manage at least fifty percent of the parking supply. If the City intends to continue to operate and maintain off-street parking through surface lots or structures, a variety of financial strategies could be implemented.

Parking Improvement Districts

Parking improvement districts are a form of special assessment or business improvement district. The state of North Dakota permits these districts to promote business activity or new business development. These districts would assess a small amount to all properties in the district, typically excluding single-family residences, with the funds used to purchase, operate, and maintain parking lots, as well as other aesthetic projects, if they could reasonably show that the investment supports business development or promotion.

Fee-in-Lieu or Impact Fees

Fee-in-lieu or impact fees are charged to developers to provide public services to a new development. This option allows the City maximum control over location, design, and layout for parking provision in downtown Mandan. This alternative could directly finance a parking ramp structure as a long term alternative to surface parking.

Changes to Parking Supply

Typically, parking requirements come in the form of parking minimums; a development must have a certain number of parking spaces based on the number of square feet, residential units, or some other measurement. Parking minimums were originally designed to prevent a free-rider problem. If developers were not required to provide parking, patrons to their development would use limited on-street parking or other lots supplied by other developers. Across the county, these requirements have led to the drastic over-supply of parking.

Brief summaries for parking requirement approaches are provided below.

Maintain No Parking Requirements

Some cities have elected to let developers entirely determine what their parking needs are, only providing review and approvals throughout the zoning process. Madison, Wisconsin has taken this approach in their downtown district wherein all new developments must negotiate their preferred number of parking spaces with the planning administrator, as established by a transportation management ordinance. This approach requires thorough documentation and significant effort by the planning staff as every new development would need to be reviewed.

While this approach ensures maximum flexibility for developers, without a clear process for review it could result in perceived uncertainty for developers.

Parking Maximums

Parking maximum ordinances are typically found in larger cities' downtown districts that have greater emphasis and access to alternative modes of transportation. Parking maximums must be carefully constructed to minimize spill-over effects that

may occur to neighborhood streets if parking is under supplied. The following are examples of how parking maximums have been applied across the country:

- Pittsburgh, Pennsylvania does not require any parking for the first 2,400 square feet of retail and service uses and then requires one off-street parking space per 175 feet at a maximum and one per 500 feet at a minimum. With this approach, a 5,000 square foot retail building could provide between six and 29 vehicle parking spaces.
- Helena, Montana requires 4.1 spaces per 1,000 square feet for retail uses, permitting up to 120 percent of the required parking spaces as the maximum parking allowed. With this approach, a 5,000 square foot retail building could provide between 21 and 26 vehicle parking spaces.
- Cambridge, Massachusetts limits the number of parking spaces based on geographic areas as part of a travel demand management plan.

While the intent of parking maximums is to bring parking supply closer to parking demand, there are exceptions that could be granted to allow developers to provide parking supply beyond typical maximum amounts. For example:

- Parking maximum exceptions can be permitted to promote a certain type of behavior to meet environmental, aesthetic, or multimodal goals. Helena, Montana permits additional parking spaces if 20 percent of the parking lot is landscaped.

Shared Parking

Shared parking arrangements are most successful in larger areas with varied land uses. These arrangements can be done privately when a developer comes to an agreement with a neighboring property owner with compatible land use or by the city during project development. Compatible land uses could include residential and office space or churches and banks, where the peak demand for one use is the off-peak demand for another.

The proposed Railyard Development provides a great pilot site for shared parking in downtown Mandan. The proposed site plan (see Figure 190) includes 433 total parking spaces, including the two blocks south of Main Street. Incorporating the generalized land uses on the site plan, these assumptions were used to develop specific time of day parking estimates.

- Restaurant: 16,000 square feet
- Retail: 28,700 square feet
- Library and Public Space: 24,500 square feet
- Apartments: 40 units

Based on these assumptions the peak hour demand is 351 spaces, occurring on the weekend. While Mandan does not have parking requirements for downtown, traditional approaches to supplying parking for peak demand would require 476 total spaces. The time-of-day approach to parking results in a 26 percent reduction to parking required and a 19 percent reduction to parking supplied in the current draft site plan for the Railyard Development. Figure 189 shows the estimated demand for the Railyard based on time of day estimates and flat generation rates.

Figure 189: Parking Supply and Demand at Proposed Railyard Development for Weekday (Top) and Weekend (Bottom) Days

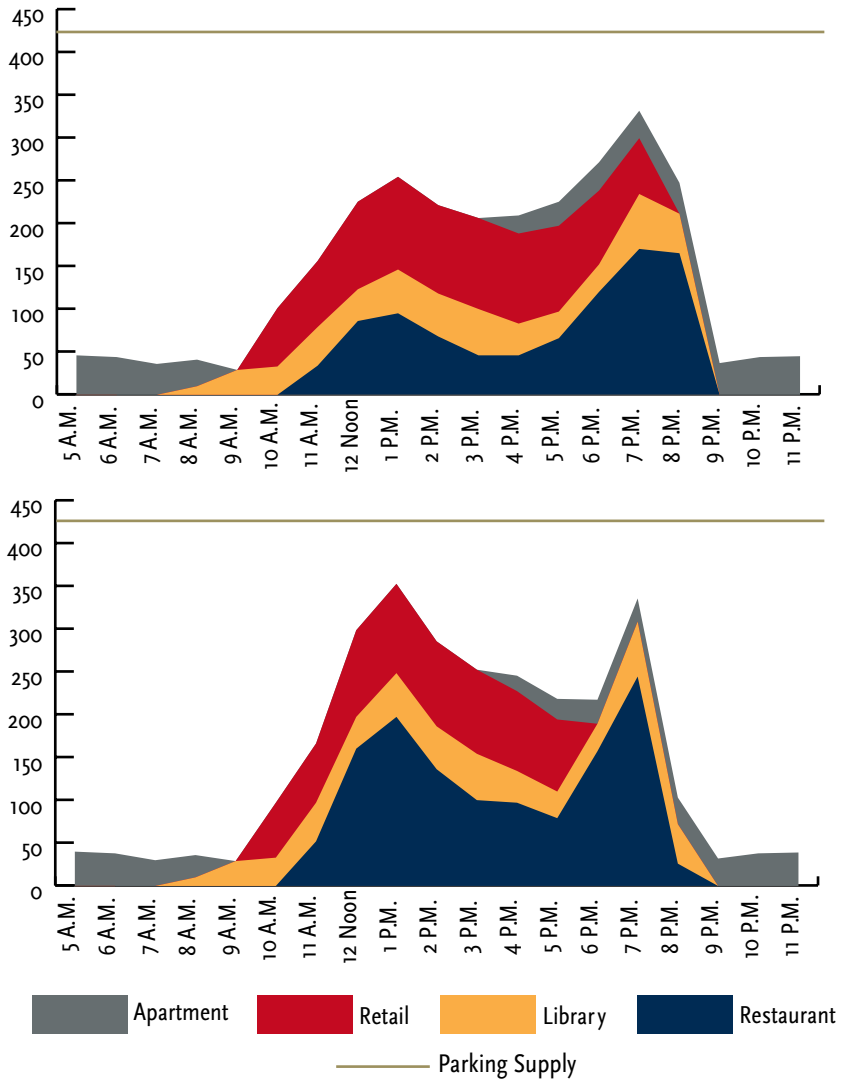


Figure 190: Proposed Railyard Development

Changing Parking Lot Aesthetics

Parking Lot Placement

Many locations throughout downtown Mandan have located off-street parking between the road and the building. This is a car-centric approach to the placement of parking lots. It gives priority access to cars to park in the front while requiring bicyclists and pedestrians to walk through the lots to access the building. However, requiring side yard or rear yard placement of parking lots locates buildings up to the lot line, improving both aesthetics and the pedestrian experience.

These requirements would be best applied to long linear corridors like Main Street and 1st Street. However, changing parking lot placement requires a long and challenging transition period. Changing the location of a parking lot would likely only occur during a parcel's full redevelopment. It would also likely require access changes. Any implementation of recommended parking lot placement should be flexible, so to not overly burden developers, or build too close to the lot line and prevent future improvements.

Figure 191: Side Yard Placement (Main Street and Collins Avenue)

Figure 192: Rear Yard Placement (Library Square Apartments)

Figure 193: Front Yard Placement (Main Street and 8th Avenue NE)

Landscaping and Screening

Landscaping can improve the aesthetics of parking lots by providing green space, defining pedestrian and vehicle spaces, and reducing the amount of impervious surfaces. Pedestrian scale landscaping in parking lots creates a more appealing streetscape, improves the walking environment and improves perceived safety.

Landscaping requirements are not contingent on redevelopment either, but could be accomplished through incentives like property tax abatements or grants/ low interest loans.

Figure 194: Landscaping and Screening

Changing Parking Demand

A variety of policies and approaches can help change parking demand.

Time Restrictions

The City of Mandan has currently implemented specific locations that are classified as 90-minute parking from 9 AM to 6 PM. As demand intensifies through development and redevelopment, changes to time restrictions could benefit businesses. Time restrictions ranging from two to four hours should be implemented for on-street parking, depending on the location. For example, on-street parking between Collins Avenue and 4th Avenue is currently limited to 90 minutes from 9 AM to 6 PM, but could be changed to two, three, or four-hour limits Monday through Friday. These expanded time restrictions would better accommodate visiting multiple locations and spending more time downtown, but would restrict employees from utilizing prime parking spots all day. On the fringes of the downtown core, increased time limits (four hours) or no time limits provide opportunities for parking for longer visits and employees.

Time limits should end at 5 PM, typical office hours and the beginning of the evening dining hours, to limit the perceived inconveniences to visiting downtown. They should also not be included for Sundays, to allow people who leave their cars overnight without penalty.

Paid Parking

There is no public paid parking in downtown Mandan. Given the current surplus in parking, paid parking is likely to be very unpopular. However, as demand increases, low-cost parking for off-street parking lots in the downtown core can encourage long-term parkers to find areas further away from the core. Paid parking should be limited to Monday through Friday from 8 AM to 5 PM, as to not overly burden residential developments or restaurants.

Paid parking on city-owned lots can help change the parking demand for prime parking locations and provide income for the operation and maintenance of city owned parking lots.

Parking Structure

In the past, a parking structure has been discussed as a possible alternative to surface lots to support new, high density development. The previous downtown parking study recommended a structure of 300 parking spaces with a 2009 cost of $5.4 million. That cost, using a four percent inflation rate would be $7.4 million in 2017 dollars. However, using the Hybrid Scenario, determined most likely to occur, the increased demand in parking would only be 288 spaces, which would easily be accommodated by existing parking, which has more than 1,500 parking spaces available at any given time on an average week and weekend day.

The Build Out Scenario, however, would significantly alter the parking landscape.

- It would increase parking demand to 1,830 spaces, which includes the current peak hour parking demand plus new demand associated with the build out scenario.
- Redevelopment would likely occur on many existing surface lots, which would reduce total parking supply to 2,262 spaces from 2,484 spaces, a nine percent reduction in total parking supply.
- This results in a general occupancy of 81 percent throughout the downtown core. However, this does not account for private parking restrictions.

To fully understand the impact the Build Out Scenario would have on parking, analysis was completed at the block level. Because specific land use types are not available, no time of day analysis can be completed. This analysis also assumes that new developments do not provide any new on-site parking.

- Figure 195 shows the net parking demand at the block level. For example, if the net demand is negative, the block is demanding more parking than it supplies (on-street, public off-street, and private off-street). There are six blocks within the downtown core area that will likely demand more parking than they can supply, but there remains sufficient parking in surrounding blocks.

This parking demand shortage was distributed to the surrounding blocks to reflect the true parking level of service. Parking level of service was developed by the National Parking Association based on their research; thresholds are shown in Table 68.

Table 68: Parking Level of Service Walking Distance Thresholds

Distance	Level of Service
Less than 400'	A
400' - 800'	B
800' - 1,200'	C
1,200' - 1,600'	D
> 1,600'	E

Based on this excess demand, parking was distributed at a proportional rate. For example, if the parking supply on the block was 75 percent public parking and 25 percent private parking, then the parking demand would be 75 percent public and 25 percent private.

- Figure 196 shows the parking level of service when restricted to public parking only (on-street and public off-street). There are multiple deficient locations, most are east of 3rd Avenue NW, where it is expected visitors to that block would need to walk more than 1,600 feet to find a parking space. While this analysis seems to point to a need for a parking structure, a more refined analysis based on actual uses and site plans should be considered.
- Figure 197 shows the parking capacity when all available surface parking is utilized. With many blocks still showing some parking availability, removing private parking restrictions would result in better utilization of surface parking in downtown and prevent the need to invest in a high-cost parking structure.

Under either scenario (public parking only, or all parking available) walking distances are likely to increase, but only to normal downtown conditions. Parking conditions that approach capacity, around 85 percent occupied, promotes the feel of a thriving downtown.

Figure 195: Net Parking Demand per Block Under Build Out Scenario

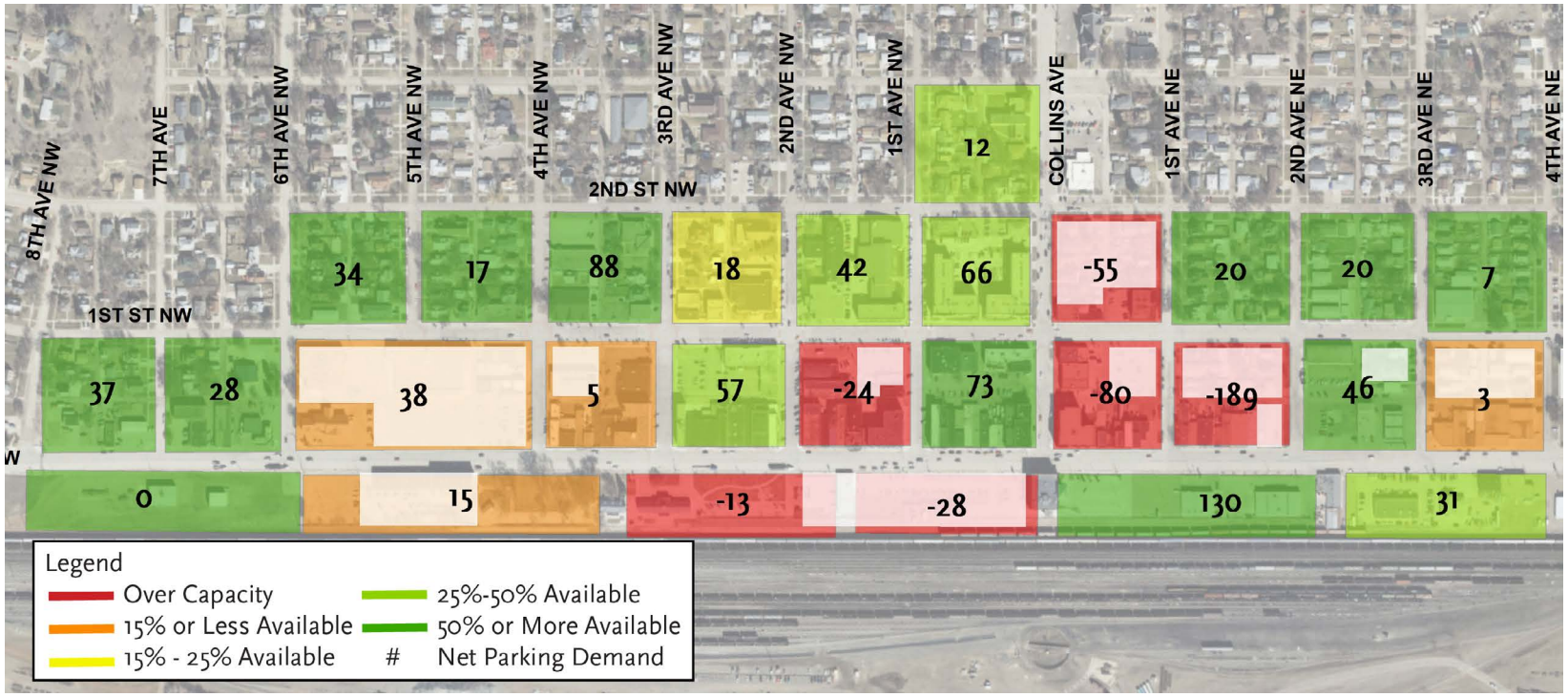


Figure 196: Public Parking Level of Service

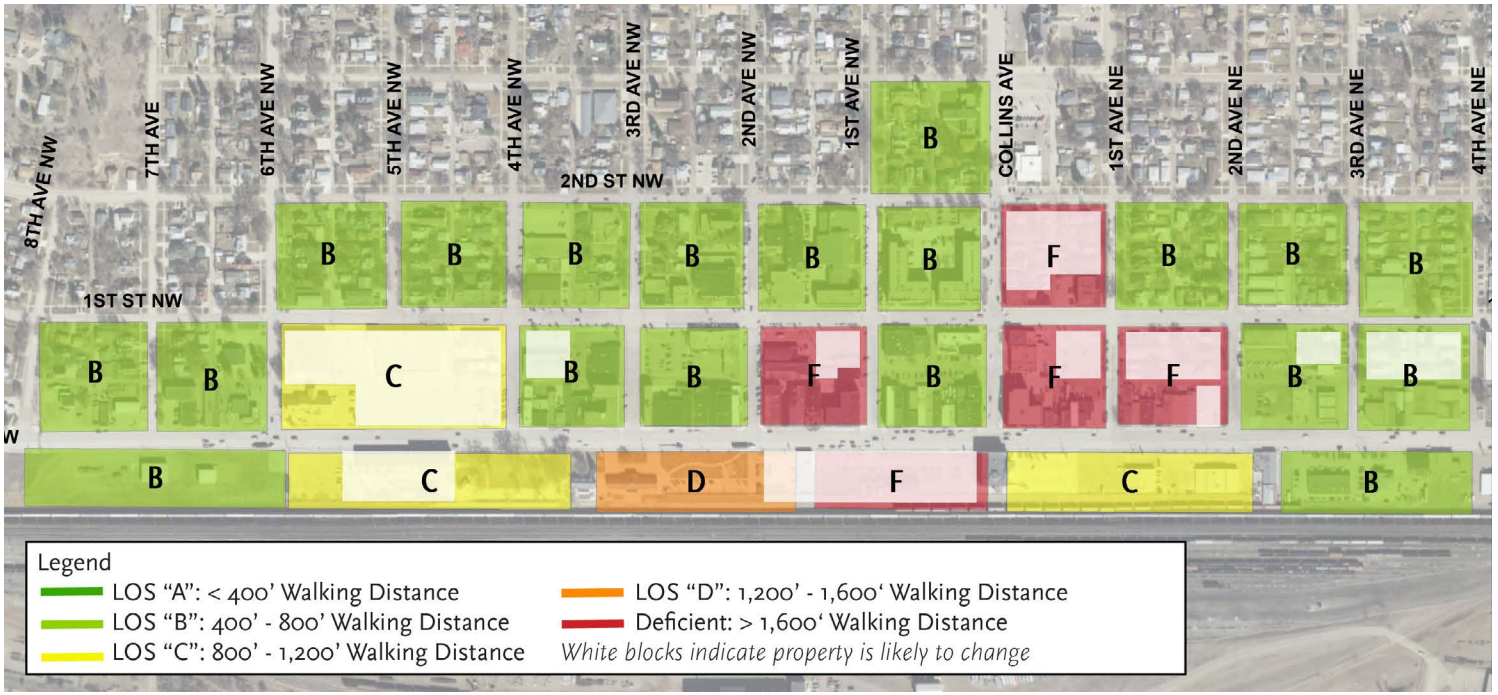
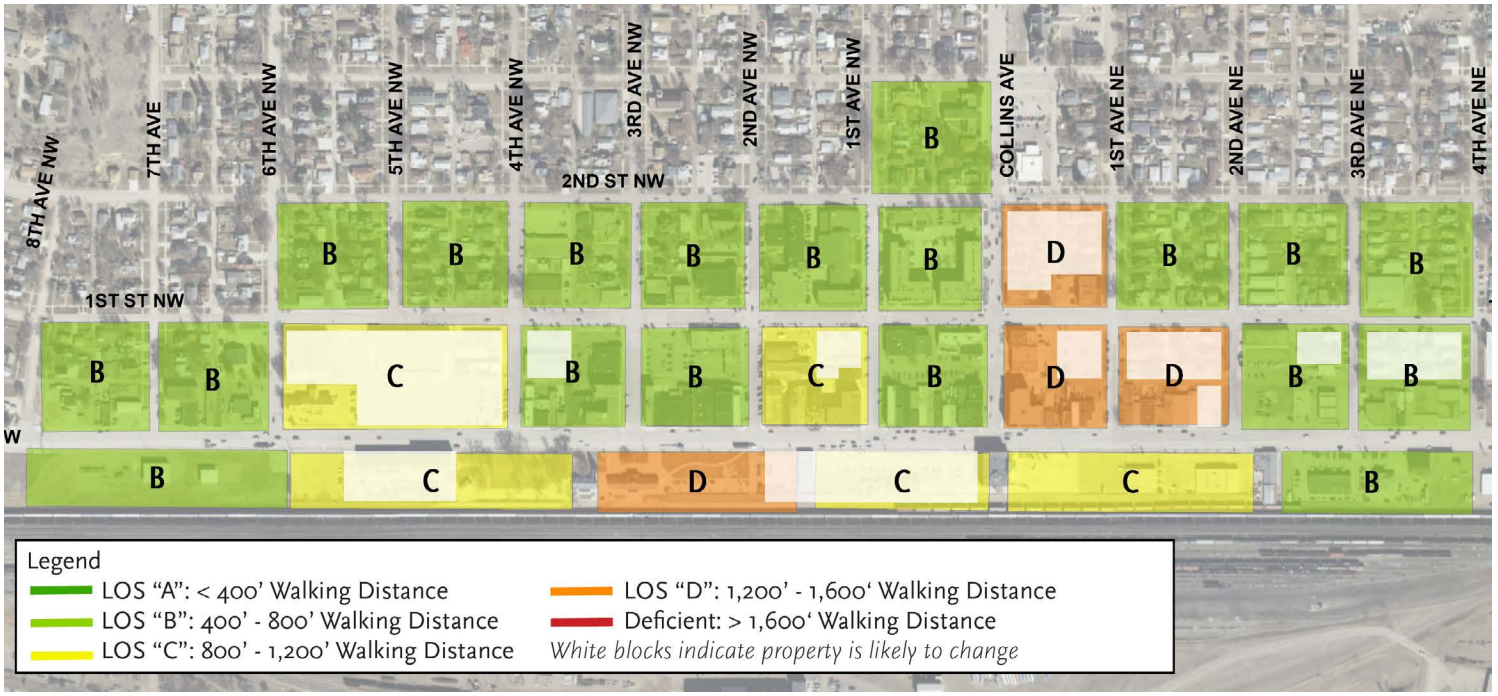


Figure 197: All Parking Level of Service



Bicycle Parking

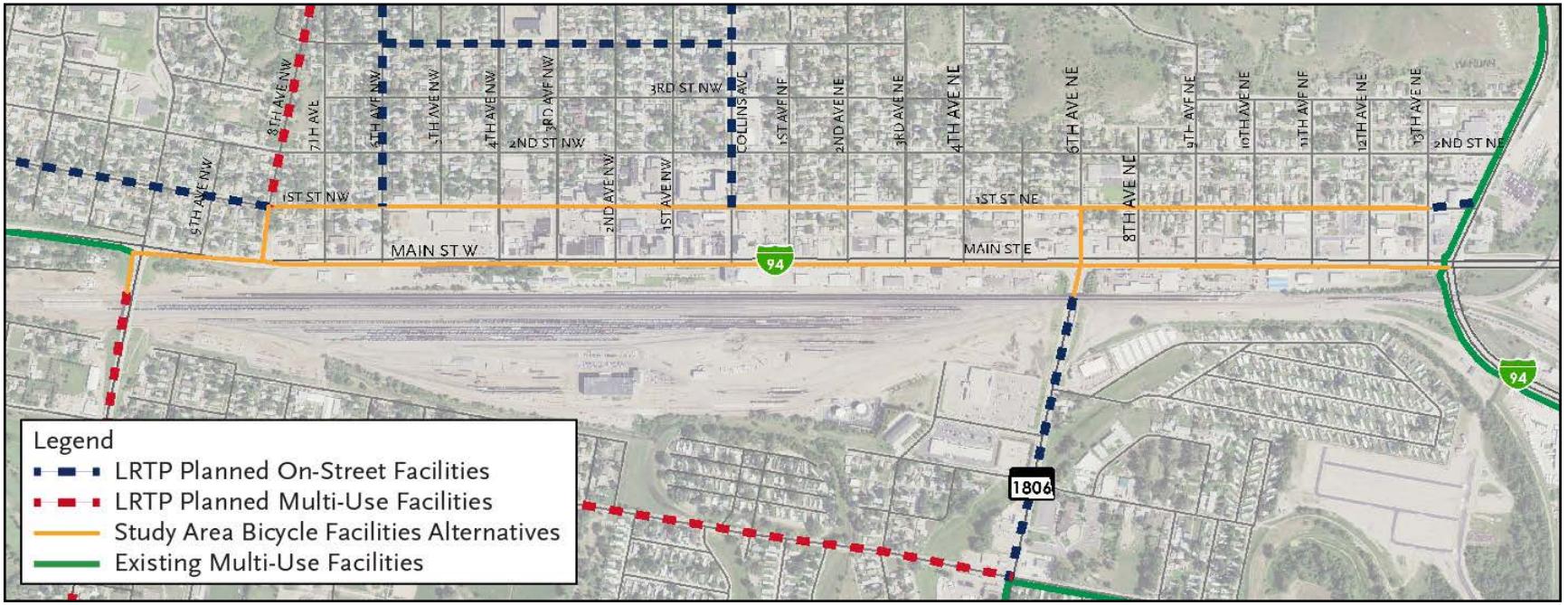
To encourage bicycle activity, bicycle infrastructure must be provided comprehensively, which includes not only the trails and lanes cyclists use to get downtown, but where they park their bicycle when they get there. There are limited bicycle parking locations, in the form of bicycle racks, currently along the corridor. Most are in the downtown core.

Bicycle parking in a downtown should be located as close to destinations as possible and highly visible. A variety of bicycle rack designs can be used. They can fit into the brand and theme of downtown or they can blend into the landscape. They can be a solitary bicycle rack in bulb outs or corrals in a parallel parking space. To increase the number of bicycle parking locations, the City of Mandan could use one or both of the following approaches:

- Provide bicycle parking in the existing right-of-way, including on-street parking and city owned parking lots. This would allow the city to identify areas with excess supply or demand of bicycle parking and respond accordingly.
- Require or encourage developers to provide bicycle parking. Two examples of this include Fargo and Minneapolis. The City of Fargo parking ordinances permit a reduction in off-street parking spaces for developments that provide bicycle parking. The City of Minneapolis requires at least three bicycle parking spaces for most commercial and service land use types.

Figure 198: Bicycle Parking

Figure 199: Bicycle Facility Connections



Bicycle Facility Connections

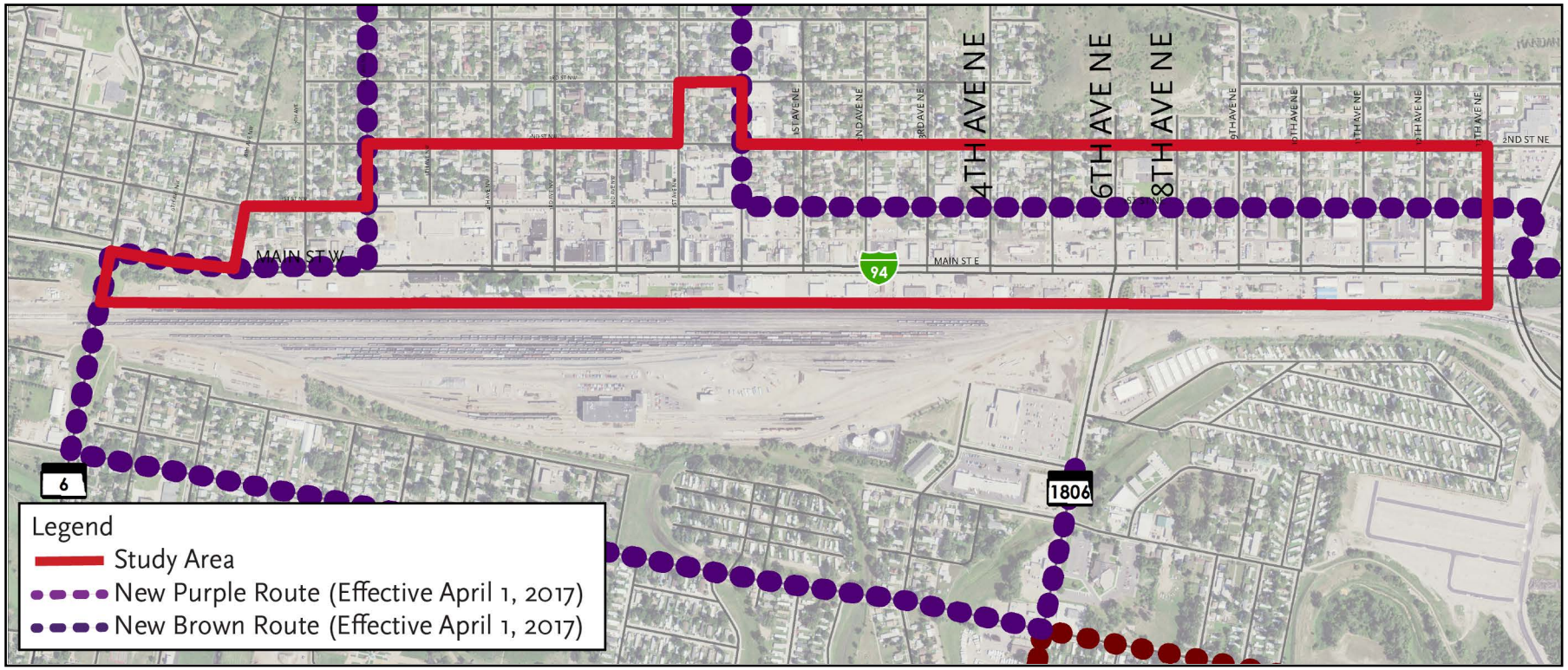
Adjacent to the Downtown Mandan Subarea there are multiple regional trails. The Envision 2040 LRTP identified multiple on-street and shared-use paths that would connect Downtown Mandan to those trails and the bicycle and pedestrian generators identified in the Existing and Future Conditions Analysis. Regardless of whether the bicycle facilities are located on Main Street or 1st Street, as discussed in the roadway alternatives above, additional connections will need to be made to complete the bicycle network. Most specifically connections north on Collins Avenue and 6th Avenue NW and south on 10th Avenue NW and 6th Avenue NE/ND 1806. Dedicated bicycle lanes are most appropriate for Collins Avenue and 6th Avenue NW; shared use paths should be considered for 10th Avenue NW and 6th Avenue NE/ND 1806. Bicycle facility connections are shown in Figure 199. However, given the larger regional context of these corridors, decisions should be made on a corridor by corridor basis, outside the scope of this project.

Transit

With the service changes recently made to Capital Area Transit, transit runs on directional routes with hourly headways and limited hours (Figure 200). Downtown Mandan is very underserved and makes transit very unappealing for choice riders. With the increase in development and redevelopment in downtown Mandan, transit supportive densities will likely increase. Recommending service level changes at the subarea level will likely be ineffective. Instead, better transit service through downtown should be analyzed as part of comprehensive system-wide improvements during the next Transit Development Plan, planned for 2018.

Consideration should also be given to improved amenities to make the service more attractive. Improved amenities for riders would include more shelters, including seating. Improved amenities for operations would include bus turnouts at busy stop locations, especially on the east end of the corridor, to help minimize delays to traffic on Main Street while passenger loading and unloading is occurring. Bus turnouts could be actual curb cuts where there is no on-street parking, or could prohibit on-street parking at stop locations. On narrowed or low volume roadways, buses would stop in the traffic stream. These improvements would only be made once route changes are made.

Figure 200: Transit



Events

There are many successful events in downtown Mandan. The alternatives discussed in this report are designed to improve the multimodal transportation environment. Below are considerations related to the special events in downtown.

- While specific roadway alternatives, like medians or cycle track, will not impede operations of special events; it will change how they operate. For example, during parades, floats would drive on one side of the median, opening up the other side of the median for spectators.
- The parking surplus will support special events. As development and redevelopment occurs, parking will become more scarce, so improved information about parking availability will become more important. Most events are held on the west side of downtown, which compliments the parking demand forecasted under the build-out scenario, which shows the highest demand on the east side of downtown. The surplus parking projected for the proposed Railyard Development may be justified to support the many special events held in downtown.
- Improving the pedestrian safety and amenities through downtown, especially Main Street, is important. Special events often require parking throughout downtown and walking to the special events, many held at Dykshoorn Park south of Main Street. Currently, special events draw the most visitors to downtown. An enjoyable pedestrian environment during a special event may encourage visitors to return to downtown. Currently, temporary control is used at 4th Avenue NW. These strategies should be continued, but monitored to ensure they are meeting the needs of event-goers.
- Traffic routing during events pushes traffic onto 1st Street, meaning that 1st Street roadway alternatives will need to be able to accommodate truck traffic. Finding ways to reroute truck traffic before it gets to downtown will help minimize impacts trucks may have trying to maneuver 1st Street, especially with restricted turning radii. Dynamic message signs, discussed later in this report may help reroute pass-through traffic away from downtown.
- Travel demand management along Main Street will help reroute through traffic away from the most congested areas of downtown during events. Permanent travel demand management strategies are likely unnecessary, but the use of temporary dynamic message signs and regular media channels before and during events can help minimize traffic delays.

Figure 201: Mandan Events

Alternatives Discussed but not Studied

Truck Bypass Route

Truck traffic can conflict with the ability to provide a multimodal corridor conducive for a successful downtown. It is often perceived as a safety issue for pedestrians and on-street parking. It can also have a negative effect on the aesthetics of a downtown. For these reasons, a truck bypass route around downtown Mandan has been discussed for many years.

As discussed in the *BMMPO Low Cost Corridor Improvement Study* and in the Existing and Future Conditions Analysis for this study, it is expected that up to two-thirds of truck traffic may begin to decline as industrial uses, specifically the aggregate pits, reach the end of their useful life and relocate, expected in the next five years. Therefore, a new bypass route to serve expected diminishing truck traffic is unlikely to be necessary in the future and was not studied. A truck bypass would be very costly, as no good existing parallel route exists. Additionally, Main Street is the I-94 business loop, meaning preventing trucks from using Main Street through downtown would require giving up the federal designation.

One-Way Side Streets

Envision 2040, the current Long Range Transportation Plan, identified the potential conversion of cross streets to one-way operations. Locally (Bismarck and Fargo) and nationwide, cities have been converting one-way streets to two-way streets, finding that two-way streets lead to slower traffic and a better multimodal environment.

Two-way streets also provide direct routes for emergency service vehicles, an important consideration with the Sheriff's Department and Fire Station in downtown Mandan. Other research has found negative impacts to property values and economic development as well as increased travel time for short, local trips associated with one-way streets.

Given the impacts to roadway connectivity, vehicular and multimodal operations and safety, and economic development, one-way conversions were not evaluated for downtown Mandan. Furthermore, no appropriate one-way pairs with logical termini were identified.

Intelligent Transportation Systems

Intelligent Transportation Systems, or ITS, incorporates technology to improve the safety and efficiency of the transportation network. A variety of ITS solutions would be valuable within the downtown subarea and are discussed below.

- Dynamic Message Signs (DMS) are electronic signs used to display special messages about real time transportation conditions. Minneapolis uses dynamic messages signs mounted to their signal standards to bring awareness to delays and parking availability. DMS would be valuable for traffic routing during special events, especially during events that close Main Street.
- Traffic Control Signal Interconnect uses fiber cables to connect traffic control signals to improve traffic progression, reducing congestion, crashes, and emissions. Interconnect is planned on Main Street for the 2018 Main Street Signal Replacement and Interconnect project.
- Pan-Tilt-Zoom Cameras (PTZ cameras) are used for traffic surveillance and allows for real time traffic monitoring. This allows signal timing to be updated from a central location. This is especially beneficial during special events, when directional traffic (entering or exiting an event) may require more green time than typically allowed.
- Dynamic Speed Display Signs (DSDS) provide real time speed information for vehicles as they pass. They are most appropriate near speed transition areas; within the downtown subarea, they should be considered for Main Street, where 85th percentile speeds are up to eight miles over the posted speed limit and speeding violations are very common. FHWA research has found that DSDS result in an average speed reduction around seven miles per hour.
- Smart Parking tools provide real time parking availability and direct visitors to available spaces in downtown lots. Typically, these systems are based on payment systems or other form of ticketed parking. However, using vehicle detection at the access points or at the individual spaces could provide the same information to the system to determine the number of parking spaces available. This information could be connected to a parking mobile application to help travelers plan their route before they leave home.

Figure 202: Dynamic Message Signs in Downtown Minneapolis

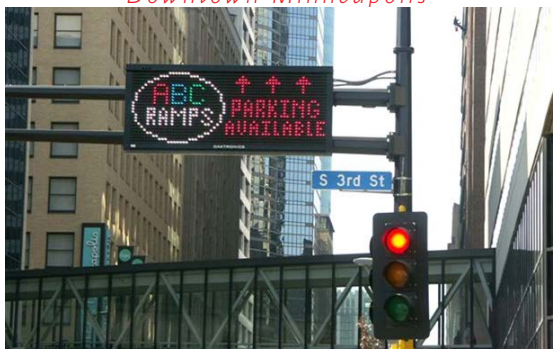
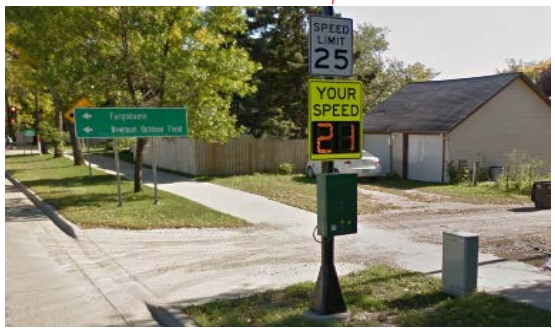
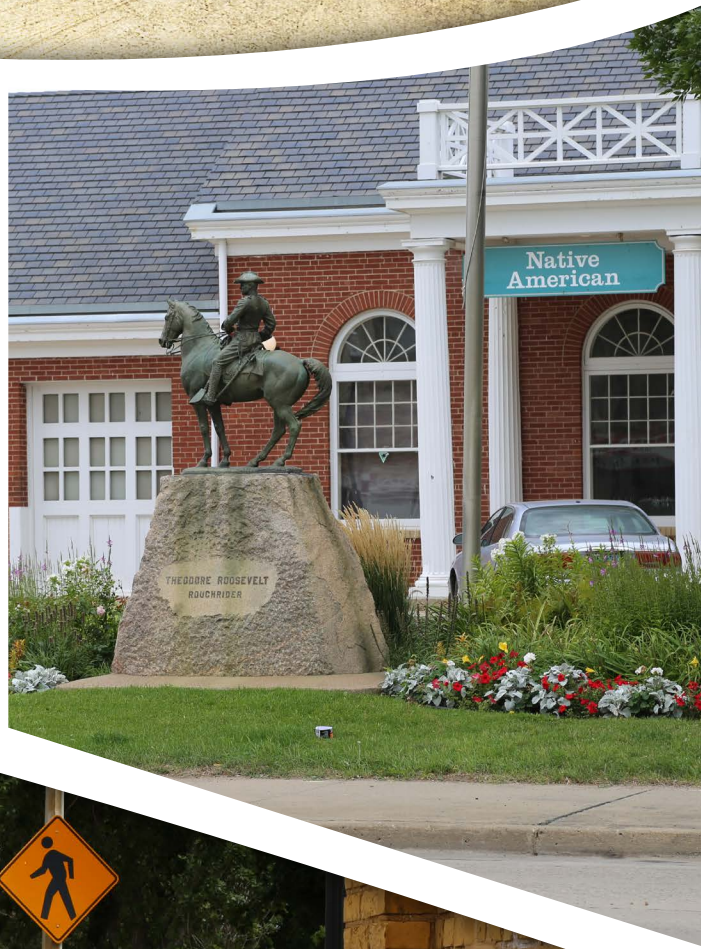


Figure 203: Smart Parking Sign at Como Park in St. Paul

Figure 204: Dynamic Speed Display Near NDSU Campus



IMPLEMENTATION PLAN



ALTERNATIVES SUMMARY

The Implementation Plan chapter of the report summarizes the results of alternatives evaluation, scoring, and ranking to help guide the selection of improvements to be carried through implementation.

Alternatives were scored and ranked using the following scoring categories:

- Technical Score
- Steering Committee Support Score
- Public Support Score
- Overall Score

Detailed discussion related to all alternatives that were evaluated in this corridor study can be found in the Transportation Alternatives Report.

TECHNICAL SCORE

This score describes expected multimodal mobility and safety, property and business impacts and planning-level cost estimates. Higher scores indicate more desirable alternatives from a technical standpoint.

Detailed information related to the technical scoring can be found in the Transportation Alternatives report, with key results summarized in this chapter. Note that some alternatives did not receive Technical Scores, with these cases being noted later in this chapter.

The maximum technical score an alternative can receive is 10, but due to the balance of benefits and costs, no alternative scored higher than 5.8 or lower than 3.3.

STEERING COMMITTEE SUPPORT SCORE

This score describes the amount of Steering Committee support for alternatives under consideration. The consultant team presented results from alternatives analysis to the Steering Committee at Steering Committee Meeting #4 on October 4th, 2017.

Figure 205: Steering Committee Meeting

CROSS-SECTION AND INTERSECTION IMPROVEMENT ALTERNATIVES

Steering Committee members were asked to rank each cross-section alternative and intersection improvement in order from most preferable to least preferable. For these types of alternatives, the rankings assigned for each alternative were used to calculate the Steering Committee Support Score. High rankings (i.e. ranked 1 of 4) resulted in higher scores and low rankings (i.e. ranked 4 of 4) resulted in lower scores.

MAXIMUM STEERING COMMITTEE SUPPORT SCORE FOR CROSS-SECTION AND INTERSECTION IMPROVEMENT ALTERNATIVES

The maximum Steering Committee Support Score varies by the number of alternatives under consideration. For a location with four alternatives, the maximum score would be 4, for three alternatives the maximum score would be 3, etc. Note that while the Steering Committee discarded some alternatives, the discarded alternatives still count toward the total number of considered alternatives for the Steering Committee support score.

SUBAREA-WIDE ALTERNATIVES

The committee was also asked which types of subarea-wide improvements they support. Subarea-wide improvements were not assigned Support Scores, rather the percentage of committee members supporting each improvement-type was identified.

SUMMARY OF STEERING COMMITTEE INPUT

A summary of steering committee input is presented below, with more detailed results available in Appendix A.

PUBLIC SUPPORT SCORE

This score describes the amount of community support for considered alternatives. After alternatives analysis were presented at Public Input Meeting #2, the community was invited to take an online survey to provide feedback related to alternatives. All online surveys completed between October 30th, 2017 and November 15th, 2017 were reviewed and used for alternatives ranking.

Information related to alternatives was disseminated in the following ways;

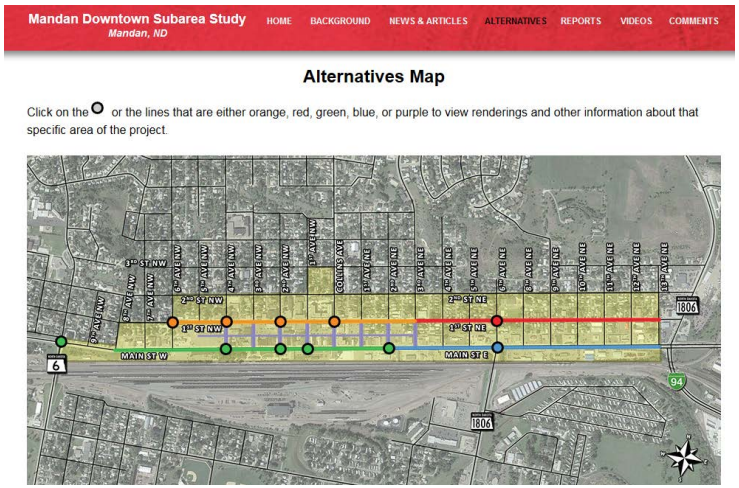
- Public Input Meeting on October 25th
- Recording of Public Input Meeting on Website

- Interactive web page on website
- Mandan Progress Organization Presentation on November 1st
- Mandan City Commission Presentation on November 7th
- Article in the Bismarck Tribune
- Multiple news segments on KFYR
- Multiple Messages Sent Via City Social Media Outlets
- Multiple Messages Sent Via Project and City E-mail Lists

Some improvement options were discarded through the Technical and Steering Committee review process, therefore were not presented to the community.

Figure 206: Local Media Coverage of Public Input Meeting

Figure 207: Interactive Project Website



CROSS-SECTION ALTERNATIVES

Similar to the Steering Committee, the community was asked to rank each cross-section alternative in order from most preferable to least preferable. Rankings assigned to each cross-section alternative were used to calculate the Public Support Score. High rankings (i.e. ranked 1 of 4) resulted in higher scores and low rankings (i.e. ranked 4 of 4) resulted in lower scores.

INTERSECTION IMPROVEMENT ALTERNATIVES

For intersection improvement alternatives, the community was asked to select only their preferred alternative. As such, the percentage of surveyed community members supporting each alternative was determined. To better relate community feedback with Steering Committee feedback, community survey results were converted to a Support Score by multiplying the percentage of people supporting an alternative by the total number of alternatives.

MAXIMUM PUBLIC SUPPORT SCORE FOR CROSS-SECTION AND INTERSECTION IMPROVEMENT ALTERNATIVES

Like the Steering Committee Support Score, the maximum Public Support score varies by the number of alternatives under consideration. For a location with four alternatives, the maximum score would be 4, for three alternatives the maximum score would be 3, etc. Note that for public survey results, discarded alternatives do not count toward the total number of considered alternatives, where discarded alternatives were considered when developing Steering Committee Support Scores.

SUMMARY OF COMMUNITY INPUT

The online survey was taken by 186 members of the community. About half of the public elected no changes at all within the subarea, citing costs as the main factor. Most of the do-nothing survey responses were received after the second public input meeting, when traffic to the website and survey spiked due to multiple brief stories by news outlets in the Bismarck-Mandan area. The other half of the public voted for changes to one or multiple segments of Main Street and 1st Street. While there may be multiple factors for the cluster of do-nothing survey responses, to ensure the prioritized alternatives fully respected the public engagement process, the survey results were incorporated at face value into the overall score discussed below. This allowed for the most transparency in the ranking of alternatives.

A summary of all community input can is presented in the following section with more details available in Appendix A.

OVERALL SCORE

An overall score was then calculated to factor technical benefits, Steering Committee Support, and public support. The overall score is the average of the Technical, Steering Committee, and public support scores described above. It is important to note that the different scoring approaches do not perfectly align. The purpose of this analysis is to concisely summarize the different evaluation techniques to allow for decisions makers to make informed decisions. In other words, the summary scores are not recommendations. Rather they are merely a tool to summarize a lot of information.

WEST MAIN STREET ALTERNATIVES: 6TH AVENUE NW TO 2ND AVENUE NE

CROSS-SECTION ALTERNATIVES RANKINGS

A 3-Lane Section with added parallel parking on the south side of the corridor received the highest Overall Score, being the second-highest ranked option by both the steering committee and the community, and the third highest-ranked option in terms of Technical Score.

Table 69: West Main Street Cross-Section Alternatives Rankings

Alternative	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
3-Lane Section: Parking Option				
3-Lane Section: Cycle Track Option				
3-Lane Section: Bike Lanes Option				
Do Nothing				
2-Lane Section: Wider Sidewalks Option				

A 3-lane section with a cycle track also scored highly due to high Steering Committee Support and the highest Technical Score, however a cycle track does not have broad public support. Based on the feedback that was received, there is a perception that bike facilities would not be widely used.

- Highest Ranking Alternative: 3-Lane Section With Added Parking
- Estimated Cost: $420,000

As a truck route, truck traffic is a concern on Main Street. All of the proposed 3-lane sections can easily accommodate normal truck sizes. If the fourth travel lane is be removed, oversized loads will be able to encroach into the center left-turn lane without issue. However, these large loads should be encouraged to move during off-peak periods to limit conflicts in the center left-turn lane. This is not anticipated to be an issue for multiple reasons:

- Main Street was previously a 3-lane section and had limited conflicts with agricultural truck traffic.
- Oversized loads represent a very small percentage of total truck traffic and overall traffic volumes. The oversized loads that are present are seasonal in nature.
- The number of trucks using Main Street is expected to decline as much as 60 percent overtime when the aggregate pit and asphalt plant relocate

INTERSECTION ALTERNATIVES RANKINGS

MAIN STREET AND 10TH AVENUE NW

Maintaining the existing signal with improved detection capability and interconnectivity with adjacent signals received the highest Overall Score, scoring the highest in all categories.

- Highest Ranked Alternative: Maintain Signal and Add Detection/Interconnect
- Estimated Cost: $200,000 (assumes new signal constructed)

Table 70: Main Street and 10th Avenue NW Intersection Improvements Alternatives Rankings

Alternative	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
Maintain Signal and Add Detection/Interconnect				
Roundabout				
Convert to AWSC				

Figure 208: Rendering of West Main Street 3-Lane Section with Added Parking

MAIN STREET AND 4TH AVENUE NW

Adding flashing beacons to this unsignalized intersection was rated higher than a do-nothing option in all categories. This will improve pedestrian crossing opportunities while minimizing impacts to through traffic. If a 3-lane corridor cross-section is built, beacons can be coupled with a raised pedestrian refuge island to reduce conflict potential by nearly 50 percent.

» Highest Ranked Alternative: Add flashing beacons

» Estimated Cost: $12,500

Table 71: Main Street and 4th Avenue NW Intersection Improvements Alternatives Rankings

Alternative	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
Add Flashing Pedestrian Beacon				
Do Nothing				

MAIN STREET AND 1ST AVENUE NW

Maintaining the existing signal with improved detection capability and interconnectivity with adjacent signals received the highest Overall Score, receiving much higher public support than removing the signal. Maintaining the signal is expected to operate at LOS "A" through 2040, however the signal is not expected to be warranted through 2040.

Compared to maintaining the signal, removing the unwarranted signal and adding flashing beacons has similar Technical and Steering Committee Support Scores, and is expected to operate with minor approach LOS "B" through 2040.

An alternative that would remove the signal with no other improvements was discarded due to concerns about a lack of pedestrian amenities.

» Highest Ranked Alternative: Maintain Signal and Add Detection/Interconnect

» Estimated Cost: Estimated Cost: $200,00 (assumes new signal constructed)

Table 72: Main Street and 1st Avenue NW Intersection Improvements Alternatives Rankings

Alternative*	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
Maintain Signal and Add Detection/Interconnect				
Remove Traffic Signal: Add Flashing Pedestrian Beacon				

Figure 209: Example of Rectangular Rapid Flashing Beacon

EAST MAIN STREET ALTERNATIVES: 2ND AVENUE NE TO 13TH AVENUE NE

CROSS-SECTION ALTERNATIVES RANKINGS

A five-lane section with wider sidewalks and access management improvements was the highest ranking alternative, receiving the highest Technical and Steering Committee Scores.

A four-lane section with wider sidewalks but no median was discarded by the Steering Committee due to safety concerns associated with an absence of turn lanes.

- Highest Ranked Alternative: 5-Lane Section with Wider Sidewalks
- Estimated Cost: $500,000

Table 73: East Main Street Cross-Section Alternatives Rankings

Alternative*	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
5-Lane Section with Wider Sidewalks and Access Management				
Do Nothing				
4-Lane Section With Median and Access Management				

*4-Lane Section With Wider Sidewalks (No Median) alternative was discarded

Figure 210: Rendering of East Main Street 5-Lane Section with Wider Sidewalks

INTERSECTION ALTERNATIVES RANKINGS

MAIN STREET AND 6TH AVENUE NE

A phased improvement plan for this intersection received the highest Overall Score, receiving the highest Steering Committee and Public Support Scores. The phased improvement plan would first replace all left-turn signal heads with flashing yellow arrow signal heads to support protected-permitted left-turn phasing on all approaches. A mid-term improvement would reconfigure lane assignments with the existing intersection footprint, with the ultimate build configuration fully reconstructing the intersection. Since the phased improvement plan involves incremental improvements, no Technical Score was developed for this intersection.

- Highest Ranked Alternative: Phased Improvement Plan
- Estimated Cost: $6,000 (only short-term improvements – signal head replacement)

Table 74: Main Street and 6th Avenue NE Intersection Improvements Alternatives Rankings

Alternative	Steering Committee Support Score	Public Support Score	Overall Score
Phased Improvement Plan			
Do Nothing			

WEST 1ST STREET ALTERNATIVES: 6TH AVENUE NW TO 2ND AVENUE NE

CROSS-SECTION ALTERNATIVES RANKINGS

Shared lanes with reverse angle parking received the highest Overall Score, being the highest ranked alternative by the Steering Committee, however support was not as high with the community who preferred maintaining the existing cross-section.

Prior to sharing alternatives analysis results with the community, shared lanes with front angle parking was discarded due to safety concerns between parking maneuvers and cyclists.

- Highest Ranked Alternative: Shared Lanes and Reverse Angle Parking
- Estimated Cost: $340,000

Table 75: West 1st Street Cross-Section Alternatives Rankings

Alternative*	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
Shared Lanes and Reverse Angle Parking				
Cycle Track				
Do Nothing				

*Shared Lanes with Front Angle Parking alternative was discarded

TRAFFIC CONTROL ALTERNATIVES RANKINGS

Conversion to a West 1st Street roundabout corridor received the highest Overall Score due to the highest Technical Score and the highest Steering Committee Support Score. A roundabout corridor however did not have broad public support. This would construct mini-roundabouts at 6th Avenue West, 4th Avenue West, and 2nd Avenue West. A standard single lane roundabout would be constructed at Collins Avenue.

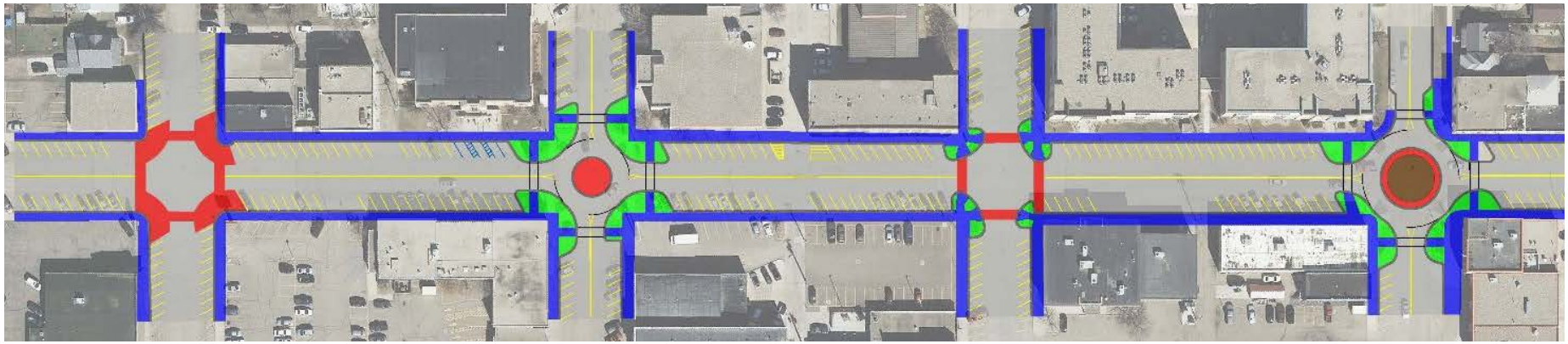
- Highest Ranked Alternative: Roundabout Corridor
- Estimated Cost: $650,000

Table 76: West 1st Street Traffic Control Alternatives Rankings

Alternative	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
Roundabout Corridor				
Traffic Signals, TWSC and In-Roadway Signs				
Do Nothing				

Figure 211: Rendering of West 1st Street Shared Lanes and Reverse Angle Parking

Figure 212: West 1st Street Roundabout Corridor Concept



EAST 1ST STREET ALTERNATIVES: 2ND AVENUE NE TO 13TH AVENUE NE

CROSS-SECTION ALTERNATIVES RANKINGS

Maintaining the existing cross-section configuration received the highest Overall Score, being the preferred option by both the steering committee and the community.

This result is important because past plans, including the current LRTP and Pedestrian and Bicycle Plan have identified 1st Street as the preferred bicycle connection through the Downtown Subarea. The preference to not make any improvements on this segment of 1st Street increases the need for bicycle facilities on Main Street or another parallel route to connect the city's bicycle facilities.

» Highest Ranked Alternative: Do Nothing

Table 77: East 1st Street Cross-Section Alternatives

Alternative	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
Do Nothing				
Through Corridor				
Quiet Corridor				

INTERSECTION ALTERNATIVES RANKINGS

1ST STREET AND 6TH AVENUE NE INTERSECTION

Maintaining existing northbound/southbound two-way stop control received the highest Overall Score, primarily based on strong support from both the Steering Committee and the community.

Note that converting the existing pedestrian beacon to a flashing beacon was considered, but not solicited for input from the public since overall impacts will be minor. The 2017 Bismarck-Mandan School Safety Crossing Study identified this location as a potential site for a pedestrian hybrid beacon.

» Highest Ranked Alternative: Do Nothing - Maintain Existing Northbound/ Southbound Two-Way Stop Control

Table 78: 1st Street and 6th Avenue NE Intersection Improvements Alternatives Rankings

Alternative	Cost Weighted Technical Score	Steering Committee Support Score	Public Support Score	Overall Score
NB/SB Two-Way Stop Control				
Roundabout				

*Conversion of existing pedestrian beacon to rectangular rapid flashing beacon (RRFB) was discarded

Figure 213: Existing East 1st Street Cross-Section

SIDE STREET IMPROVEMENT ALTERNATIVES

Steering Committee members and the community were asked to indicate which types of side street improvements they supported. Respondents could select all improvement-types they supported.

The Steering Committee fully supported the addition of bike corrals and developing the alleyway between Main Street and 1st Street as a pedestrian resource. The Steering Committee was also generally in favor of parklets and the closure of a side street to support downtown redevelopment. Of the side street closure options, community supports was highest for the closure of 2nd Avenue NW compared to other options.

Table 79: Steering Committee and Public Support for Side Street Improvement Alternatives

Alternatives	Steering Committee Support	Public Support
Bike Corrals	100%	33%
Alleyway Pedestrian Concepts	100%	38%
Parklets	88%	29%
Close 2nd Avenue NW for Development	86%	42%
Close 2nd Avenue NE for Development	83%	12%
Close 4th Avenue NW for Development	71%	31%

SUBAREA-WIDE IMPROVEMENTS

The Steering Committee was asked to select subarea-wide improvement concepts they are in support of. Since many of these concepts are policy-based or intended to be considered as part of overall downtown improvement strategies beyond this subarea study, most were not presented to the public. Public input related to these concepts can be gathered as such policies or concepts are considered for implementation.

Subarea improvement options were categorized as:

- Sidewalk improvement strategies
- Parking policies
- Multimodal improvements
- Intelligent transportation systems (ITS) improvements

SIDEWALK IMPROVEMENT STRATEGIES

For sidewalk improvement strategies, the Steering Committee fully supported the completion of an ADA Transition Plan, and had high support for a sidewalk capital improvement plan. These plans will ensure a continuous evaluation of deficiencies and will develop plans to mitigate these deficiencies.

Table 80: Steering Committee Support for Sidewalk Improvement Alternatives

Alternative	Steering Committee Support
ADA Transition Plan	100%
Sidewalk Capital Improvement Plan	89%

PARKING POLICIES

The most supported parking policies were shared parking between adjacent properties and the implementation of landscaping to buffer parking lots from pedestrian space. There was also support for policies to place parking lots in locations that increase walkability, such as having parking lots adjacent to alleyways rather than Main Street or 1st Street. Some support was expressed for a parking structure, however analysis in the Transportation Alternatives report indicates that most blocks will have available parking supply though 2040 under expected development scenarios.

Table 81: Steering Committee Support for Parking Policy Alternatives

Alternative	Steering Committee Support
Shared Parking Between Properties	89%
Landscaping	78%
Parking Placement to Benefit Multimodal Users	67%
Build Parking Structure	56%
Parking Improvement Districts	44%
Time Restrictions	44%
Fee-In-Lieu or Impact Fees	33%
No City-Mandated Parking Requirements	33%
Parking Maximums	33%

MULTIMODAL IMPROVEMENTS

The Steering Committee mostly supports both improved regional bicycle connections and improve transit access for the downtown area.

Table 82: Steering Committee Support for Multimodal Alternatives

Alternative	Steering Committee Support
Improved Regional Bike Connections	89%
Better Transit Access	78%

INTELLIGENT TRANSPORTATION SYSTEMS (ITS) IMPROVEMENTS

Signal interconnect on Main Street was the most supported ITS improvement, and signal interconnect on Main Street is currently programmed for 2018 construction.

Table 83: Steering Committee Support for Intelligent Transportation Systems Alternatives

Alternative	Steering Committee Support
Signal Interconnect	89%
Dynamic Speed Display Signs	56%
Dynamic Message Signs	44%
Pan-Tilt-Zoom Cameras	22%
Smart Parking Tools	22%

SUMMARY OF HIGHEST RANKING ALTERNATIVES

A graphic summary of the highest ranked alternatives described above can be seen in Figure 214.

PRIORITIZATION OF IMPROVEMENTS

To minimize project costs, cross-section and intersection improvements can be completed as part of a single project to avoid duplicative contractor mobilization costs and construction impacts. Isolating intersection improvements can also create incompatibilities with a future cross section, requiring duplicative construction efforts. An example of such an incompatibility is new signal standards or pushbuttons needing to be relocated to be in proper locations once a new cross-section is built.

To assist in prioritizing which segments should be targeted for improvements first, the amount of benefit estimated for all improvements on each segment was calculated. This was done by averaging the technical scores for all improvements on each segment (cross-section and intersection improvements) and comparing this to the average technical score for making no improvements. The percent difference between the average technical score for the improvements and the average technical score for the no build scenario was calculated. A higher percent difference between these averages indicates a higher amount of benefits associated with the improvements.

Using the methodology described above, the West Main is the segment with the greatest benefits from improvements with 1st Street being a close second. Note that do-nothing was the highest ranked alternative on East 1st Street.

It is important to remember that the technical score incorporates mobility and safety benefits as well as costs and impacts. As such, benefits below are diluted where costs are high or impacts are considerable. For example, the benefit for East Main Street seems modest on the surface, however this is due to the property impacts related to closing driveways and the costs associated with relocating the south curbline.

Figure 214: Summary of Highest Ranked Alternatives

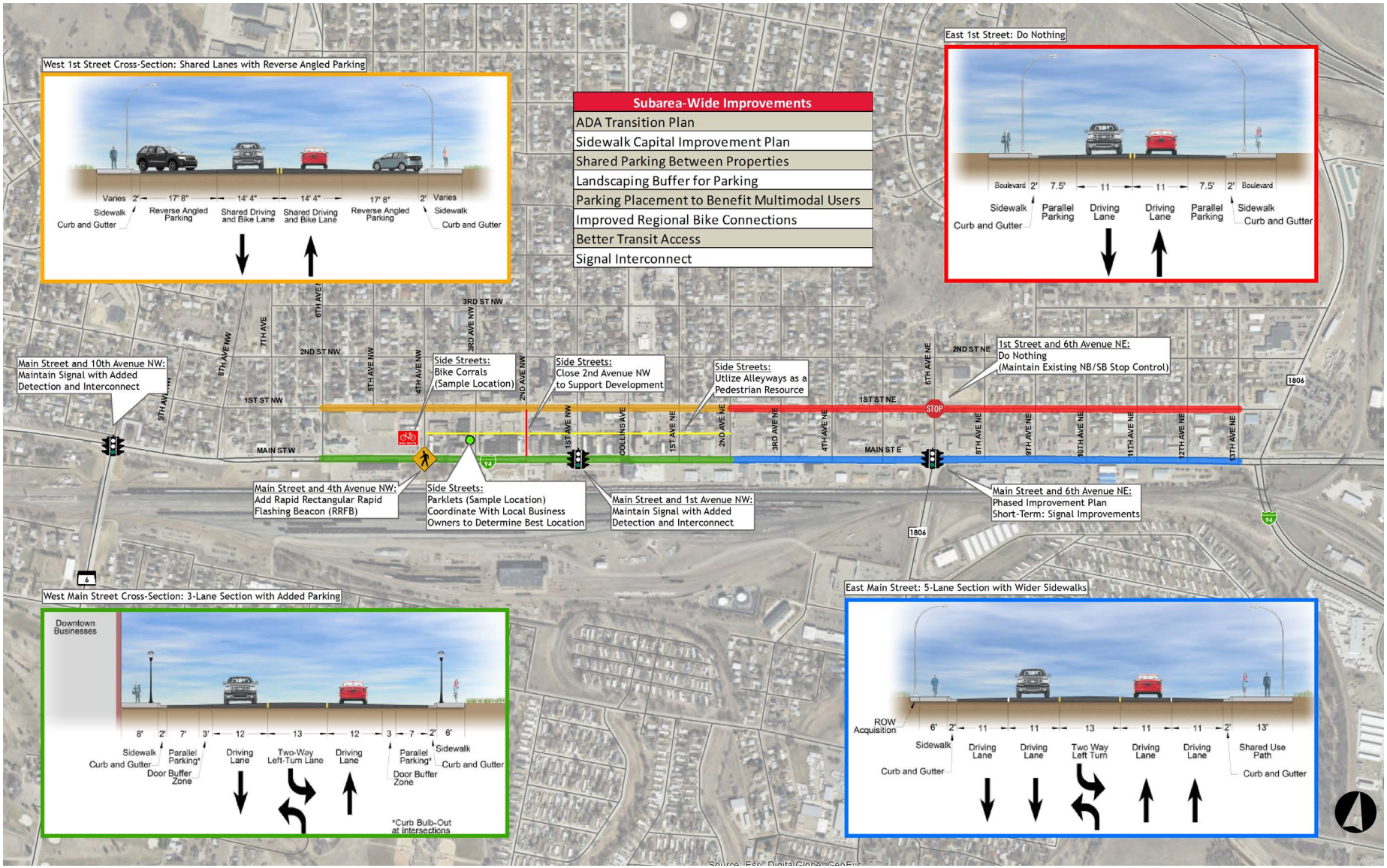


Table 84: Estimated Benefits for All Improvements (By Segment)

Segment	Location	Highest Ranked Alternative	Technical Score - By Improvement		Technical Score - Average of All Improvements		Percent Improvement	Cost for All Improvements [1]
			Highest Ranked	Do Nothing	Highest Ranked	Do Nothing		
West Main Street	Overall Cross-Section	3 Lane Section: Parking Option	4.9	3.7	4.8	3.7	30%	$820,000
	10th Ave NW Intersection	Maintain Signal and Add Detection/Interconnect	+	+				
	4th Ave NW Intersection	Add Flashing Pedestrian Beacon	4.7	3.7				
	1st Ave NW Intersection	Maintain Signal and Add Detection/Interconnect	+	+				
East Main Street	Ovreall Cross-Section	5-Lane Section with Wider Sidewalks	5.4	5	5.4	5	8%	$506,000
	6th Ave NE Intersection	Phased Improvement Plan	+	+				
West 1st Street	Ovreall Cross-Section	Shared Lanes and Reverse Angle Parking	5.6	4.8	5.5	4.35	26%	$730,000
	Corridor Traffic Control	Roundabout Corridor	5.4	3.9				
East 1st Street	Overall Cross-Section	Do Nothing	+	+	+	+	+	+

+No basis for comparison for do-nothing alternatives. Maintaining signals and adding detection/interconnect is assumed to be the same as a do-nothing condition at applicable locations.

1 – Assumes a new signal will be constructed (included in cost estimate - assumed $200,000 per signal)

AESTHETICS PLAN

Aesthetic improvements bring life to functional transportation and public space improvements. Aesthetic improvements accomplish several goals:

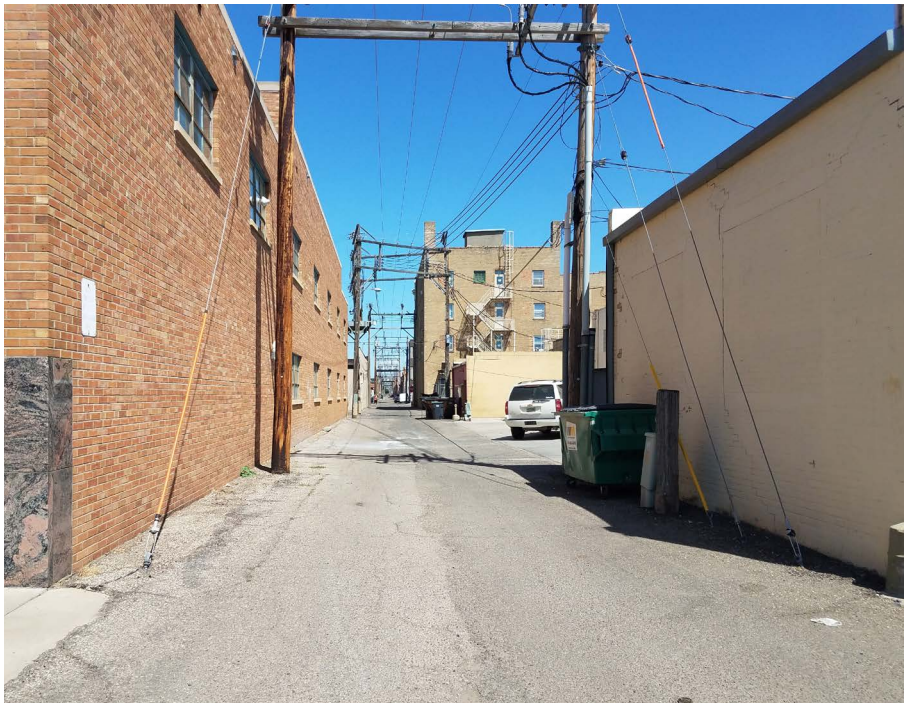
- Create a positive first impression of downtown
- Serve functional purposes in conjunction with visual appeal
- Can attract and stimulate private property owner investment

Minor and relatively inexpensive enhancements are easy to imagine and can significantly add life to downtown. Features such as benches, trash receptacles, light fixtures, planting boxes, and community graphics should be designed under the same theme to maintain a consistent character downtown.

ALLEYWAY AESTHETICS

Aesthetic improvements can be applied to alleyways to create an appealing alternative pedestrian route, but still function as a vehicle route for service and delivery vehicles. Features could be incorporated in addition to the safety enhancements described in the Transportation Alternative chapter.

Figure 215: Existing Mandan Alleyway



POTENTIAL ALLEYWAY THEME: MANDAN RODEO DAYS

Figure 215 and Figure 216 show a potential "Mandan Rodeo" theme. However, any themes that showcase the history, culture, traditions, or characteristics of downtown are possible, and each block could have a different theme.

Potential features to improve alleyway aesthetics include:

- Window planters – Break up blank walls of adjacent buildings
- Lighting element – Adds visibility to invite pedestrians at all times of the day
- Dumpster/mechanical screening – Shields and provides an aesthetic element for items located in the alley. The design mimics the rodeo gate at the old rodeo grounds in Mandan.
- Building murals – Break up blank walls and offers opportunities to showcase Mandan's history. The murals show a sequential history of the Rodeo through the years.
- Brick pavers – Define the alleyway as a special place for activity, different from parking lots and streets. The variation in brick style and color can represent paths and natural materials found near Mandan.
- Painted utility poles – Improve the appearance of the worn wood poles for a consistent image throughout the alley.

Mandan's rich history provides opportunities for other themes to derive design inspiration. Opportunities include:

- Native American heritage and origins in Mandan
- Historic buildings of Mandan's past
- Geographic features such as the prairie or Missouri River

Figure 216: Example Rendering of Mandan Alleyway with Rodeo Theme

1. Window planters – Break up blank walls of adjacent buildings
2. Lighting element – Adds visibility to invite pedestrians at all times of the day
3. Dumpster/mechanical screening – Shields and provides an aesthetic element for items located in the alley. The design mimics the rodeo gate at the old rodeo grounds in Mandan.
4. Building murals – Break up blank walls and offers opportunities to showcase Mandan's history. The murals show a sequential history of the Rodeo through the years.
5. Brick pavers – Define the alleyway as a special place for activity, different from parking lots and streets. The variation in brick style and color can represent paths and natural materials found near Mandan.
6. Painted utility poles – Improve the appearance of the worn wood poles for a consistent image throughout the alley.

The following graphics show real-life examples of aesthetic improvements that can be used in alleyways:

Figure 217: Paver Delineation

Location: Detroit, MI

Figure 218: Hanging Planters

Location: Seattle, WA

Figure 219: Building Mural

Location: Belle Plaine, IA

STREETSCAPE AESTHETICS

Figure 220 shows how aesthetic improvements can be applied to streetscapes in downtown. This example shows a depiction of aesthetic improvements along Main Street along with the recommended transportation improvements described in the Transportation Alternative chapter. Improvements should include functional and aesthetic elements. Furniture elements should all have a common design theme. These include:

- Updated street furniture – seating areas with trash bins should be well-defined, in good condition, and not interfere with pedestrian walkways
- New bicycle racks – Bicyclists expect a secure place to park. Racks need to be provided, especially with enhancements for alternative transportation within and to downtown.
- Bump-outs/Curb Extensions – Curb extensions shorten the crossing distance for pedestrians, create space for additional landscaping and placement of benches, give more protection for street lights, and allow installation of stop signs closer to the drive lane.
- Landscaping – Similar to parking lot applications, landscaping provides color and shade to downtown while reducing impervious surfaces. Opportunities include planter beds, street trees, and hanging flower baskets. A landscaping maintenance plan is essential for upkeep and appeal.
- Updated light fixtures - The character and type of illumination of light fixtures along the street should complement downtown streetscape elements. Banners attached to light fixtures can indicate arrival to the downtown district.
- Enhanced crosswalks – Crosswalks offer an opportunity for aesthetic appeal while alerting motorists of potential pedestrian activity. Color pavements or brick pavers can be emulated from other areas of downtown Mandan.

The following graphics show real-life examples of improvements that can be used in to improve streetscape aesthetics.

Figure 220: Example Streetscape Enhancements on Main Street at 3rd Avenue NW

Figure 221: Planter and Street Tree Protection

Location: Unknown

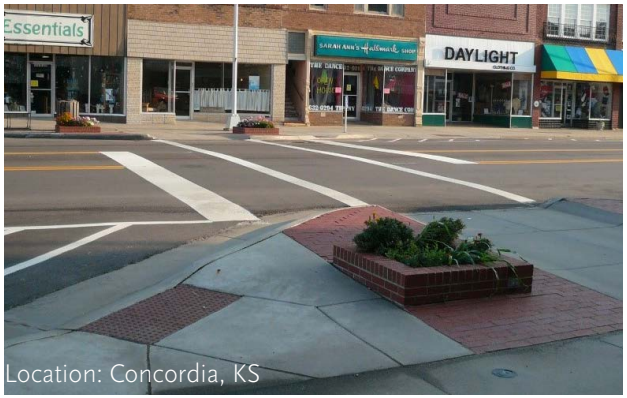
Figure 222: Portable Planter Boxes

Location: Crested Butte, CO

Figure 223: Decorative Light Fixture

Location: Rapid City, SD

Figure 224: Curb Extension and Planter Box



Location: Concordia, KS

Figure 225: Benches and Trash Receptacles

Location: Omaha, NE

Figure 226: Benches and Trash Receptacles

Location: Rapid City, SD

Figure 227: Bike Racks and Trash Receptacles

Location: Boulder, CO

IMPLEMENTATION STRATEGIES

This section discusses strategies that can be used to transition from planning to project development and implementation.

STATEWIDE FUNDING OPPORTUNITIES

There is continued uncertainty with future Federal funding in North Dakota. One of the programs subject to change is the Urban Roads Program. As discussed in more detail below, a new Urban Grant Program opens new funding opportunities within downtown Mandan. However, the Urban Grant Program will tentatively draw its program revenue from other existing programs at NDDOT.

URBAN GRANT PROGRAM (TENTATIVE)

INTRODUCTION

The Main Street Initiative is built on three pillars: a skilled workforce; smart, efficient infrastructure; and healthy, vibrant communities. The Urban Grant Program is designed to help communities undertake transportation projects that will meet this vision. The Urban Grant Program is a new NDDOT program to focus on reinvesting and fortifying a community's existing transportation assets to maximize the public return on investment. The stated objectives of the program are to:

- Preserve existing transportation assets
- Ensure safety of all users of the transportation system
- Maximize the return on investment from public funds
- Improve multi-modal transportation options such as walking, bicycling, and public transportation
- Enhance the economic vitality of the area by providing transportation assets that support revitalization efforts, development of vacant or underutilized parcels within existing urban areas, and/or redevelopment of established portions of communities
- Support economically sustainable growth, lessening the need for outward expansion of community transportation infrastructure and associated services

This program is limited to communities with 5,000 population or greater. NDDOT has not set an annual allocation for the program. It will likely be around $3 to $8 million, and will be administered through competitive grants. Because the funds allocated to this program are Federal funds, there will be a match required, typically 20 percent of the total project costs. To be eligible, the project development process must be completed, with construction funds authorized, in the federal fiscal year the grant award is given.

The grant application process is premised on four primary questions:

- What is the community need for the project? Explain why the project is needed and what the community has done to help support the project.
- Community impact of the project - How will it offer significant long-term value to the community, specifically in addressing the program's objectives?
- Consistency with an associated plan - The community must provide a linkage between the proposed project and a publicly adopted plan and/or public involvement process.
- Project support of central business district - Projects which directly support the central business district of a community will be given preference.

HOW MANDAN MEETS THE CRITERIA

Part of the downtown subarea is within the Urban Grant program boundaries, specifically Main Street from 10th Avenue NW to 2nd Avenue NE, and 1st Street from 8th Avenue NW to 2nd Avenue NE, and 2nd Street from 6th Avenue NW to 2nd Avenue NE. The West Main Street alternatives have the greatest benefits and most closely align with the goals in the Main Street Initiative and the Urban Grants Program. As such, West Main Street should be the first segment that pursues Urban Grant program funds. Many of the alternatives will improve the multimodal facilities in downtown Mandan and will also connect to existing multimodal infrastructure. The improved facilities will promote pedestrian activity, the safe and efficient crossing of Main Street, and with some alternatives, bicycle activity. The improved multimodal mobility will help support existing businesses and the new Railyard Development currently being proposed on Main Street.

The aesthetic element of roadway improvements is a strong component of creating a resilient and inviting downtown. More detailed aesthetics planning will be necessary beyond what was included in the scope of this project. This may include brackets, some planter styles, street furniture, aesthetic lighting, etc.

Once West Main Street is constructed, the City of Mandan can shift grant focus to the West 1st Street segment. The alternatives in this segment also closely align with the goals of the Urban Grants program. However, it is not recommended to pursue multiple grants at one time. This will result in competing projects within the city and dilute the overall value per dollar of the requested project.

URBAN AND REGIONAL ROADS FUNDING

INTRODUCTION

There are a variety of other Federal and State funding sources that all or part of downtown Mandan improvements may be eligible for.

- Regional Roads Program. This program provides support for maintaining the condition and performance of the National Highway System, which includes Main Street, ND 1806, and ND 6. Projects must be on an eligible facility and support national goals for improving infrastructure condition, safety, mobility, or freight movement and be consistent with Metropolitan and Statewide planning requirements. This fund is expected to provide around $2.3 million for the Bismarck-Mandan metropolitan area annually, based on the 2017-2020 Transportation Improvement Plan (TIP). These programs are competitively programmed through the long range transportation plan and the TIP.
- Urban Roads Program. This program provides block funding to states to administer as necessary; all functionally classified roads in downtown Mandan (see Figure 228).

HOW MANDAN MEETS THE CRITERIA

Utilizing Mandan's Urban Program funds or NDDOT Regional funds on this project would likely be the best approach for implementing the prioritized projects on East Main Street.

With acceptable pavement conditions, no project was identified or cost constrained for East Main Street in the 2040 Long Range Transportation Plan. This plan will be valuable to help establish a prioritized list of projects for the City of Mandan to be input into the next Long Range Transportation Plan, expected to be adopted in the next few years.

LOCAL FUNDING OPPORTUNITIES

SPECIAL ASSESSMENTS, SALES TAX, OR CITY GENERAL FUNDS

Special assessments or the use of city general funds may be best used on low-cost or phased implementation projects. These funding sources are also critical when paying for cost shares for federal projects. Often times, Grants success rates are increased by adding additional local cost shares above the minimum 20 percent.

Examples of small-scale spot improvements that should be considered using local funds include:

- Intersection improvements that are completed in isolation (i.e. if improvements are completed at Collins Avenue and 1st Street in isolation as opposed to corridor-wide).
- Improvements off the functionally classified system like alleyway improvements or sidestreet improvements. Similarly, improvements on collector roadways can use similar funding strategies since funding availability results in few collectors receiving federal funding. The functional class system is shown in Figure 228.
- Aesthetic Improvements that cannot be incorporated as part of a larger project (i.e. seasonal aesthetic changes along Main Street that could not be incorporated in the larger Main Street project).

Another opportunity to fund these types of projects using local funds is the development of a Business Improvement District (BID). A BID is a taxing district that assesses a tax to any non-single-family property for the purposes of implementing improvements to support business development or promotion. This may include aesthetic improvements like banners, lighting, planters, street furniture, etc. or elevated service provision like increased frequency of street cleaning, downtown ambassadors, etc.

Finally, the City of Mandan expects to collect around $2.3 million in sales tax in 2017, and expects that to remain steady through 2018. These funds are typically allocated to property tax reduction, economic development, and street, water, and sewer improvements.

DEVELOPER FUNDED

Figure 228: Functional Class

Many of the subarea and spot improvements included in this study are visionary (i.e. alleyway improvements, roadway closures to support development, etc.). They are not necessary for a safe and connected downtown, but would enhance the prioritized improvements and the downtown environment. These visionary projects should be implemented when the opportunity arises, most likely through redevelopment or roadway projects. For the roadway closures (4th Avenue NW, 2nd Avenue NW, 2nd Avenue NE), the feasibility and evaluation will need to occur as development interest in the surrounding parcels occur.

For other items, like parklets, the city should provide design guidelines and an application process and fee for property owners to install parklets. This allows the city oversight of the program while allowing private interests to determine the extent they want to participate.

CHANGES TO CITY PROGRAMS AND POLICIES

Many of the subarea-wide improvement plans require additional effort from the city to implement:

- Sidewalk Capital Improvement Plan. The City of Mandan will need to develop methods to evaluate and prioritize sidewalk improvements in downtown and likely city-wide. Once these methods are developed, project funding and phasing will need to be identified. Projects could be paid for through assessments, general funds, business improvement districts, or developer impact fees/exactions.
- ADA Transition Plan. An ADA Transition Plan will identify any deficiencies city-wide to help the city transition towards compliant facilities. The City could use their planning dollars through the Metropolitan Planning Organization to complete the plan, but it must be limited to public right-of-way and public facilities.
- Parking Policy Changes. Writing specific ordinances is beyond the scope of this study. The City should evaluate the different parking policies presented in this study and consider how and where they may be necessary in downtown.

NEXT STEPS

Stakeholder input gathered throughout this study indicates that many of the identified improvement options are polarizing. The following key decisions are pivotal toward determining direction for the next steps of the project;

Identify a Plan on West Main Street

There are many decisions to be made on this corridor. However, the most pressing of all decisions is related to the cross-section on West Main Street. This segment was identified as the most critical in terms of need, it already has an NDDOT project associated with it and has the greatest potential for Urban Grant Funds. This decision however may be the most challenging. Despite the technical scoring showing clear benefits, the public survey showed a split between those wanting to alter West Main to support downtown business and pedestrian conditions versus those that did not want to endure the extra cost or did not want to reduce their speeds on Main Street. This decision ultimately comes down to whether Main Street is intended to serve downtown activities or serve as a regional high-speed arterial. If the roadway is reconfigured to 3 lanes, further discussion is necessary regarding where 3 lanes should begin/end; either at Collins Avenue or 2nd Avenue NE.

Regional Bicycle Corridor

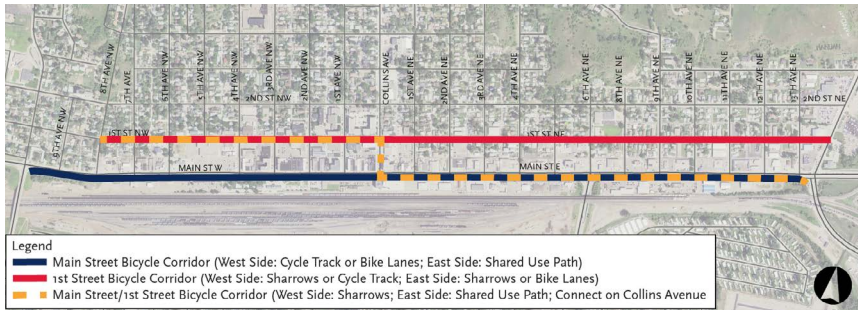
Surrounding the core of Mandan are multi-use trails: the Old Red Trail, the Missouri River Nature Trail, Sunset Park Trail, etc. Past plans, including the current LRTP and Pedestrian and Bicycle Plan, have identified 1st Street as the preferred bicycle connection through the Downtown Subarea. However, neither report evaluated in detail the cross-section width of 1st Street that would result in parking impacts nor was it clear at the time they were completed that a shared use path would be planned for East Main Street and West Main Street may be reconfigured. The preference to not make any improvements on East 1st Street increases the need for

Figure 229: Existing and Planned Bicycle Network

bicycle facilities on Main Street or another parallel route to connect the city's bicycle facilities. This study evaluated bike corridors on both 1st Street and Main Street, but no one solution arose through the study process. There are multiple solutions, all with advantages and disadvantages, which are discussed below.

- 1st Street Bicycle Corridor. On the west side of 1st Street, the prioritized alternative included shared bicycle/vehicular lanes; on the east side, the second highest ranked alternative included shared bicycle/vehicular lanes and the third highest ranked alternative included bike lanes.
- Main Street Bicycle Corridor. On the west side of Main Street, the second highest scoring alternative included the two-way cycle track on the south side; on the east side, the prioritized alternative included a shared use path on the south side.
- Main Street/1st Street Bicycle Corridor. Bicycle facilities were incorporated into the prioritized West 1st Street improvements and the East Main Street improvements. As currently prioritized, bicyclists could travel East-West if facilities were provided on a controlled sidestreet such as Collins Avenue or 1st Avenue NW.
- Phased implementation. The West Main Street improvement is the highest priority in the entire subarea. As this project is implemented and new development occurs, the demand and acceptance of bicycle facilities may well evolve. A phased implementation could follow this strategy:
  - Implement the West Main Street improvement with temporary bulb-outs on the south side of West Main. Reassess bicycle demand and parking utilization on the south side of Main Street after the Railyard development is complete.

Figure 230: Bicycle Corridor Alternatives



  - Determine priorities on West Main Street. At this point, the city can make permanent the bulb-outs and parking on the south side and shift the bicycle corridor to 1st Street, or they can transition to a two-way bicycle facility on the south side of Main Street.

There is no obvious solution for the bicycle corridor designation. Each segment comes with its own unique challenges for implementation and acceptance and impacts on other elements of the downtown transportation network. The Steering Committee had no unanimous support for any bike strategy, with 40 percent supporting a Main Street approach, 40 percent for a 1st Street approach, and 20 percent for a phased approach. Ultimately decision makers will need to select an approach, otherwise, downtown, normally the most active bicycle center in a city, will be a primary barrier to regional bike travel. Barriers to downtown bicycle travel may discourage the bicycling community from visiting downtown businesses, attending events, or considering living or working downtown. Including bicycle facilities may also improve the likelihood to receive Urban Grant Program funds.

Table 85: Advantages and Disadvantages of Bicycle Corridors

Solutions	Advantages	Disadvantages
1st Street Bicycle Corridor	» Consistent with other regional plans, including the LRTP and Bicycle and Pedestrian Plan » Lower traffic volumes and speeds than Main Street	» Shared or unprotected bike lanes are unlikely to attract novice riders that may frequent downtown events, but would support bike movements by more skilled and confident riders. » Require parking removal on East 1st Street would be impactful to homeowners
Main Street Bicycle Corridor	» Connect the most popular origins and destinations (Bismarck, downtown), with the most aesthetically interesting path (parks, front facing buildings, etc.) » Provides dedicated and separated bicycle facilities that would be attractive to all types from novice to advanced	» Main Street has more traffic than 1st Street » Bike facilities on West Main Street would come at the expense of a lane of parking. While the parking analysis for this project does not anticipate the parking lane to be widely used, several nearby businesses have been in support of the parking lane.
Main Street/1st Street Bicycle Corridor	» Allows for highest scoring alternatives from this report to be implemented	» Discontinuity of facilities is unlikely to be attractive to most types of bicyclists. Families are unlikely to want to use the shared lanes on 1st Street, while experienced cyclists are unlikely to use the shared use path on Main Street.
Phased Improvement Plan	» Allows for flexibility in planning where and how to support bike facilities still using the alternatives developed for this study	» The identified bicycle corridor will not be clear until Main Street has been reconfigured and analyzed

INTERIM, DEMONSTRATIVE OR PHASED IMPROVEMENT STRATEGIES

The transformative and controversial nature of the improvements proposed along this corridor will likely need to be introduced as demonstration projects. Demonstration projects will require the use of local funds, but will allow the city to gauge support for and educate the public on the different alternatives like reverse-angled parking and mini-roundabouts. If the alternatives are well received or improve traffic flow and safety, the city could opt to again use special assessments and general funds to make permanent improvements or apply for funds through the NDDOT Urban program.

For these interim solutions or phased improvements to be successful, an effective public involvement campaign and evaluation must be completed. It is recommended that the City properly allocate funding to not only implement the temporary solutions but also plan for public involvement and before and after studies to be completed.

Early in 2018, NDDOT will be seeking demonstration communities for "popup" projects to provide temporary bike lanes and other street improvements to improve bicycle, walking and active community principles. Mandan should consider asking for opportunity to participate in this program to showcase potential improvements on a temporary basis. Based on public feedback, and improvement technical needs, the following interim or demonstrative projects should be considered;

» Temporary Roadway Reconfiguration on Main Street. This has been successful completed using paint, cones, hay bails, and other strategies to temporarily reduce lanes for evaluation purposes.

Figure 231: Temporary Roadway Reconfiguration

» Trial Roundabouts. There are rubber mini-roundabouts available for purchase for trial roundabout deployment. Other communities have used hay bales, plastic barriers and painting to test roundabouts. It would be recommended to test this at a location that clearly does not need the AWSC such as 4th Avenue NW and 1st Street.

Figure 232: Temporary Rubber Roundabout

» Pilot Implementation of Reverse Angled Parking. Reverse angled parking can be first tested on a few blocks of 1st Street before larger-scale implementation. The ideal location for testing this configuration is between 1st Avenue NW and 3rd Avenue NW where parking is most active and buildings are closest to on-street parking, providing loading and unloading benefits that are associated with reverse angled parking. This also shows the community that City believes so strongly in the improvement that they would be the first group to test it at their office.

» Alleyway Improvements. Alleyway improvements will require a combination of City and private development to be successful. If the buildings do not conform and support a revitalized alleyway, they will not be successful. One opportunity to spur excitement for an active alleyway system is to incorporate this into the Railyard development. This could then permeate to the east as additional blocks become interested in capitalizing on this opportunity.

FUNDING

The Bismarck-Mandan MPO TIP and the North Dakota STIP have not incorporated new projects for 2018 through 2021. However, once solicitation begins for new projects, especially the Urban Grant program, the City of Mandan will need to understand the priority and opportunity for projects already identified within the community and those within this study.

For many projects, funding them exclusively through local funds will not be feasible. Mandan should request the Bismarck-Mandan MPO add key elements of this study to their cost-constrained element of the Envision 2040 LRTP. This will likely require removing or replacing other projects. This will make projects eligible for future TIP/STIP cycles for consideration for Urban and Regional funds.

For projects that are more specific to downtown operations and maintenance (aesthetic elements, improvements tied to development, etc.), the City of Mandan should begin exploring local funding options to maintain a high level of services in downtown.

PROJECT DEVELOPMENT

An environmental document is the next step for any construction project identified in this study. This means the highest-ranking alternatives in this report are not the final decision.

Following guidance pursuant to 23 CFR 450 Appendix A regarding the linking of planning and the National Environmental Protection Act (NEPA) process, there are two ways in which the transportation planning process can limit the alternatives solutions to be evaluated during the NEPA process:

(1) By shaping the purpose and need for the project

(2) By evaluating and eliminating alternatives from detailed study in the NEPA process prior to its start.

Since this study did not include a purpose and need statement, the only way to eliminate alternatives is through the scoring process. Therefore, the environmental document could elect to only evaluate the top one or two ranked build alternatives identified in this study. This will prevent unnecessary time and money spent re-evaluating alternatives already studied during this process, facilitating a faster project delivery schedule, which is important for the Urban Grant program solicitation process.