Appendix A: Figures

Belgrade Avenue Corridor Study

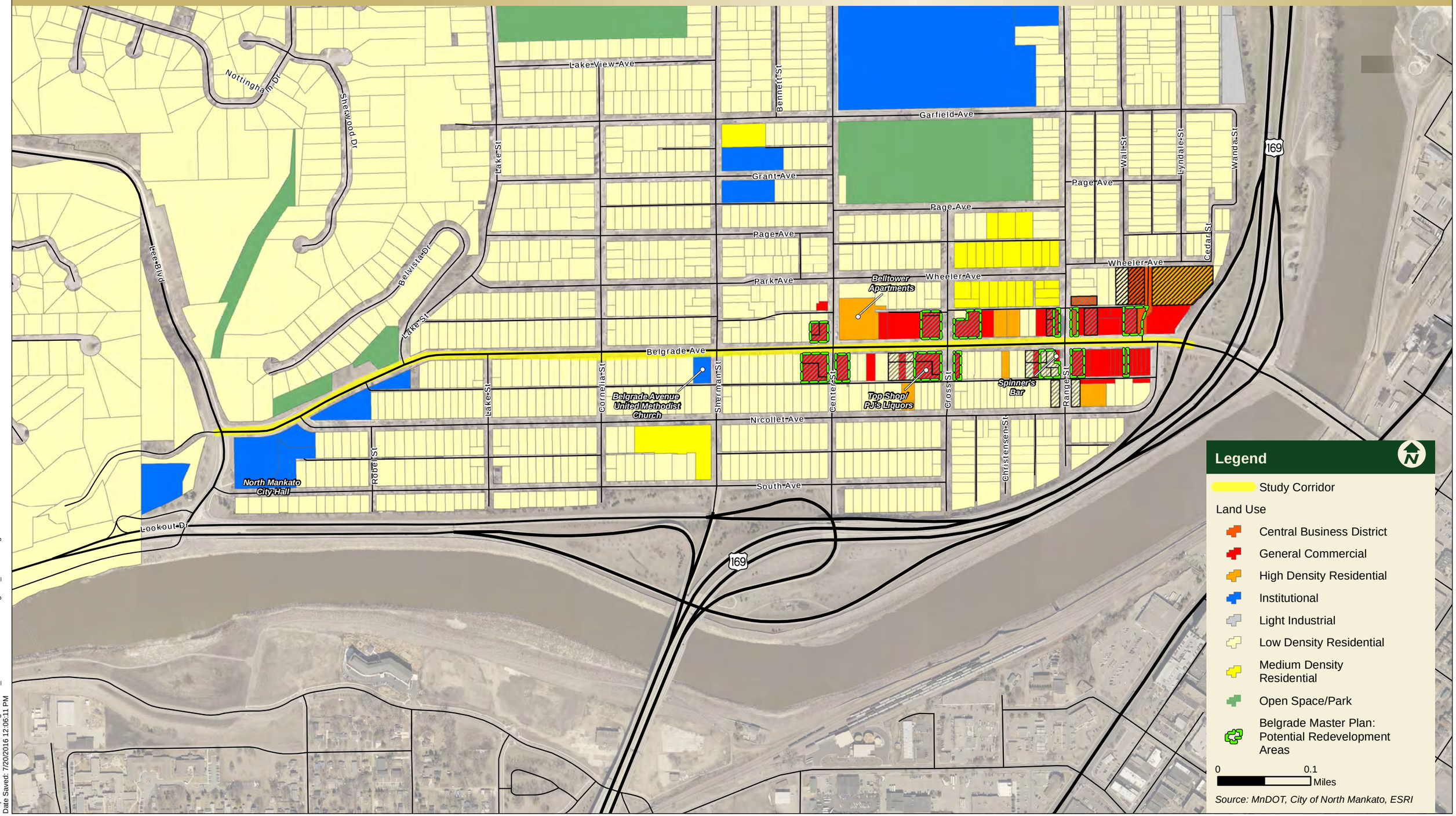
Mankato/North Mankato Area Planning Organization

Figure A.1

Existing & Future Land Use

July, 2016

BOLTON & MENK Engineers & Surveyors



Map Document: \\Arcserver1\gis\MAPO_MUIT42111862\ESRI\Belgrade_DillonPl\Belgrade - Land Use.mxd
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Belgrade Avenue Corridor Study

Mankato/North Mankato Area Planning Organization

Figure A.2

Traffic Operations

October, 2016

BOLTON & MENK Engineers & Surveyors

Lake View Ave
Bennett St
1,450
1,000
Garfield Ave
Lake St
Grant Ave
1,900
Page Ave
Page Ave
Page Ave
Wall St
Lyndale St
Wanda St
19,200
169
Lee Blvd 12,600
Bel Vista Dr
1,550
Lake St
Park Ave
Belltower Apartments
Wheeler Ave
Wheeler Ave
Cedar St
3,600
Belgrade Ave
6,300
8,700
AM/PM
21,500
21,100
Lake St
Cornelia St
Belgrade Avenue United Methodist Church
Sherman St
1,150
Nicollet Ave
1,700
Center St
Top Shop/ PJ's Liquors
Cross St
Spinner's Bar
Range St
Christensen St
AM/PM
6,200
9,200
North Mankato City Hall
Robel St
South Ave
5,900
Lookout Dr
9,200
9,200
169
32,500

Legend

- #,### — Average Annual Daily Traffic (AADT) Volumes - 2015
- Problematic Traffic Back-Ups
- Problematic Traffic Delays

Traffic Control

- All-Way Stop
- Traffic Signal

0 0.1 Miles

Source: MnDOT, City of North Mankato, ESRI

- Corridor
- Central Business District (CBD)
- AM/PM — Intersection Level of Service

Level of Service Grade

A-C, D, E, F

Map Document: \\Arcserver1\gis\MAPO_MUIT4211862\ESRIMaps\Belgrade - Traffic Operations.mxd
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Belgrade Avenue Corridor Study

Mankato/North Mankato Area Planning Organization

Figure A.3

Crash History 2010 to 2014

July, 2016

BOLTON & MENK Engineers & Surveyors

1 RAN OFF ROAD
2 PEDESTRIAN CRASHES

4 RIGHT ANGLE
1 SIDESWIPE PASSING
1 SIDESWIPE OPPOSING
1 HEAD ON

1 REAR END
3 RIGHT ANGLE
1 HEAD ON
1 PEDESTRIAN CRASH 2007
1 PEDESTRIAN CRASH

1 LEFT TURN
1SIDESWIPE PASSING
2 REAR END

4 REAR END
2 RIGHT ANGLE
1 SIDESWIPE PASSING
1 PEDESTRIAN CRASH

7 REAR END
3 RIGHT ANGLE
2 LEFT TURN
1 RAN OFF ROAD
1 SIDESWIPE PASSING

1 LEFT TURN
1 RAN OFF ROAD
4 REAR END
4 RIGHT ANGLE
3 SIDESWIPE PASSING

Lake View Ave
Garfield Ave
Grant Ave
Page Ave
Park Ave
Wheeler Ave
Belgrade Ave
Nicollet Ave
South Ave
Lookout Dr
Nottingham Dr
Sherwood Dr
Lee Blvd
Bel Vista Dr
Lake St
Bennett St
Wall St
Lyndale St
Wanda St
Cedar St
Cornelia St
Sherman St
Center St
Cross St
Christensen St
Range St
Robel St
Belltower Apartments
Belgrade Avenue United Methodist Church
Top Shop/ PJ's Liquors
Spinner's Bar
North Mankato City Hall
169

Legend

- Corridor
- Central Business District (CBD)
- Pedestrian/Bicycle Crash (2010-2014)
- Pedestrian/Bicycle Crash (Other)
- Crashes Within Normal Range
- Serious Injury Crashes Outside Normal Range
- ## Number of Vehicle Crashes

0 0.1 Miles

Source: MnDOT, City of North Mankato, ESRI

Map Document: \\Arcserver1\gis\MAPO_MUIT42111862\ESRIMaps\Belgrade - Crash History.mxd
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Belgrade Avenue Corridor Study

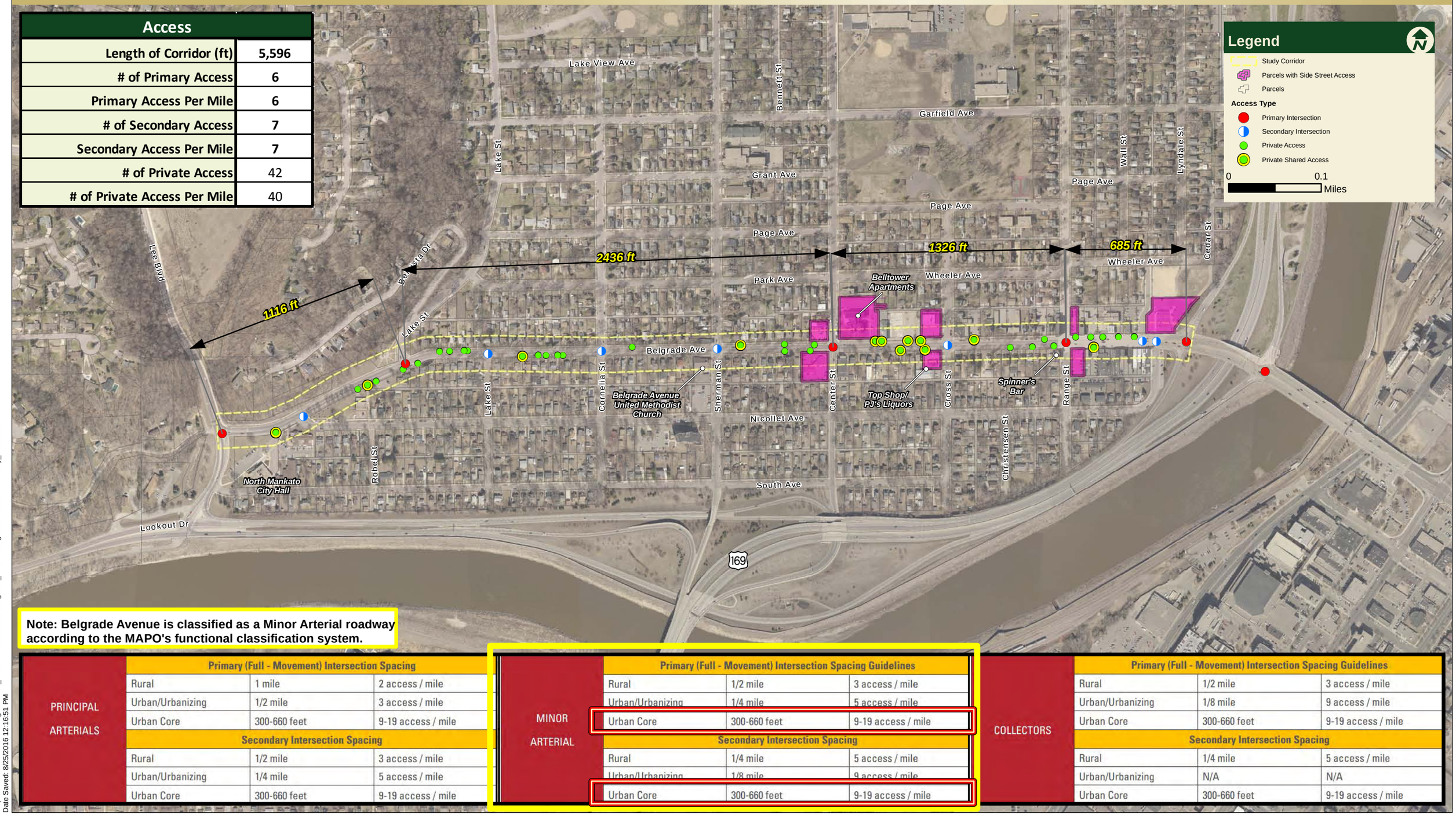
Mankato/North Mankato Area Planning Organization

Figure A.4

Access Inventory

August, 2016

Access	
Length of Corridor (ft)	5,596
# of Primary Access	6
Primary Access Per Mile	6
# of Secondary Access	7
Secondary Access Per Mile	7
# of Private Access	42
# of Private Access Per Mile	40



Note: Belgrade Avenue is classified as a Minor Arterial roadway according to the MAPO's functional classification system.

PRINCIPAL ARTERIALS			
Primary (Full - Movement) Intersection Spacing			
	Rural	1 mile	2 access / mile
	Urban/Urbanizing	1/2 mile	3 access / mile
	Urban Core	300-660 feet	9-19 access / mile
Secondary Intersection Spacing			
	Rural	1/2 mile	3 access / mile
	Urban/Urbanizing	1/4 mile	5 access / mile
	Urban Core	300-660 feet	9-19 access / mile

MINOR ARTERIAL			
Primary (Full - Movement) Intersection Spacing Guidelines			
	Rural	1/2 mile	3 access / mile
	Urban/Urbanizing	1/4 mile	5 access / mile
	Urban Core	300-660 feet	9-19 access / mile
Secondary Intersection Spacing			
	Rural	1/4 mile	5 access / mile
	Urban/Urbanizing	1/8 mile	9 access / mile
	Urban Core	300-660 feet	9-19 access / mile

COLLECTORS			
Primary (Full - Movement) Intersection Spacing Guidelines			
	Rural	1/2 mile	3 access / mile
	Urban/Urbanizing	1/8 mile	9 access / mile
	Urban Core	300-660 feet	9-19 access / mile
Secondary Intersection Spacing			
	Rural	1/4 mile	5 access / mile
	Urban/Urbanizing	N/A	N/A
	Urban Core	300-660 feet	9-19 access / mile

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Belgrade Avenue Corridor Study

Mankato/North Mankato Area Planning Organization

Figure A.5

Pedestrian & Bicycle Connections

August, 2016

BOLTON & MENK Engineers & Surveyors

Lake View Ave
Bennett St
Garfield Ave
Lake St
Grant Ave
Page Ave
Wall St
Lyndale St
Wanda St
Cedar St
Rex Macbeth River Trail
169
Lee Blvd
Belvista Dr
Park Ave
Belltower Apartments
Wheeler Ave
Belgrade Ave
Cornelia St
Sherman St
Center St
Cross St
Range St
Spinner's Bar
Top Shop/ PJ's Liquors
Belgrade Avenue United Methodist Church
Nicollet Ave
Christensen St
Robert St
North Mankato City Hall
South Ave
Lookout Dr
Minnesota River Trail
North Star Bridge Trail

Legend

- Existing Sidewalks
- Proposed Sidewalks

Trail System

- Existing On-Road Bike Route
- Existing Trails
- Proposed On-Road Bike Route
- Proposed Trail
- Corridor
- Central Business District (CBD)

0 0.1 Miles

Source: City of North Mankato, ESRI

Map Document: \\Arcserver1\gis\MAPO_MUIT42111862\ESRI\Maps\Belgrade - Ped_Bike Connections.mxd
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Belgrade Avenue Corridor Study

Mankato/North Mankato Area Planning Organization

Figure A.6

Transit Routes

October, 2016

BOLTON & MENK Engineers & Surveyors

Lee Blvd
BelVista Dr
Lake St
Grant Ave
Page Ave
Park Ave
Belgrade Ave
Belgrade Avenue United Methodist Church
Cornelia St
Sherman St
Nicollet Ave
South Ave
Center St
Belltower Apartments
Wheeler Ave
Top Shop/ PJ's Liquors
Cross St
Christensen St
Spinner's Bar
Range St
Wall St
Lyndale St
Cedar St
Wanda St
169
North Mankato City Hall
Robel St
Lookout Dr

Legend

- Bus Stations
- MTS Bus Route 4
- MTS Bus Route 5

0 0.1 Miles

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Belgrade Avenue Corridor Study

Mankato/North Mankato Area Planning Organization

Figure A.7

Parking Assessment

August, 2016

500 Block North (Corner)		
Public	Private	Priv. Shared
6	12	0

400 Block North		
Public	Private	Priv. Shared
30	40	90

300 Block North		
Public	Private	Priv. Shared
39	18	55

200 Block North		
Public	Private	Priv. Shared
73	105	0

500 Block South (Corner)		
Public	Private	Priv. Shared
3	40	0

400 Block South		
Public	Private	Priv. Shared
25	40	25

300 Block South		
Public	Private	Priv. Shared
41	0	0

200 Block South		
Public	Private	Priv. Shared
56	31	41

Parking Data											
500 Block			400 Block			300 Block			200 Block		
Public	Private	Priv. Shared	Public	Private	Priv. Shared	Public	Private	Priv. Shared	Public	Private	Priv. Shared
9	52	0	55	80	115	80	18	55	129	136	41

Legend

Parking Type

- Public
- Private
- Private - Shared
- Central Business District (CBD)

0 250 Feet

Parking Totals		
Public	Private	Priv. Shared
273	286	211

Source: MnDOT, City of North Mankato, ESRI

Belltower Apartments

Top Shop/ PJ's Liquors

Spinner's Bar

Map Document: \\Arcserver1\gis\MAPO_MULT42111862\ESRIMaps\Belgrade - Parking Assessment.mxd
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Appendix B: Open House Summaries

Belgrade Avenue Corridor Study
&
Belgrade Master Plan
Open House 1 Summary
January 26, 2017
&
January 28, 2017
5:30 to 7:30 PM
St. Paul's Evangelical Church, North Mankato

Purpose:
The purpose of the Belgrade Avenue Corridor Study Public Information Meeting was to introduce the study and to solicit input on issues, needs and opportunities along the corridor.

Attendees:
There were a combined 55 people that signed into the open house events including members of City Staff, Elected Officials, stake holders along the corridor, and the general public.

Materials Presented:
The meeting was set up in an open house format giving attendees the opportunity to view materials and visit with project staff at their leisure. A brief presentation began at 6:00 PM. The following information was available for public review and input:

Belgrade Avenue Corridor Study:
- Study Purpose
- Study Schedule
- Parking Assessment
- Traffic Operations
- Crash History
- Pedestrian/Bicycle Connections
- Typical Sections/Streetscaping

Belgrade Master Plan:
- Plan Purpose
- Plan Goals
- Community Input
- Implementation Plan
- Design Guidelines

Comments Received:
Public Input was collected throughout the duration of the open house through discussions with staff and written comments. Questions were also asked through Audience Polling during the presentation. The following summarizes public comments collected:

Written Comments:
- One participant questioned the importance of a pedestrian friendly atmosphere stating that funds that would be used to accomplish that would be best spent on general road repairs. This participant also stated that the bumpouts in the downtown are acceptable but further down the corridor they are not.

- One participant expressed support for the 3-Lane option as opposed to the other layouts mentioning that if parking would be located south of the 200-Block, the six-plexes should be removed as Nakato and Spinners lots tend to overflow and fill other businesses spots. The participant suggested that locating parking there may assist with solving drainage issues.
- One participant is concerned about the cost, who pays. "I think we have a solution in search of a problem."

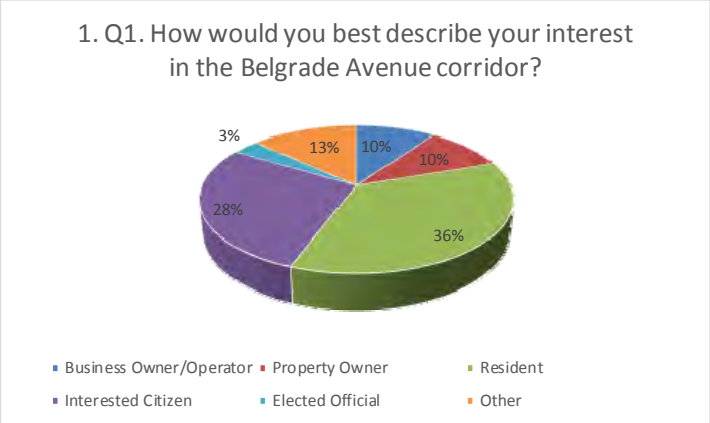
Verbal Comments:

- Some participants expressed concern regarding proposed bumpouts. After discussion and a better understanding potential benefits were acknowledged by the group.
- Some expressed concerns for heavy trucks turning at the proposed mini roundabout. There was general lack of understanding as to the function of the mini-roundabouts. The mini roundabout at Range didn't receive a lot of support.
- Participants generally had concerns with a roundabout added at the Lee/Belgrade intersection. There were concerns with the downward slope traveling south into the roundabout. Concerns were that cars wouldn't be able to yield and would slide into the roundabout in the winter months. Project and City Staff explained that the roundabout would need more engineering if implemented and that there is potential to shift it south and flatten some of the area of concern if necessary.
- Several supported a mid-block crossing over the 200 Block of Belgrade.
- One participant didn't support change along the corridor suggesting that our proposed changes would work toward the detriment of the area.
- Some liked the idea of wider sidewalks in the 200 block and generally supported the proposed changes presented.
- Some were concerned about the identifying of homes as future parking areas in the southern part of the CBD. Staff explained that those identified are not marked for destruction but that if the need arises for the City to add parking and there are willing sellers, negotiations could take place to convert properties. Staff also explained that this would only be necessary if redevelopment occurs in the district and parking becomes scarce.
- One participant was concerned about drainage issues in front of Sharon's Craft and wondered if the street reconstruction would alleviate that issue.

Audience Polling Questions and Results:

Q1. How would you best describe your interest in the Belgrade Avenue corridor? (Multiple Choice)

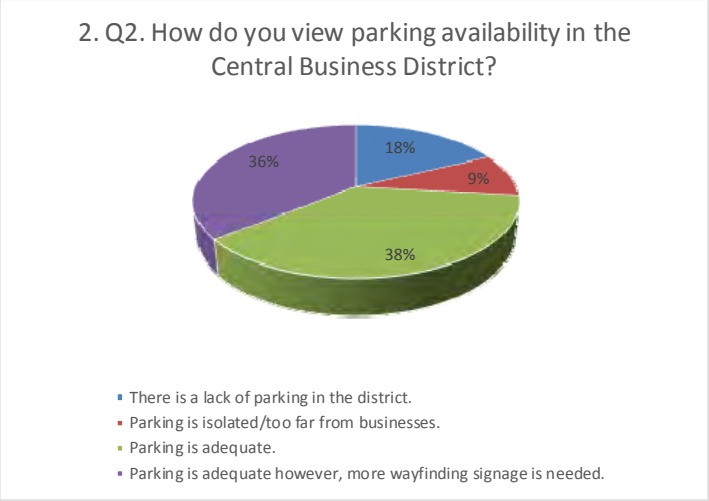
	Percent
Business Owner/Operator	10%
Property Owner	10%
Resident	36%
Interested Citizen	28%
Elected Official	3%
Other	13%
Totals	100%



•Based on the results from question 1, the majority of attendees were residents and interested citizens.

Q2. How do you view parking availability in the Central Business District? (Multiple Choice)

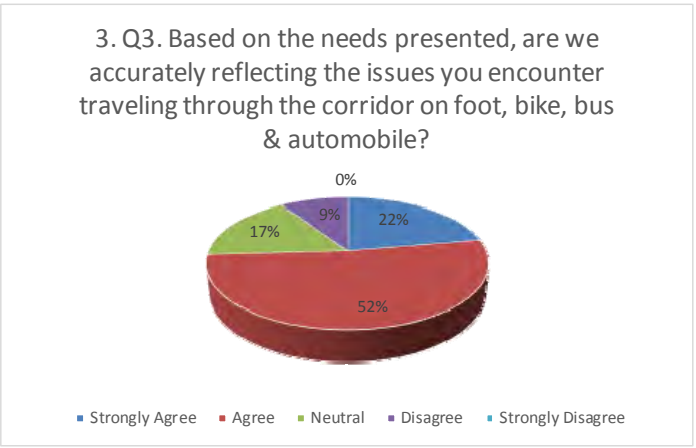
	Percent
There is a lack of parking in the district.	18%
Parking is isolated/too far from businesses.	9%
Parking is adequate.	38%
Parking is adequate however, more wayfinding signage is needed.	36%
Totals	100%



•Based on results from Question 2, most participates view parking as adequate and suggest that wayfinding signage is needed.

Q3. Based on the needs presented, are we accurately reflecting the issues you encounter traveling through the corridor on foot, bike, bus & automobile? (Multiple Choice)

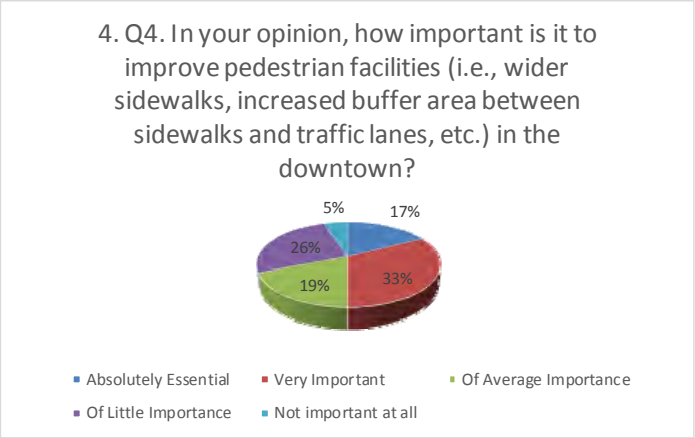
	Percent
Strongly Agree	22%
Agree	52%
Neutral	17%
Disagree	9%
Strongly Disagree	0%
Totals	100%



•Based on results from Question 3, 74% of participants agree that project teams are accurately reflecting the issues encountered when traveling though the corridor.

Q4. In your opinion, how important is it to improve pedestrian facilities (i.e., wider sidewalks, increased buffer area between sidewalks and traffic lanes, etc.) in the downtown? (Multiple Choice)

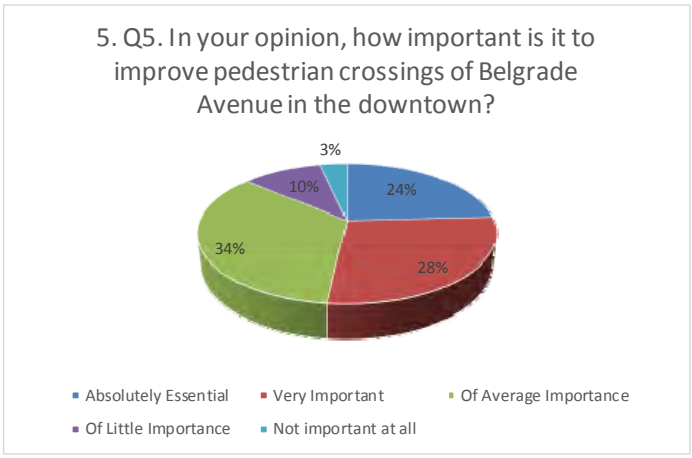
	Percent
Absolutely Essential	17%
Very Important	33%
Of Average Importance	19%
Of Little Importance	26%
Not important at all	5%
Totals	100%



•Based on results from Question 4, 50% of those responding think it is of greater than average importance to improve pedestrian facilities in the downtown. 19% think it is of average importance.

Q5. In your opinion, how important is it to improve pedestrian crossings of Belgrade Avenue in the downtown? (Multiple Choice)

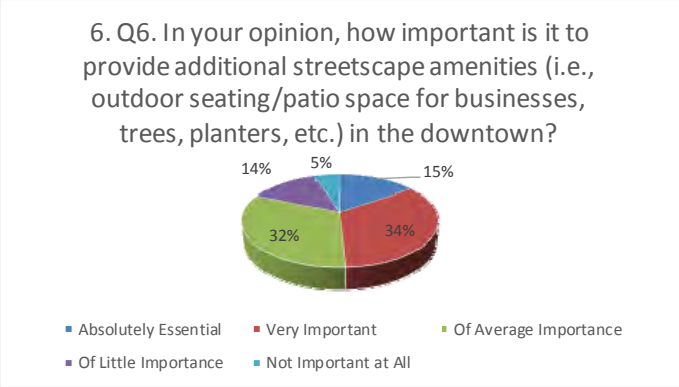
	Percent
Absolutely Essential	24%
Very Important	28%
Of Average Importance	34%
Of Little Importance	10%
Not important at all	3%
Totals	100%



•Based on Question 5, 52% of those responding stated that it is important to improve pedestrian crossings in the downtown. 34% suggested it was of average importance.

Q6. In your opinion, how important is it to provide additional streetscape amenities (i.e., outdoor seating/patio space for businesses, trees, planters, etc.) in the downtown? (Multiple Choice)

	Percent
Absolutely Essential	15%
Very Important	34%
Of Average Importance	32%
Of Little Importance	14%
Not Important at All	5%
Totals	100%



•Based on results from Question 6, 49% suggested that it was more than of average importance to provide additional streetscape amenities in the district. 32% suggested it was of average importance.

Appendix C: Property/Business Owner Meeting Summaries

Belgrade Avenue Corridor Study

North Mankato, Minnesota

Business Owner Meetings

October 2016

1. **Brunton Architects – 1:00 PM – 10/18/16**

Attendees:

- Cory Brunton – Owner
- Jake Huebsch – Transportation Planner, Mankato/North Mankato Area Planning Organization (MAPO)
- Matt Lassonde – Transportation Planner, Bolton & Menk, Inc.

Discussion:

- Cory provided the following information about his business operations and functionality of Belgrade overall:
  - Cory recognized his business as destination business that doesn't attract pedestrians but has noticed in influx of pedestrians in the area that he attributed to the various events in the downtown that bring people and create recognition for the area.
  - Greater Corridor Comments:
    - Cory commented that the grate at the bottom of Lee Boulevard is problematic in the winter; it is really slick with ice and can cause vehicles to spin out/lose control.
  - 200 Block Comments:
    - Inability to take a left turn onto Nicollet Avenue when traveling west is problematic acting as a catalyst for other circulation issues throughout the 200 Block that include:
      - Forces vehicles wanting to access parking on Nicollet Avenue near Belgrade Avenue to go to the Range Street intersection and take a left to circle back.
      - Vehicles will often turn left into Frandsen Bank and access alley from Range and pass through behind businesses.
      - During events, this creates enhanced traffic flows onto Wall Street to Wheeler Avenue for those passing through the downtown to the west. Cory suggested a left turn would allow for vehicles to be routed onto Nicollet which may be better suited to accommodate temporary traffic during these times.
    - Traffic coming over the bridge makes crossing difficult in the 200 Block. Would like to see pedestrian crossing at mid-block.

- The Frandsen lot has no directional signage and this causes confusing vehicle conflicts. Parking is angled for vehicles to enter from Belgrade but vehicles also exit at the same location where space is limited causing conflicts. Semi-trucks delivering to Nakato pull into this entrance and park along the Nakato building as well causing increase friction in circulation here. Cory suggested that signage may assist with this.
- Traffic in the alley is awkward in general with semi-truck deliveries blocking throughways. Cory suggested that this is problematic from many perspectives, especially from an emergency access perspective as fire trucks would have trouble getting through.
- Semi-trucks delivering to Spinner's park on Range Street and take up the southbound lane in front of the establishment right next to the intersection. This is problematic to those that have committed to turning left or right onto Range (traveling south) as they are forced into oncoming traffic. There was suggestion of the potential for a loading zone instead of parking at this location to accommodate deliveries.
- Cory mentioned that sandwich boards on the corner outside of Spinner's are distracting to drivers at the intersection suggesting that they pull them back from the intersection to reduce distraction.

2. **Nakato – 3:00 PM – 10/18/16**

Attendees:

- Jim and Jan Downs – Owners
- Jake Huebsch – Transportation Planner, Mankato/North Mankato Area Planning Organization (MAPO)
- Matt Lassonde – Transportation Planner, Bolton & Menk, Inc.

Discussion:

- Jim and Jan provided the following information about business operations for Nakato and functionality of Belgrade overall:
  - They value their parking lot and the access they have to the property.
  - One issue that they have experienced is that trucks have to deal with the overhead power lines and these are problematic when attempting to traverse through the alley and behind properties.
  - Matt and Jake mentioned that sidewalk expansion is a common topic in meetings. They suggested that they are not interested in expanding the patio but would welcome any beautification efforts to the sidewalks. As owners of Pagliai's Pizza in Mankato as well, they talked about how that area has benefited largely due to the recent enhancements to the sidewalks and traffic calming that has taken place surrounding that location. They mentioned that has only increased patronage to the

restaurant.
    - They have noticed an increase in pedestrians with the art sculpture walk and area events.
    - Their parking lot is shared with Spinner's and is key to area events where the community gathers at the Range Street/Belgrade Avenue Intersection.

3. **Dino's – 3:30 PM – 10/24/16**

Attendees:

- Natasha O'Hara – Owner
- Jake Huebsch – Transportation Planner, Mankato/North Mankato Area Planning Organization (MAPO)
- Matt Lassonde – Transportation Planner, Bolton & Menk, Inc.

Discussion:

- Natasha provided the following information about business operations for Dino's Pizzeria and functionality of Belgrade overall:
    - Natasha reiterated others' concerns with high traffic speeds on Belgrade within the 200 Block.
    - She is generally concerned with peoples' ability to get across at mid-block. As Dino's is a busy establishment, they will often send patrons over to the Circle Inn to have drinks while they wait for a table at the pizzeria. She is concerned that this is a dangerous crossing in current conditions.
    - Natasha asked if increased parking was in the plans; she believes that current parking resources are scarce in the downtown. Mentioned possibly having saw-tooth parking on the south side of Belgrade in the 200 Block.
    - She mentioned that the restaurant could use wider sidewalks and would expand patio space as this is the only type of expansion that would be feasible. She agreed that the transformation on Front Street works well and brings in a lot more pedestrians in Mankato's downtown.
    - There are issues at the Range Street intersection with vehicles and pedestrians not knowing who has the right-of-way; there is confusion.
    - She has also experienced issues with food vendors parking in the alley.

4. **Expressway Gas Station/CENEX – 1:00 PM – 10/25/16**

Attendees:

- Daric Zimmerman – Business Rep
- Jake Huebsch – Transportation Planner, Mankato/North Mankato Area Planning Organization (MAPO)
- Matt Lassonde – Transportation Planner, Bolton & Menk, Inc.

Discussion:

- Daric provided the following information about business operations for the

Expressway/Cenex Station and functionality of Belgrade overall:

- Daric mentioned that access for deliveries on the property is tight. Would like to be able to send trucks through the property to the back alley and out to Range Street intersection to exit.
- Left turns into the parking lot and out are problematic and a center turn lane might help with this. Currently crossing two lanes of traffic to get out.
- This property gets completely blocked off during events and they lose business. Perhaps signage to direct vehicles to the alley to access the property would be beneficial as they remain open and can accommodate patrons.
- They would like to raise the store sign.
- Parking added to the north side of Belgrade in the 200 Block may be problematic with traffic entering and exiting the property.

5. Frandsen Bank – 2:00 PM – 10/25/16

Attendees:

- Shane Van Engen/ Pam Habinger – Business Reps
- Jake Huebsch – Transportation Planner, Mankato/North Mankato Area Planning Organization (MAPO)
- Matt Lassonde – Transportation Planner, Bolton & Menk, Inc.

Discussion:

- Shane and Pam provided the following information about business operations for the Frandsen Bank and functionality of Belgrade overall:
  - Parking with Nakato is an issue. People are parking in front of the Bank and leaving vehicles while the Bank is open and patrons can't find a place to park. Employees have been forced to park over on Nicollet Public Parking areas at these times.
  - Matt asked Shane if there are plans to move the drive through. Shane and Pam suggested that they don't have current plans to move the drive through but would consider this in the future if the Central Business District expands to the south and opportunity opens up. Shane and Pam mentioned that the bank drive through was moved there due to heavy traffic in previous years. Currently, the traffic isn't as heavy as it used to be through the drive through.
  - Pam and other employees often cross Range several times a day between the bank and the drive through.
  - There is a post office box in the Frandsen Bank lot that causes issues with traffic passing through.
  - Delivery food trucks will block in employees for long amounts of time in the alleys.
  - They said they would consider signage or directional arrows for the

parking lot.

- They mentioned that there are drainage issues in front of the building that cause water to come up to the front doors.
- Pam mentioned that traffic is heavy in the back alley.

Appendix D: Business on Belgrade Group Meeting Summary

Belgrade Avenue Corridor Study

North Mankato, Minnesota

Business On Belgrade Meetings

Tuesday, February 28, 2017
&
Thursday, March 2, 2017
Bolton & Menk, Inc

Summary

Attendees:

Name	*Title*
John Harrenstein	*City Administrator, City of North Mankato*
Mark Dehen	*Mayor, City of North Mankato*
Courtney Kietzer	*Intern, City of North Mankato*
Jim Whitlock	*President, Business on Belgrade Association; Owner, Brickhouse Graphics*
Jim Downs	*Owner, Nakato*
Jan Downs	*Owner, Nakato*
Derric Zimmerman	*Development Director, Cenex Gas Station*
Angie Bersaw	*Senior Transportation Planner, Bolton & Menk, Inc.*
Matt Lassonde	*Transportation Planner, Bolton & Menk, Inc.*
Katie Heintz	*North Mankato Taylor Library*
Ellen Keonigs	*Y Barbers/Onatah*
Brenda Wilcox	*Y Barbers/Onatah*
Raymond Gong	*Like Nu Dry Cleaners*
Scott Kamps	*DeMars Construction*
Max DeMars	*DeMars Construction*
Jeni Bobholz	*Circle Inn*

Two meetings were held at Bolton & Menk, Inc. between Project and City Staff and the Business on Belgrade (BoB) Group on February 28th and March 2nd of 2017. The meetings were held to solicit feedback from the BoB group as most were absent from the open houses held in January. Eleven members total from the group were present at the meetings.

The following is summary of the discussions that took place during both meetings:

- *Both meetings were set up to facilitate informal discussion. The 200 Block concepts dominated the conversation among participants.*
- *Midblock Crossing at Wall Street:*
    - *There was ample discussion of the midblock crossing near Wall Street. Impacts to parking are an issue in front of businesses that depend on vehicles stopping briefly in front of the store for a haircut or to drop items at the cleaners. The bumpout shown with the midblock crossing would remove at least two parallel parking spots from the front of those businesses.*

Mayor Dehen and Administrator Harrenstein inquired about possibly moving the crossing to better align with a path located along the eastern edge of the Cenex parking lot, adjacent to the Circle Inn Bar. This would move the crossing west approximately 80-feet placing a potential bumpout in front of the White Orchid clothing store and the vacant lot on the south side of Belgrade. The Mayor mentioned that he would like to see the crossing develop in phases beginning with striping the facility first, adding the bumpouts if needed in the future, and potentially adding a pedestrian flasher to the crossing if needed later on. Project Staff agreed that phased implementation seemed reasonable and will work to validate whether this is possible or not.

- *Like Nu Cleaners and Y Barbers representatives were not supportive of removing parking stalls from the south side of Belgrade at all. They raised concerns about potential loss of business. Raymond G. argued that his customers are carrying heavy loads of clothing into the building and need close access. Also, insurance reasons prevent him from having customers enter from the rear of the building. Ellen K also said that Y Barbers depends on customers stopping briefly for a haircut stressing the need for parking stalls.*

- *3-lane option with mini-roundabout:*
  - *The mini-roundabout, a concern of participants at previous meetings, continued to be an issue among participants. Mayor Dehen and Administrator Harrenstein were wondering if there was an option to remove the mini-roundabout and still maintain a three lane option. It was discussed that the roundabout would be problematic during events such as the Fun Days parade where floats move through the intersection and Blues on Belgrade where a stage occupies the area during the event. Angie suggested that she has discussed the 3-lane option without the mini-roundabout with the project traffic engineer who has confirmed that as a viable option. Project Staff will move forward with development of that as an option.*
  - *Derric from Cenex mentioned that the 3-lane option works well for his business as it is currently difficult for vehicles turning left into the gas station, specifically delivery trucks. The center turn-lane option would facilitate left hand turns, removing one westbound thru-lane of conflict traffic to compete with.*
  - *BoB representatives at the meeting generally supported wider sidewalks in the area and improvements to the streetscape.*
  - *Some were concerned that it would be impossible to parallel park with the 3-lane option.*
- *4-lane option with bumpouts at Range and midblock:*
  - *Administrator Harrenstein expressed preference for the existing 4-lane scenario that exists today and mentioned that he has received calls from people who also support non-action.*
  - *Participants supported closing accesses on Belgrade to the public parking lot adjacent to the American legion as well as the Circle Inn Bar. Mayor Dehen suggested he would like to see the mid-block crossings and access closure implemented in one phase as a short-term project.*
- *Wall Street, Nicollet Avenue, and USTH 169 intersections:*
  - *Angie and Matt explained the various options for access to Wall Street, Nicollet Avenue, and the USTH 169 intersection. The first option identifying a dedicated turn-lane onto Nicollet Avenue was generally supported by the group. Matt reminded the group that the turn onto Nicollet wasn't wholly supported by the Project Engineer but remained a viable option. Matt explained that previous concerns have been raised by vehicles detoured onto Wall Street as a*

result of events downtown. Traffic entering the downtown have a long way to travel to access businesses on the south side of Belgrade during events due to detours and heavy traffic is routed onto Wall and Wheeler which are not well suited to accommodate that traffic. One solution discussed is to provide a removable barrier to allow left-turning traffic onto Nicollet during events. This may alleviate most of the aforementioned issues.

- *Max DeMars questioned if Nicollet Avenue could somehow be hooked up to a roundabout at the USTH 169 intersection. Participants also wondered if a mini-roundabout could work at Nicollet/USTH 169. Matt mentioned he would discuss with the project team.*

- *In General:*
  - *Some didn't support less traffic or slowed traffic through the area. They believe it is good for business. Those participants also believe that narrower and less lanes will deter customers from accessing businesses and they will stop passing through there.*
  - *Some would like Staff to consider an option with keeping four lanes and only widening sidewalks on the south side of the road.*
  - *Discussion occurred regarding a path through the vacant lot on the south side of Belgrade accessing a new parking lot placed in the rear of the buildings. Max DeMars owns the vacant lot and parking area on the south side and said he'd be open to discussions of selling the property for those purposes. This would increase parking in the area in the direct vicinity of businesses.*
- *Lee Boulevard:*
  - *Participants were generally supportive of a roundabout at the Lee Boulevard/Belgrade Avenue Intersection. Mayor Dehen mentioned that he would like to see an oblong roundabout that facilitates southbound thru-traffic more than other directions. Angie and Matt mentioned they would speak with other Project Staff.*
  - *City and Project Staff agreed that it was feasible to move the proposed crosswalk from Nicollet Avenue to the path adjacent to the North Mankato Water Treatment Facility just west of Lake Street. Project Staff will work to insert this connection into concepts.*

Appendix E: Steering Committee Meeting Summaries

Belgrade Avenue Corridor Study

North Mankato, Minnesota

Steering Committee Meeting

Wednesday, September 8, 2016
North Mankato Police Annex
5:30 – 6:30 pm

Summary

Attendees:

Name	Title/Agency
Jake Huebsch	Transportation Planner; Mankato Area Planning Organization (MAPO)
Angie Bersaw	Senior Transportation Planner; Bolton & Menk, Inc.
Michael Fischer	City Planner; City of North Mankato
Matt Lassonde	Transportation Planner; Bolton & Menk, Inc.
Tom Hagen	Steering Committee Member
Barb Church	Steering Committee Member
Matthias Leyrer	Steering Committee Member
Jon Hamel	Steering Committee Member
Sheila Skilling	Steering Committee Member

1. Introduction and Roles

- *Agency and Consulting Staff introduced themselves and their affiliation to Steering Committee members and discussed roles in the project.*
- *Staff discussed the role of the Steering Committee in the Project*

2. Presentation

A presentation was given to introduce project goals, relationship to the Belgrade Master Plan efforts, status of the corridor study, existing conditions on Belgrade Avenue, schedule, and next steps.

The following materials were provided to Steering Committee members for discussion of existing conditions:

- *Maps:*
  - *Access Inventory*
  - *Parking Assessment*
  - *Traffic Operations*
  - *Crash History*
  - *Pedestrian and Bicycle Connections*
  - *Land Use*
  - *Transit*
- *Project Schedule*

- *Project Handout (This included: general project information, contact information, website location)*

3. Steering Committee Discussion with Staff

Staff led a discussion with committee members to identify answers to the following overarching questions:

- *What are your primary transportation concerns with Belgrade Avenue?*
- *What do you want to achieve with improvements to Belgrade Avenue?*

The following is a summary of the discussion between staff and committee participants:

- *One member discussed the significance of ambience along the corridor that has been a part of several discussions in many previous planning efforts. He suggested that changes to the corridor will need to keep this in mind in regards to roadway design. Angie mentioned that streetscaping will be a consideration in our roadway design alternatives.*
- *One participant would like to see commercial development spread further west along Belgrade rather than clustering it at the eastern edge of the corridor near the Veteran's Memorial Bridge.*
- *Several participants suggested that they would like to see slower traffic along Belgrade, specifically within the Central Business District (CBD). Staff suggested there are measures that can be implemented in streetscape design that can cause drivers to slow down. Measures include sidewalk bumpouts, narrower lanes, parking configurations, etc. Staff confirmed that several methods could be explored in concept alternative development. One participant suggested that the Veteran's Memorial Bridge is designed like a highway and that encourages drivers to exceed the speed limit through the CBD.*
- *There was some discussion regarding lane configuration downtown. Matt suggested that the removal of one lane in the four lane section at the 200 Block has been a discussion topic in many previous Belgrade Master Plan meetings. Angie asked whether participants would like to see wider sidewalks, increased on-street parking, or other infrastructure if more space becomes available at the road sides. Some suggested they would like to see wider sidewalks along the 200 Block of Belgrade to accommodate patio dining at restaurants and increased pedestrian movement. Alternative parking measures were also discussed such as angled parking in front of the south side businesses or parking on both sides of the street. Staff confirmed that several options would be considered during concept alternative development.*
- *A participant suggested that cameras located at key locations in Mankato have been quite beneficial for traffic accident and other purposes and recommended that consulting staff consider integrating this into design.*
- *Participants began discussing the adequacy of parking resources along the corridor. One participant mentioned that previous studies suggested that there is a perceived shortage of parking resources along the corridor. Matt confirmed that several studies do state that the shortage is perceived. One participant recommended additional lighting on side streets to make on-street parking there seem more inviting and safe. This would perhaps encourage patrons to park there and remove some of the strain on other parking resources and assist with ending the perception of a parking shortage. Wayfinding signage to parking was also discussed as a tool to solve parking perceptions.*
- *The general opinion of the group was that pedestrian/bicycle crossings are unsafe in most locations as vehicles speed and ignore stop signs. Matt asked the group if pedestrians could be accountable for also not following the rules of the road.*

Participants suggested that bicyclists are often seen failing to exercise appropriate roadway conduct while riding, also running stop signs and getting into traffic which was seen as problematic along the corridor. Matt and Angie described Nicollet Avenue as a designated bike route per the City's complete streets policy along with Sherman Street and Center Street. One participant asked how these were marked and suggested that "sharrows" are not good means of marking a designated on-road bike path. Participants suggested a stop sign at Sherman to accommodate the existing on-road path.

- *Another concern with pedestrian access was identified in the 200 Block. Participants identified the block as very long and not easy to cross. The crossing at Range Street is a far distance from most public parking.*
- *Participants inquired about transit routes and the general future of transit in North Mankato. Jake mentioned that the MAPO already has a planning effort in the works to study the transit system and identify any potential changes.*
- *Traffic control measures were discussed for various intersections. The southbound ramp on 169 was discussed and participants inquired to the feasibility of a roundabout option in that location. Matt mentioned that the City requested a high level design to assess the potential geometric fit for a roundabout but discussions have not moved forward from there. Angie and Matt discussed that a future Intersection Control Evaluation (ICE) study will be taking place and will explore multiple possibilities. Some inquired about the potential for a mini-roundabout at the Range/Belgrade intersection to improve potential delays and pedestrian movements. Angie suggested that participants view an informational video prepared for the City of Shakopee to see how mini-roundabouts operate. Angie suggested that many possibilities would be explored through concept development.*
- *One participant suggested that the gas station and the bank drive through are vehicle focused businesses and cause a lot of traffic in the area. Angie said access modifications will be looked at closely in the CBD but noted that discussions with individual businesses would also need to occur to make sure proposed changes, if any, would work with their business operations.*

4. Next Steps

a. Development & Evaluation of Alternatives—October 2016 to January 2017
b. Future Traffic Analysis—November to December 2016
c. Downtown Plan Steering Committee Meeting #2—November 2016
d. Public Open House #1—December 2016

Belgrade Avenue Corridor Study
&
Belgrade Avenue Master Plan
North Mankato, Minnesota
Steering Committee Meeting

January 19th, 2017
North Mankato Police Annex
6:00 to 7:30 pm

Summary

Attendees:

Name	Title/Agency
Jake Huebsch	Transportation Planner; Mankato Area Planning Organization (MAPO)
Angie Bersaw	Senior Transportation Planner; Bolton & Menk, Inc.
Michael Fischer	City Planner; City of North Mankato
Matt Lassonde	Transportation Planner; Bolton & Menk, Inc.
Courtney Kietzer	Planning Analyst, City of North Mankato
Randy Zellmer	Committee Chair
Megan Flanagan	City Center Partnership
Linda Myron	Committee Member
Lynn Schreiner	Committee Member
Barb Church	Committee Member
Jon Hammel	Committee Member
Matthias Leyrer	Committee Member
Sheila Skilling	Committee Member
Tom Hagen	Committee Member
Tom Bohrer	Committee Member

1. Welcome and Introductions

2. Belgrade Master Plan Updates

- *Matt opened discussion with the proposed revisions to the Belgrade Master Plan - Section 4.6 Historic Preservation and Design Guidelines. Tom H. raised concerns he had with the language in the section referring to the City using the Planning Commission as the authority on historic preservation instead of a historic preservation commission.*
- *Courtney gave a brief rundown of the Design Guideline Document Updates. All agreed that the guidelines were done well and conveyed the right message. However, Jon H. questioned the*

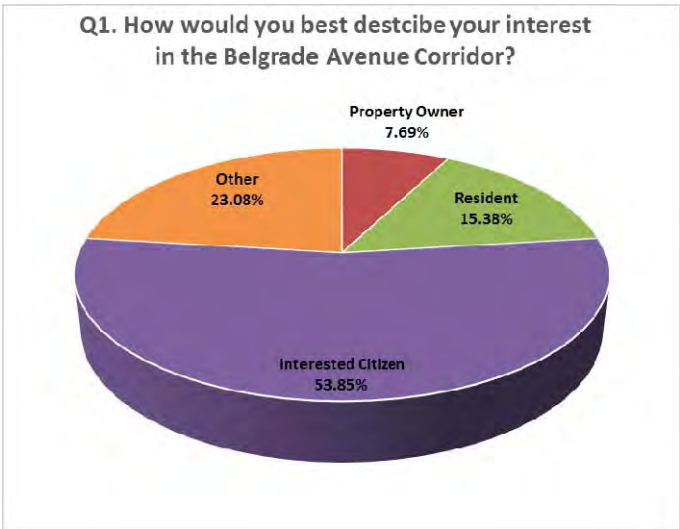
City's ability to enforce the guidelines as policy. Tom H. and others encouraged Project Staff to work with the City to change the language.

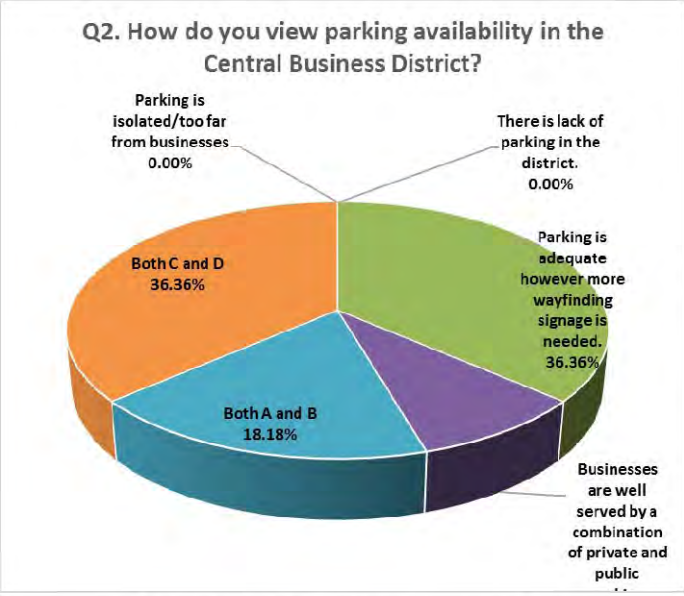
- *Matt said that he would work with City Staff and Project Partners to find a suitable solutions to the concerns. Several potential courses of action were discussed including moving forward with finalizing an inventory of historic resources begun by Courtney K. and involving the State Historic Preservation Office in the process for guidance on action to take. Matt reassured the group that this would be resolved.*

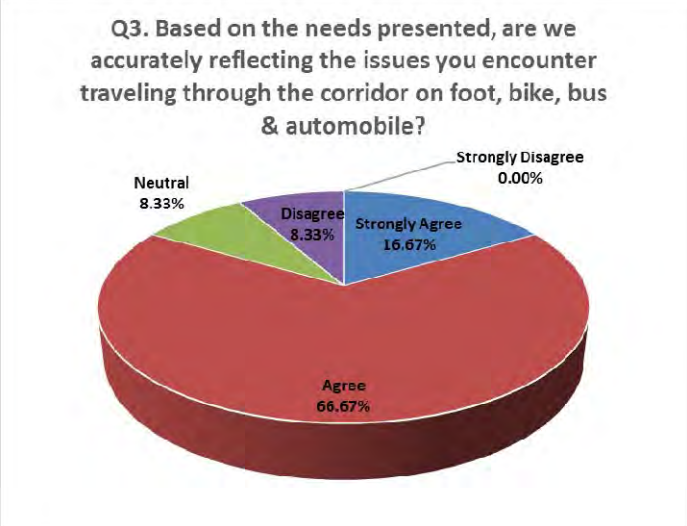
3. Belgrade Corridor Study Updates Presentation

- *The following materials were presented to Steering Committee members for discussion:*
  - *Study Progress*
  - *Brief review of existing conditions:*
    - *Access Inventory*
    - *Parking Assessment*
    - *Traffic Operations*
    - *Crash History*
    - *Pedestrian and Bicycle Connections*
    - *Land Use*
    - *Transit*
  - *Study Goals*
  - *Range of Concept Alternatives including:*
    - *Improvements from Lee Boulevard to Lake Street*
    - *The addition of bumpouts to the following intersections:*
      - *Cornelia Street*
      - *Sherman Street*
      - *Center Street*
      - *Cross Street*
    - *200 Block Concepts including:*
      - *4-lane option with added bumpouts*
      - *3-lane options with mini roundabout at the Range/Belgrade intersection and access closures at Circle Inn (adjacent to Wall St) and public parking lot (adjacent to Range St). The 3-lane option would provide extended sidewalk widths and space for streetscape amenities and potential patio opportunities for businesses. This option would also include one of the following variations of the Wall Street, Nicollet Avenue, USTH 169 SB Ramp intersections:*
        - *Dedicated WB turn-lane onto Nicollet from Beglrade.*
        - *Extended median past Wall Street to provide pedestrian refuge for mid-block crossing. This would prevent traffic from turning left onto Nicollet and Wall Street.*
        - *Maintained existing median preventing left hand turns onto Nicollet Avenue.*
          - *Roundabout at USTH 169 providing traffic calming conditions for traffic entering the downtown from the Veteran's Memorial Bridge. This option would maintain a similar median preventing left turns onto Nicollet as exists*

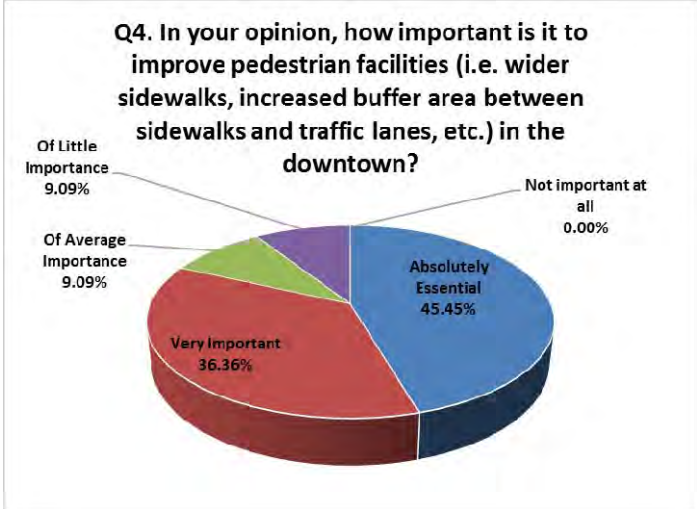
today.

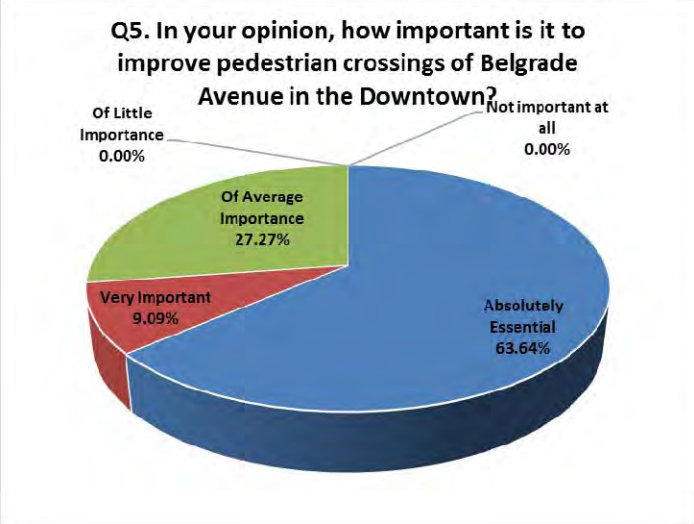


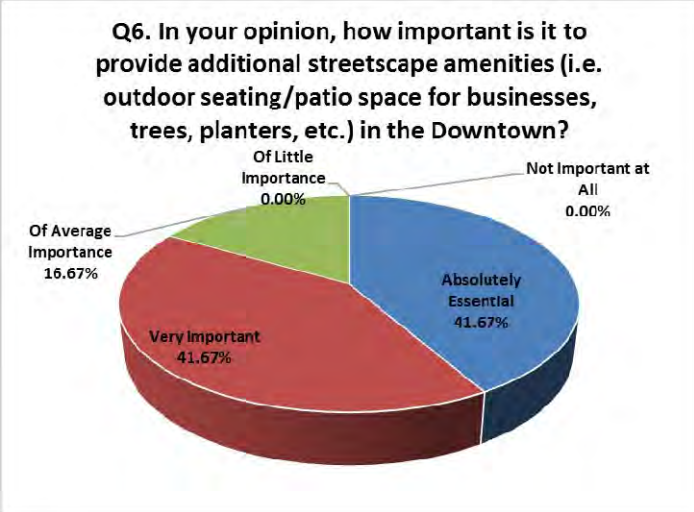




- *Throughout the presentation, several questions were presented to the committee through polling software. The following represents the questions presented and the responses received:*
- *Question 1 assessed the interests of those attending the meeting. Most members of the Steering Committee are Interested Citizens.*
- *Question 2 assessed the groups views on parking availability in the district. Most believed that the district is well served by parking but would benefit from wayfinding signage.*
- *Question 3 asked if the group thought the study accurately reflects the issues on the corridor. The vast majority agreed that it did.*
- *Question 4 asked the importance of improved pedestrian facilities. Most (90%) favored improved pedestrian facilities.*
- *Question 5 asked about the importance of crossings of Belgrade in the Downtown. All participants found this important.*







- *Question 6 asked about the importance of streetscape amenities. Most placed high importance on additional streetscape amenities.*

4. Next Steps

- Project Staff explained next steps and upcoming meetings asking the commission to attend and assist with asking questions to the general public.

a. Next Steering Committee Meeting – February/March

b. Upcoming Open Houses:

i. January 26, 5:30pm to 7:30pm

ii. January 28, 10:00am to 11:30am

Belgrade Avenue Corridor Study
&
Belgrade Avenue Master Plan
North Mankato, Minnesota
Steering Committee Meeting

April 25th, 2017
North Mankato City Hall
6:00 to 7:30 pm

Summary

Attendees:

Name	Title/Agency
Angie Bersaw	Senior Transportation Planner; Bolton & Menk, Inc.
Michael Fischer	City Planner; City of North Mankato
Matt Lassonde	Transportation Planner; Bolton & Menk, Inc.
Randy Zellmer	Committee Chair
Linda Myron	Committee Member
Barb Church	Committee Member
Matthias Leyrer	Committee Member
Tom Hagen	Committee Member
Chris Person	Committee Member

1. Matt and Angie presented the results of the Open House Meetings and the Business on Belgrade Meetings as well as the draft study recommendations to the Steering Committee Group.
2. The group then discussed the status of the Corridor Study and Next Steps. The following outlines the ensuing discussion:
    a. All in attendance were asked to review the proposed Belgrade Avenue Master Plan before completing the Belgrade Avenue Corridor Study.
    b. All participants agreed that the two efforts need a stronger link with language incorporated in both plans linking them. It was discussed that, when drafting the Corridor Study for 200 – 500 blocks of Belgrade, the study would incorporate proposals that align with the Belgrade Master Plan.
    c. Angie and Matt initially identified timeframes from implementation and the group didn't feel that this fit with the project recommendations. The committee suggested we do away with Priority identification in years. Concern being, a bulk of what is proposed is in the 6 – 20 year category, with likelihood little will actually be implemented.
    d. The Steering Committee Chair, Randy Zellmer, suggested, and the group agreed, that the Belgrade Avenue Corridor Study should represent the views of those who participated while avoiding allowing those with negative thoughts to control the plan. Those present

at the open houses agreed that they didn't experienced the same negative views at the open houses for the Master Plan.

e. The group was in approval of proposing some temporary trials as has been done in the Riverfront Drive Corridor Study in the Mankato Old Town area thinking that maybe people will have a different view after a trial run.
f. A preference from the group was to request the presentation to the City Council be at a Work Session to allow more time to present and discuss both studies.
g. The group would like to wrap up the planning efforts before summer stating "It has been over a year for the Master Plan. It would be nice to bring to an end before summer, when folk's priorities shift to summer activities."

Appendix F: Public Comment Web Application Results Summary

BOLTON & MENK

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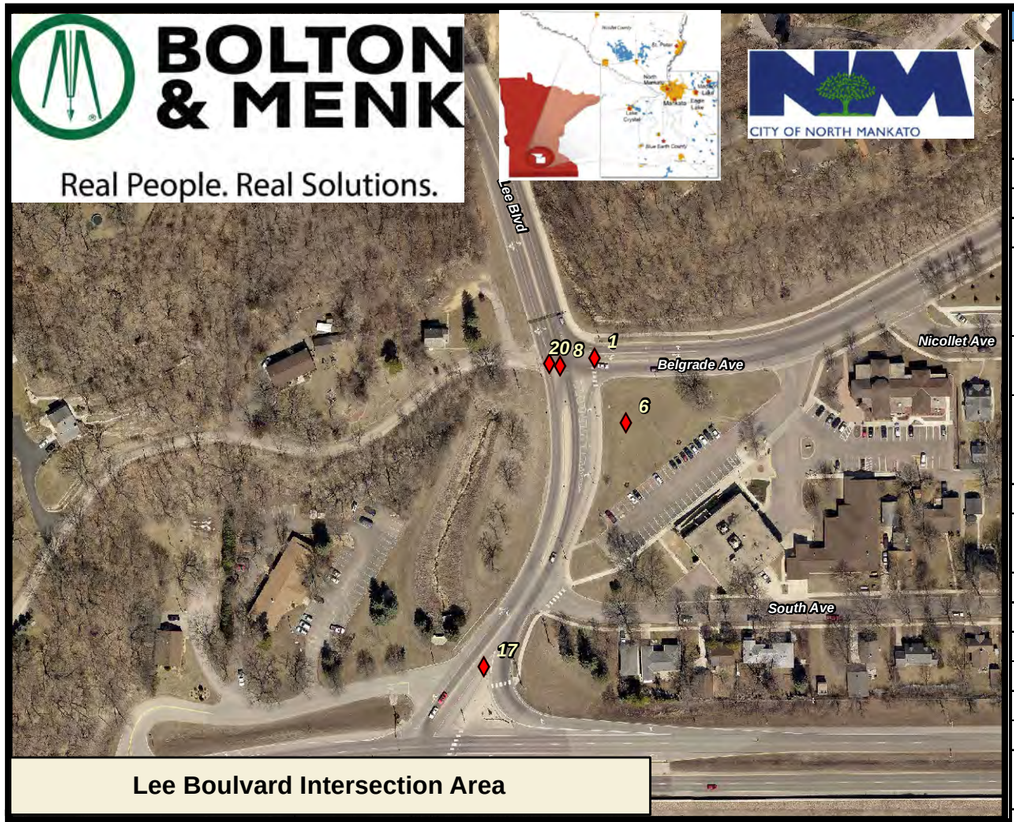
CITY OF NORTH MANKATO



Lee Boulvard Intersection Area

Sherman Street to Nicollet Avenue

ID	Problem Areas	Comments
1	Unsafe Driving Conditions	Left turns onto Lee Boulevard from Belgrade are unsafe at peak traffic times. This will cause delays and force drivers to drive into heavy oncoming traffic.
2	Other	The inability to take a left turn here is problematic and has repercussions extending throughout the CBD. This causes unwanted traffic flow through the alley and Frandsen/Nakato Parking Lots.
3	Lack of Pedestrian Crossings	
4	Difficulties Accessing Riverfront	Hard to get onto Belgrade from Wall street
5	Other	There needs to be a bike lane, or no cars parked on the side of the road
6	Unsafe Driving Conditions	bicycles should NOT be on the streets, thry DO NOT obey street signs (ie: running stop signs) riding 2 to 6 wide taking up the whole lane and holding up traffic, this is the worst idea ever. then forcing the tax payer to pay for unused hike/bike trails
7	Difficulties Accessing Riverfront	Cars at the four way stop sign on Belgrade either don't come to a complete stop or don't take their turn at the intersection- creating problems and an unsafe intersection.
8	Unsafe Pedestrian Conditions	Crossing Lee Blvd at the bottom of the hill is extremely dangerous. It's also dangerous crossing Belgrade Ave. at the intersection of Lee Blvd and Belgrade Ave. Drivers speed and do not give pedestrians or bicyclists the opportunity to cross.
9	High Traffic Speeds	The entire Belgrade should be pedistrian-centric- currently car-centric.
10	Lack of Pedestrian Crossings	As a pedestrian, I generally feel unsafe crossing Belgrade in morning and evening rush hours. Also, there is not a good place to cross Belgrade at the Circle Inn/Marigold Building corner.
11	Inadequate Parking	I seldom shop there because I don't see safe places to park. Parallel parking is just too risky with the traffice.
12	Lighting	When walking alone Belgrade much of the block is dark except for the corner
13	Inadequate Parking	Need more
14	Lack of Pedestrian Crossings	and some street intersections in lower north have no stop or yield signs.
15	Inadequate Parking	
16	Traffic Delay	
17	Trail and Sidewalk Gaps	Having a painted cycling lane from veteran's memorial bridge to lookout drive would be great for connecting existing cycling routes. The lanes on broad street in Mankato are a fantastic example.
18	High Traffic Speeds	Intersections by highwy,LeeBlvd and belgrade fountain are sometimes difficult w\lack of driver speeds unaware of pedestrians
19	Other	What are the considerations that have been made regarding the needs of an aging population?
20	Unsafe Pedestrian Conditions	Roundabouts are EXTREMELY unsafe for for pedestrians. Many athletes use our hills - let's keep them safe
21	Unsafe Conditions for School Children	Need to reduce the amount of lanes and have bump-outs at intersections so kids, elderly people, bikes, parents with kids/dogs, etc. can cross more safely.
22	Difficulties Accessing Riverfront	Too many people going through stop signs or entering wrong way on Belgrade and Center. Too hard to make a left turn at the end of Belgrade Ave during rush hours. Roundabouts ARE NOT the solution.

Belgrade Avenue Corridor Study - Public Comment Geoform

This Public Comment Geoform was hosted on the project website to collect input. 25 users responded throughout the study process. Each location corresponds with a concern identified in the table above.

Appendix G: Existing Traffic Conditions Technical Memorandum

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12224 Nicollet Avenue
Burnsville, MN 55337-1649

Ph: (952) 890-0509
Fax: (952) 890-8065
Bolton-Menk.com

MEMORANDUM

Date: September 19, 2016

To: Paul Vogel

From: Ross B. Tillman, P.E.
Kelsey E. Retherford, E.I.T.

Subject: Existing Traffic Conditions
Belgrade Avenue Corridor Study
City of Northern Mankato, MN
Project No.: T42.111862

Introduction

The Mankato/North Mankato Area Planning Organization in cooperation with the City of North Mankato have requested a corridor study along Belgrade Avenue from Lee Boulevard to TH 169 North Ramp. Belgrade Avenue is located along the southern edge of the City of Northern Mankato. This memorandum provides a summary of the existing conditions as a baseline to understand the needs and potential solutions.

Data Collection

13-hour turning movement counts were completed at the intersections analyzed in May of 2016. The AM peak hour was found to be from 7:15-8:15am and the PM peak hour was found to be from 5:00-6:00pm. The existing traffic volumes are shown in **Figure 1** of **Appendix A**.

Existing Conditions

Belgrade Avenue is a two lane undivided roadway from Lee Boulevard to Range Street, four lane undivided roadway from Range Street to Nicollet Avenue and a four lane divided roadway from Nicollet Avenue to east of the TH 169 North Ramps. The intersections of Belgrade Avenue at the TH 169 North and South Ramps are signalized. The intersections of Belgrade at Range Street and Center Street are all way stop controlled. Belgrade Avenue at Sherman Street and Belgrade Avenue at Lake Street are side street stop controlled with Belgrade Avenue having the right of way. The intersection of Belgrade Ave at Lee Boulevard is side street stop controlled with Lee Boulevard having the right of way.

The speed limit on roadways throughout the project area is 30 MPH. TH 169 is classified as a Principal Arterial. Belgrade Avenue and Lee Boulevard are classified as Minor Arterials. North of Belgrade Avenue Range Street is classified as a Major Collector. Center Street and Lake Street north of Belgrade Avenue are classified as a Minor Collector. All other roadways are classified as Local roadways.

Safety Analysis

A crash review was completed using the Minnesota Crash Mapping Analysis Tool (MnCMAT) for the previous five years (2010-2014). MnDOT uses a comparison of the crash rate and the critical rate when

determining whether or not there is a safety issue at an intersection. The crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside of the expected, normal range. The critical index reports the magnitude of this difference and a critical index of less than one shows that the intersection is operating within the normal range. **Table 1** shows the critical index comparing the total number of crashes and the critical index for the amount of fatal and serious injury crashes at each intersection analyzed.

Table 1. Intersection Crash Indices

Intersection	Total Crash Critical Index	Fatal & Serious Injury Crash Critical Index
Belgrade Avenue at TH 169 North Ramp	0.32	-
Belgrade Avenue at TH 169 South Ramp	0.53	0.86
Belgrade Avenue at Range Street	0.6	-
Belgrade Avenue at Center Street	0.35	-
Belgrade Avenue at Sherman Street	0.88	1.26
Belgrade Avenue at Lake Street	0.47	-
Belgrade Avenue at Lee Boulevard	0.68	-

All intersections have a total crash critical index less than one showing that the number of crashes reported at each of the intersections between 2010 and 2014 is within the normal range. However when analyzing the number of fatal and serious injury crashes reported at each intersection it was found the intersection of Belgrade Avenue at Sherman Street is experiencing a higher than usual number compared to similar intersections statewide.

Table 2 below summarizes the crashes reported at the intersection of Belgrade Avenue at Sherman Street from 2010 to 2014. There were a total of 6 reported crashes.

Table 2. Crash Type and Severity at Belgrade Avenue at Sherman Street

Crash Type	Incapacitating Injury	Possible Injury	Property Damage
Right Angle	-	1	2
Rear End	-	-	1
Pedestrian	1	-	-
Head On	-	-	1

Due to the low volume at this intersection having an incapacitating injury crash is what caused this intersection to operate outside the normal range compared to similar intersection for fatal and serious injury crashes. Additionally with a total crash critical index of 0.88, if there had been one more crash reported over the five year period analyzed this intersection would also be operating outside the normal range for total crashes.

At the intersection of Belgrade Avenue at TH 169 North Ramps there were 13 crashes reported. **Table 3** below summarizes the crashes.

Table 3. Crash Type and Severity at Belgrade Avenue at TH 169 North Ramps

Crash Type	Possible Injury	Property Damage
Rear End	1	3
Right Angle	3	1
Sideswipe Passing	-	3
Left Turn	-	1
Ran off Road	-	1

At the intersection of Belgrade Avenue at TH 169 North Ramps rear end and right angle crashes were the most common types of crashes. One of the rear end crashes and three of the right angle crashes resulted in possible injury crashes. All other crashes at the intersection were property damage only crashes.

At the intersection of Belgrade Avenue at TH 169 South Ramps there were 14 crashes reported. **Table 4** below summarizes the crashes.

Table 4. Crash Type and Severity at Belgrade Avenue at TH 169 South Ramps

Crash Type	Incapacitating Injury	Possible Injury	Property Damage
Rear End	1	1	5
Right Angle	-	-	3
Sideswipe Passing	-	-	1
Left Turn	-	-	2
Ran off Road	-	-	1

At the intersection of Belgrade Avenue at TH 169 South Ramps rear end crashes were the most common types of crash. One of the rear end crashes resulted in an incapacitating injury, one was a possible injury crash and the other five were property damage only crashes. All other crashes at the intersection were property damage only crashes.

At the intersection of Belgrade Avenue at Range Street there were 8 crashes reported. **Table 5** below summarizes the crashes.

Table 5. Crash Type and Severity at Belgrade Avenue at Range Street

Crash Type	Non-Incapacitating Injury	Possible Injury	Property Damage
Rear End	-	1	3
Right Angle	-	1	1
Sideswipe Passing	-	-	1
Pedestrian	1	-	-

Rear end crashes were the most common at the intersection of Belgrade Avenue at Range Street. Three of the rear end crashes were property damage only crashes and one was a possible injury crash. There were two right angle crashes, one sideswipe crash and a pedestrian crash that resulted in a non-incapacitating injury.

At the intersections of Belgrade Avenue with Center Street, Lake Street, and Lee Boulevard there were seven or less reported crashes between 2010 and 2014. At Center Street there were two rear end crashes, one sideswipe passing, and one left turn crash. One of the rear end crashes was a possible injury crash. The other three crashes reported at Center Street were property damage only crashes. At Lake Street there were two pedestrian crashes with one resulting in a non-incapacitating injury and the other was a possible injury crash. There was a property damage only crash from a vehicle who ran off the road at Lake Street. At the intersection of Belgrade Avenue at Lee Boulevard there were four right angle crashes with two resulting in possible injury crashes and two were property damage only crashes. There was also a head on, sideswipe opposing, and a sideswipe passing crash that were all property damage only crashes. The intersection crash rate worksheets are included in **Appendix B**.

Segment Crashes

A crash analysis was also completed along Belgrade Avenue to analyze non-intersection related crashes along the corridor from 2010 to 2014. All of the segment crashes were property damage only crashes. **Table 6** below shows the types of crashes reported along Belgrade Avenue.

Table 6. Belgrade Avenue Segment Crashes

Location	Crash Type
Lee Blvd to S Lake St	2-Sideswipe Passing, 3-Ran Off Road
S Lake St to Center St	1-Rear End
Center St to Nicollet Ave	1-Parking Related Crash
Nicollet Ave to TH 14	No Reported Crashes

There were two sideswipe passing crashes and three crashes from vehicles driving off the roadway between Lee Boulevard and South Lake Street. There was one rear end crash reported between South Lake Street and Center Street and one crash between Center Street and Nicollet Avenue from a car backing up into a parked car.

Existing Operational Analysis

A level of service (LOS) analysis of the peak hours was completed using the existing turning movement counts in SimTraffic. The LOS results are based on average delay per vehicle as calculated by the 2010 Highway Capacity Manual (HCM), which defines the level of service, based on control delay. Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection, and the time for the vehicle to speed up through the intersection and enter into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D is generally perceived to be acceptable to drivers. LOS E indicates that an intersection is operating at, or very near, its capacity and that drivers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity and drivers experience substantial delays. **Table 7** includes the results of the existing traffic analysis.

Table 7 - Existing (2016) Traffic Operations Analysis

Traffic Control Scenario	Peak Hour	Intersection Delay*- LOS		Maximum Delay-LOS**		Limiting Movement ***	Max Approach Queue		
							Direction	Average Queue (ft)	Max Queue (ft) ****
NB TH 169 Ramp at Belgrade Ave *Signalized Intersection*	AM	4	A	14	B	NBL	WBT	44	109
	PM	5	A	16	B	NBL	WBT	99	190
SB TH 169 Ramp at Belgrade Ave *Signalized Intersection*	AM	11	B	21	C	SBL	WBL	72	129
	PM	11	B	25	C	SBL	WBL	123	225
Range St at Belgrade Ave *All-Way Stop Controlled*	AM	7	A	9	A	EBT	EBL/T	45	71
	PM	8	A	10	B	WBL/EBT	WBL	83	145
Center St at Belgrade Ave *All-Way Stop Controlled*	AM	7	A	9	A	WBT	EBL/T	41	74
	PM	8	A	10	A	WBT	WBT	54	86
Sherman St at Belgrade Ave *Side-Street Stop Controlled*	AM	3	A	8	A	SBT	SBL/T/R	38	62
	PM	3	A	9	A	SBL	SBL/T/R	35	60
Lake St at Belgrade Ave *Side-Street Stop Controlled*	AM	2	A	6	A	SBL	SBL/R	23	43
	PM	2	A	8	A	SBL	EBL/T	17	50
Lee Blvd at Belgrade Ave *Side-Street Stop Controlled*	AM	4	A	40	E	WBL	SBL	38	93
	PM	4	A	25	D	WBL	SBL	45	97

*Delay in seconds per vehicle

**Maximum delay and LOS on any approach and/or movement

***Limiting Movement is the highest delay approach.

****Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

- Intersection delay is acceptable with LOS B or better at all of the intersections during both peak hours.
- The limiting movement operates with LOS E during the AM peak hour at the intersections of Lee Boulevard at Belgrade Avenue and LOS D during the PM peak hour.
- Queue Lengths
    - Belgrade Avenue at Range Street
        - The westbound left average queue extends beyond the American Legion and Frandsen Bank driveway

Tables C1 and **C2** in **Appendix C** show the existing delay and queue lengths for each movement at all of the intersections analyzed.

Appendix A: Turning Movement Counts

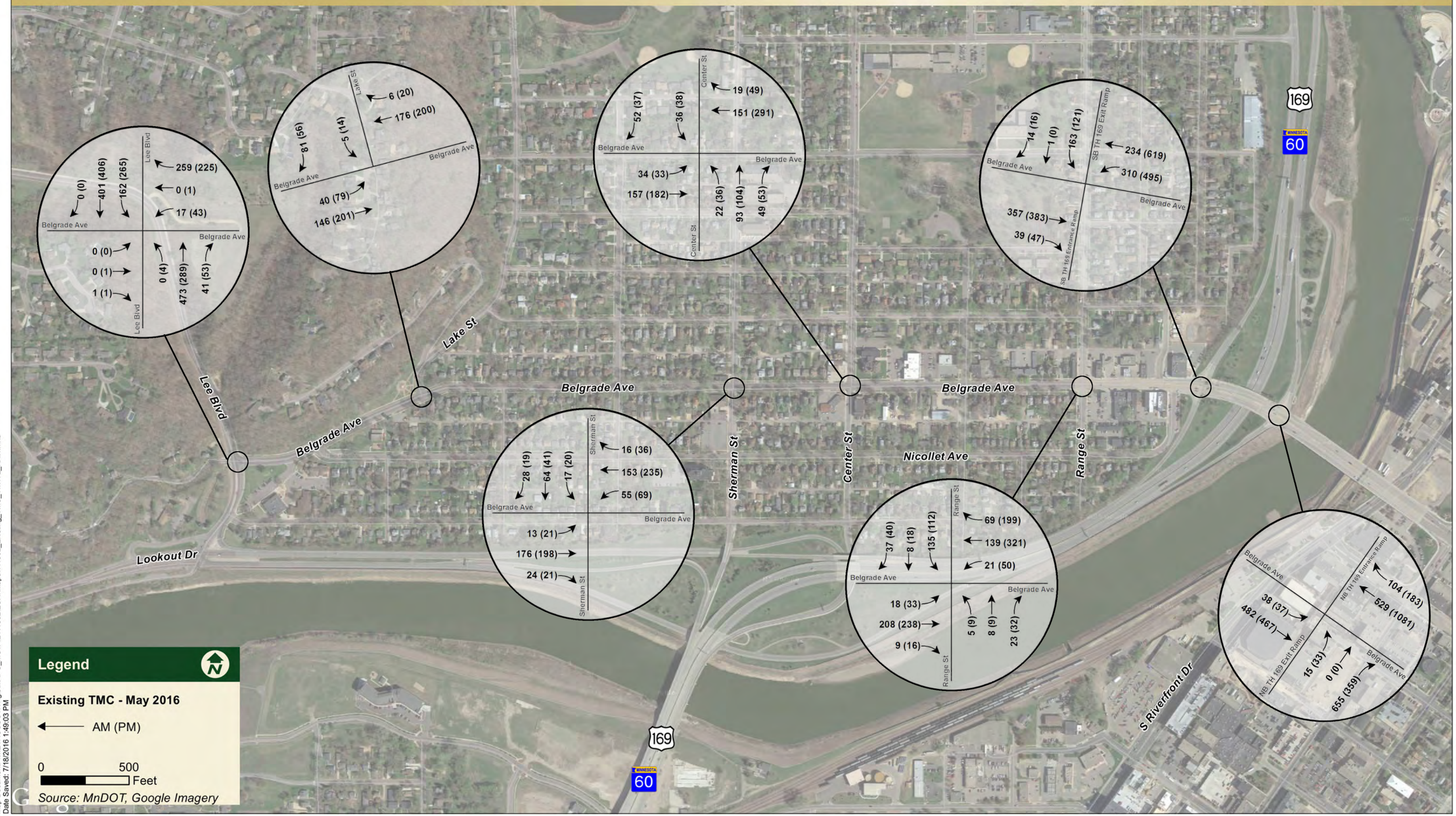
Belgrade Avenue Corridor Study

Mankato/North Mankato Area Planning Organization

Existing (May 2016) Turning Movement Counts

July 2016

BOLTON & MENK Engineers & Surveyors



Legend

Existing TMC - May 2016

AM (PM)

0 500 Feet

Source: MnDOT, Google Imagery

Map Document: \\METROSOUTH1\gis\MAPO_MUIT\42111862\ESRI\Maps\111862_Existing_TMC_11x17L_RAW.mxd
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Appendix B: Intersection Crash Rates

Intersection Safety Screening

Intersection: Belgrade Avenue at NB TH 169 Ramps

Crash Data, 2010-2014

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	4
Property Damage	9
Total Crashes	13

Intersection Characteristics	
Entering Volume	21,400
Traffic Control	Signals
Environment	Suburban
Speed Limit	30 mph

Annual crash cost = $78,120

Statewide Comparison

Signals: high volume, low speed

Total Crash Rate	
Observed	0.33
Critical Rate	1.04
Critical Index	**0.32**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Critical Rate	3.72
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.33 per MEV; this is 68% below the critical rate. Based on similar statewide intersections, an additional 28 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: Belgrade Avenue at SB TH 169 Ramps

Crash Data, 2010-2014

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	0
Possible Injury	1
Property Damage	12
Total Crashes	14

Intersection Characteristics	
Entering Volume	15,600
Traffic Control	Signals
Environment	Suburban
Speed Limit	30 mph

Annual crash cost = $143,960

Statewide Comparison

Signals: low volume, low speed

Total Crash Rate	
Observed	0.49
Critical Rate	0.92
Critical Index	**0.53**

Fatal & Serious Injury Crash Rate	
Observed	3.51
Critical Rate	4.06
Critical Index	**0.86**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.49 per MEV; this is 47% below the critical rate. Based on similar statewide intersections, an additional 13 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 3.51 per 100 MEV; this is 14% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: Belgrade Avenue at Range Street

Crash Data, 2010-2014

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	1
Possible Injury	2
Property Damage	5
Total Crashes	8

Intersection Characteristics	
Entering Volume	10,300
Traffic Control	All stop
Environment	Suburban
Speed Limit	30 mph

Annual crash cost = $71,800

Statewide Comparison *All Way Stop*

Total Crash Rate	
Observed	0.43
Critical Rate	0.71
Critical Index	**0.60**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Critical Rate	5.02
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.43 per MEV; this is 40% below the critical rate. Based on similar statewide intersections, an additional 6 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: Belgrade Avenue at Center Street

Crash Data, 2010-2014

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	1
Property Damage	3
Total Crashes	4

Intersection Characteristics	
Entering Volume	8,200
Traffic Control	All stop
Environment	Suburban
Speed Limit	30 mph

Annual crash cost = $20,640

Statewide Comparison *All Way Stop*

Total Crash Rate	
Observed	0.27
Critical Rate	0.76
Critical Index	**0.35**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Critical Rate	5.93
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.27 per MEV; this is 65% below the critical rate. Based on similar statewide intersections, an additional 8 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: Belgrade Avenue at Sherman Street

Crash Data, 2010-2014

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	0
Possible Injury	1
Property Damage	4
Total Crashes	6

Intersection Characteristics	
Entering Volume	7,000
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	30 mph

Annual crash cost = $132,120

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.47
Critical Rate	0.53
Critical Index	**0.88**

Fatal & Serious Injury Crash Rate	
Observed	7.82
Critical Rate	6.21
Critical Index	**1.26**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.47 per MEV; this is 12% below the critical rate. Based on similar statewide intersections, an additional 1 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 7.82 per 100 MEV; this is 1.3 times the critical rate.

Intersection Safety Screening

Intersection: Belgrade Avenue at Lake Street

Crash Data, 2010-2014

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	1
Possible Injury	1
Property Damage	1
Total Crashes	3

Intersection Characteristics	
Entering Volume	6,250
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	30 mph

Annual crash cost = $49,680

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.26
Critical Rate	0.56
Critical Index	**0.47**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Critical Rate	6.80
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.26 per MEV; this is 53% below the critical rate. Based on similar statewide intersections, an additional 4 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: Belgrade Avenue at Lee Street

Crash Data, 2010-2014

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	2
Property Damage	5
Total Crashes	7

Intersection Characteristics	
Entering Volume	13,450
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	30 mph

Annual crash cost = $39,800

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.29
Critical Rate	0.43
Critical Index	**0.68**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Critical Rate	3.78
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.29 per MEV; this is 32% below the critical rate. Based on similar statewide intersections, an additional 4 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Appendix C: Existing Traffic Operations

Table C1. 2016 Traffic Operational Analysis - Existing Geometry

Traffic Control Scenario	Peak Hour	Intersection Delay*- LOS		Movement Delay (sec/veh)																					
				EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
NB TH 169 Ramp at Belgrade Ave	AM	4	A	5	A	2	A	-		-		3	A	3	A	14	B	0	A	5	A	-		-		-	
Signalized Intersection	PM	5	A	7	A	3	A	-		-		6	A	4	A	16	B	3	A	5	A	-		-		-	
SB TH 169 Ramp at Belgrade Ave	AM	11	B	-		14	B	3	A	9	A	4	A	-		-		-		-		21	C	16	B	2	A
Signalized Intersection	PM	11	B	-		17	B	4	A	12	B	4	A	-		-		-		-		25	C	0	A	2	A
Range St at Belgrade Ave	AM	7	A	7	A	9	A	5	A	6	A	7	A	4	A	5	A	7	A	3	A	6	A	9	A	4	A
All-Way Stop Controlled	PM	8	A	9	A	10	A	7	A	10	B	10	A	6	A	5	A	7	A	4	A	7	A	9	A	5	A
Center St at Belgrade Ave	AM	7	A	7	A	7	A	-		-		9	A	6	A	5	A	8	A	5	A	6	A	-		4	A
All-Way Stop Controlled	PM	8	A	6	A	8	A	-		-		10	A	6	A	5	A	9	A	5	A	6	A	-		4	A
Sherman St at Belgrade Ave	AM	3	A	3	A	1	A	1	A	4	A	2	A	2	A	-		-		-		7	A	8	A	4	A
Side-Street Stop Controlled	PM	3	A	4	A	2	A	1	A	5	A	3	A	3	A	-		-		-		8	A	9	A	4	A
Lake St at Belgrade Ave	AM	2	A	3	A	1	A	-		-		1	A	1	A	-		-		-		6	A	-		3	A
Side-Street Stop Controlled	PM	2	A	4	A	1	A	-		-		1	A	1	A	-		-		-		8	A	-		3	A
Lee Blvd at Belgrade Ave	AM	4	A	0	A	0	A	18	C	40	E	0	A	2	A	0	A	6	A	7	A	9	A	1	A	0	A
Side-Street Stop Controlled	PM	4	A	0	A	13	B	4	A	25	D	2	A	2	A	7	A	6	A	6	A	6	A	1	A	0	A

*Delay in seconds per vehicle

Table C2. 2016 Peak Hour Queues by Movement - Existing Geometry

Traffic Control Scenario	Peak Hour	Queue Lengths																					
		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Avg	Max*	Avg	Max*	Avg	Max*	Avg	Max*	Avg	Max*	Avg	Max*	Avg	Max*	Avg	Max*	Avg	Max*	Avg	Max*	Avg	Max*	Avg	Max*
NB TH 169 Ramp at Belgrade Ave	AM	9	32	11	52	-		-		44	109	0	0	9	32	9	32	0	0	-		-		-	
Signalized Intersection	PM	12	42	20	72	-		-		99	190	0	0	21	48	21	48	0	0	-		-		-	
SB TH 169 Ramp at Belgrade Ave	AM	-		56	98	0	0	72	129	26	64	-		-		-		-		59	113	59	113	0	0
Signalized Intersection	PM	-		67	111	1	13	123	225	53	108	-		-		-		-		45	85	45	85	0	0
Range St at Belgrade Ave	AM	45	71	45	71	8	30	45	68	45	68	30	57	-		18	46	-		-		36	66	-	
All-Way Stop Controlled	PM	55	87	55	87	14	41	83	145	83	145	49	83	-		28	51	-		-		35	63	-	
Center St at Belgrade Ave	AM	41	74	41	74	-		-		42	67	14	41	17	43	40	67	40	67	23	45	-		23	45
All-Way Stop Controlled	PM	47	77	47	77	-		-		54	86	26	51	21	45	43	70	43	70	23	44	-		23	44
Sherman St at Belgrade Ave	AM	-		4	25	-		-		9	32	-		-		-		-		-		38	62	-	
Side-Street Stop Controlled	PM	-		8	43	-		-		13	43	-		-		-		-		-		35	60	-	
Lake St at Belgrade Ave	AM	7	33	7	33	-		-		0	0	0	0	-		-		-		23	43	-		23	43
Side-Street Stop Controlled	PM	17	50	17	50	-		-		0	0	0	0	-		-		-		25	46	-		25	46
Lee Blvd at Belgrade Ave	AM	-		0	5	-		10	32	10	32	14	38	0	0	0	4	1	10	38	93	4	50	4	50
Side-Street Stop Controlled	PM	-		2	10	-		19	47	19	47	12	34	2	16	2	16	2	13	45	97	2	26	2	26

*Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)