

Mn 220 N Corridor Study

SRC Meeting 3 – Alternatives Analysis | February 19, 2019



AGENDA

- Introductions
- Overview of Key System Needs
- Overview of Alternatives / Meeting Outcome
- Intersection Alternatives
- Intersection Alternatives Evaluation
- Segment Alternatives
- Pedestrian Connections
- Next Steps
- Other Discussion

Overview of Key System Needs

- **Key Transportation System Needs (SRC Meeting 2)**
 - Capacity
 - Increased Delay by 2045 – 17th Street, US 2
 - Safety
 - Critical Crash Rates at US 2, 17th Street and 23rd Street
 - Transportation Demand – Previous Planned Project 17th to 23rd Street, 220/US 2 Intersection
 - Social/Economic – Future Land Use Changes
 - Modal Interrelationships
 - ADA Pedestrian Ramps (33)
 - Sidewalk Gaps
 - Intersection Crossings (17th Street, 20th Street)
 - Roadway Deficiencies
 - Traffic Signal Rebuild needed by 2030 (14th Street and US 2)
 - Roadway Rehab/Reconstruct (2033/2058)
 - Access Management
 - Turn Lanes (North of 23rd Street)

Overview of Alternatives

Overview

- Intersections
- Segments
- Pedestrian Connections
- Other

Address Key Objectives

- Access Control
- Mobility
- Safety
- Pedestrian Crossing

Desired Outcome

- Understand the Trade Offs
- Informed Opinion on Preferred Alternative



Intersection Alternatives

Key Technical Comparison Metrics

- Key Considerations / Fatal Flaws / Trade Offs
- Construction Cost
- Mobility – Intersection Level of Service
- Safety – Estimated Change in Crash and Severity Rate
- Right of Way
- 20-year Traffic Operation Benefit
 - Monetizes Change in Motorist Delay
- 20-year Safety Benefit
 - Monetizes Change in Crashes
 - Injury (Fatal, Type A, Type B, Type C), Property Damage Only
- Economic Analysis - Benefit / Cost Ratio
 - $(20\text{-yr traffic op benefit} + 20\text{-yr safety benefit}) / \text{construction cost } (20\text{-year present worth} + \text{OM} - \text{remaining capital value})$

Intersection Alternatives

Evaluation Scoring Metrics

Purpose and Need

- Compatible with project purpose and needs

Intersection Capacity

- Intersection level of service
- Worst approach level of service
- Delay Benefit

Transportation Demand/System Linkage

- Side-street accessibility
- Connectivity within the study area
- Connectivity to the greater region

- Dependence on 5th Ave NW or 2nd St NE connections

- Ability to accommodate future corridor volumes

Social or Economic Demand

- Compatibility with future land development
- Existing business impact
- Ability to accommodate harvest season heavy commercial traffic volumes and movements
- Ability to accommodate year-round heavy commercial traffic movements
- Farmland impact
- Corridor visual quality impact
- Environmental impacts

Modal Interrelationships

- Pedestrian network compatibility
- Ease of pedestrian crossing
- Bicycle network compatibility
- Transit service impacts

Safety

- Crash rate
- Injury Crash Percentage
- Crash Reduction or Impact

Roadway Deficiencies

- Infrastructure lifetime

- Public street and driveway spacing

Roadway Design and Complexity

- Addresses known roadway deficiencies
- Easiness to navigate / driver familiarity
- Coordination with planned project
- Favorable construction timeline
- Right-of-way impact area
- Number of potential property acquisitions

Cost

- Estimated design & construction cost
- Cost/benefit ratio

Priority List:

- Purpose and Need
- Safety
- Intersection Capacity
- Cost / Economical
- Social or Economic Demand
- Roadway Design and Complexity
- Modal Interrelationships
- Transportation Demand/System Linkage
- Roadway Deficiencies (Access Spacing)

Intersection Alternatives

17th Street

- No build: Pedestrian Crosswalk Improvement
- Alternative A: Install Traffic Signal System
- Alternative B: Install Single Lane Roundabout

Intersection Alternatives – 17th Street

No Build: Improve Pedestrian Crossing

Curb Ext, Refuge Median, ADA Ramps



Considerations:

- Short-term intersection solution
- Does not address these concerns:
 - Long term intersection mobility
 - Existing intersection safety

Cost: Approximately \$50,000

Mobility: LOS F (2045)

Safety: No Change

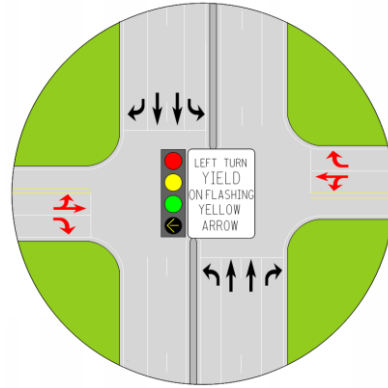
R/W: None

20-year Traffic Operation Benefit: No Change

20-year Safety Benefit: No Change

Benefit/Cost: 0

Install Traffic Signal System



Considerations:

- Warrants not met until 2045
- Expected to increase overall delay under existing conditions
- Expected to slightly improve delays by 2045

Cost: Approximately \$500,000 with ADA Improvements and Signal Communication

Mobility: LOS B (2045)

Safety: 18% reduction in crash rate and severity rate

R/W: None

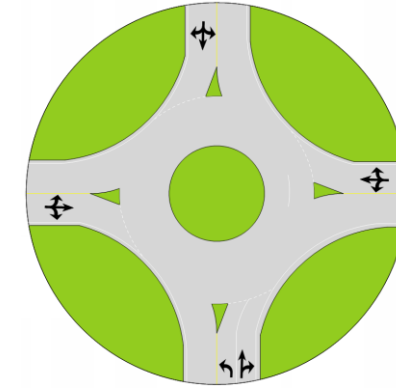
20-year Traffic Operation Benefit: (-\$1,777,272)

20-year Safety Benefit: \$219,027

Benefit/Cost:

<0

Install Single Lane Roundabout



Considerations:

- North/South ped accommodations difficult
 - May require median closure of frontage roads
 - Or routing peds on the far east and far west

Cost: Approximately \$2,600,000

Mobility: LOS A (2045)

Safety: 55% reduction in crash rate and severity rate.

R/W: None

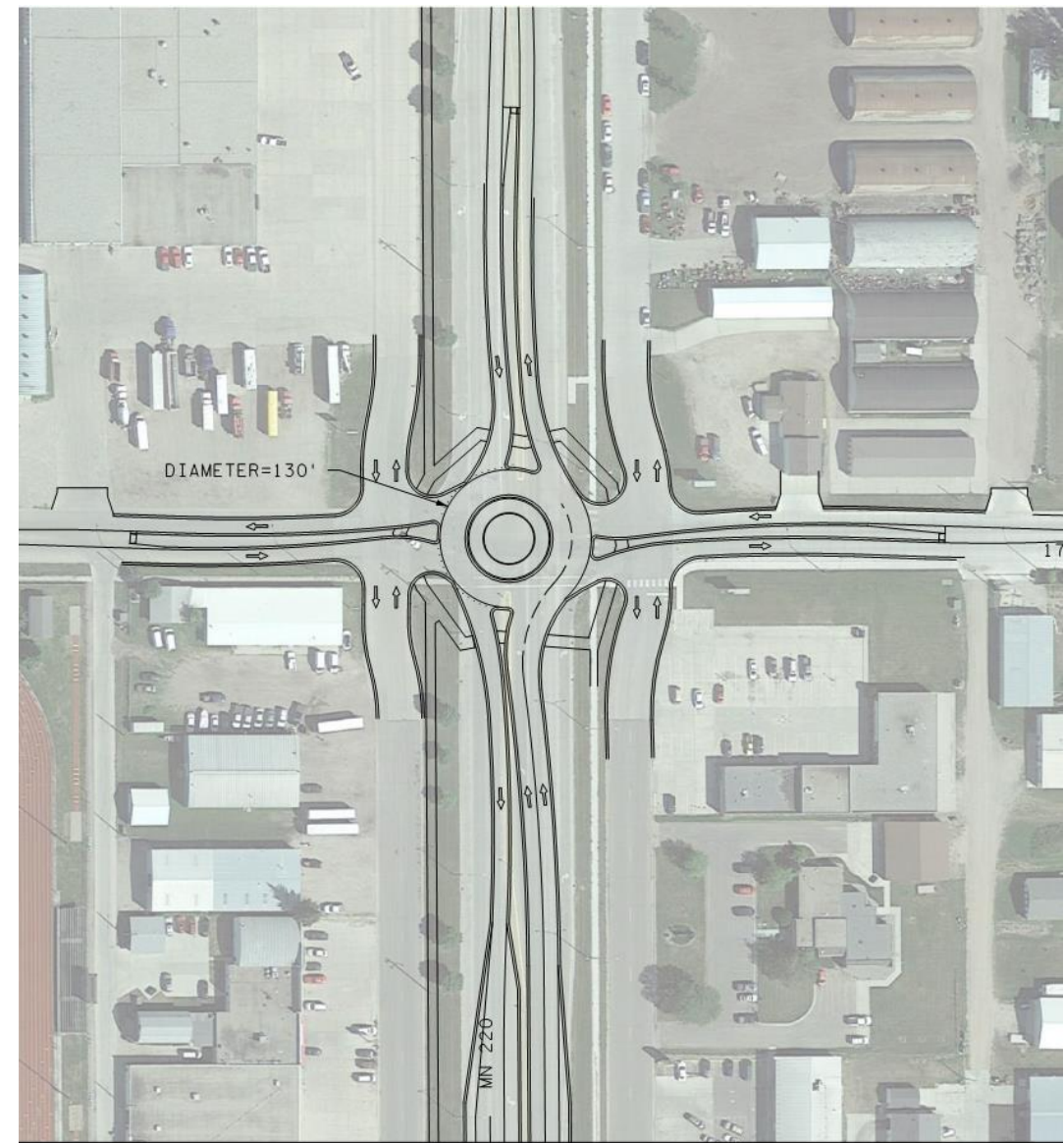
20-year Traffic Operation Benefit: \$1,487,692

20-year Safety Benefit: \$647,421

Benefit/Cost:

1.18

Intersection Alternatives – 17th Street



Intersection Alternatives – 17th Street



Intersection Alternatives – 17th Street

Evaluation Scoring Comparison

MN-220 Preliminary Alternatives Evaluation Matrix	
Purpose and Need	
1	Compatible with project purpose and needs
Intersection Capacity	
1	Intersection level of service (2045 AM/PM)
2	Worst approach level of service (2045 AM/PM)
3	Delay Benefit (Million \$; 20 Years Present Value)
Transportation Demand/System Linkage	
1	Side-street accessibility
2	Connectivity within the study area
3	Connectivity to the greater region
4	Dependence on 5th Ave NW or 2nd St NE connections
5	Ability to accommodate future corridor volumes
Social or Economic Demand	
1	Compatibility with future land development
2	Existing business impact
3	Ability to accommodate harvest season heavy commercial traffic volumes and movements
4	Ability to accommodate year-round heavy commercial traffic movements
5	Farmland impact
6	Corridor visual quality impact
7	Environmental impacts
Modal Interrelationships	
1	Pedestrian network compatibility
2	Ease of pedestrian crossing
3	Bicycle network compatibility
4	Transit service impacts
Safety	
1	Crash rate (crashes / million entering vehicles)
2	Injury Crash Percentage
3	Crash benefit (Million \$; 20 Years Present Value)
Roadway Deficiencies	
1	Infrastructure lifetime
2	Public street and driveway spacing
Roadway Design and Complexity	
1	Addresses known roadway deficiencies
2	Easiness to navigate / driver familiarity
3	Coordination with planned project
4	Favorable construction timeline
5	Right-of-way impact area
6	Number of potential property acquisitions
Cost	
1	Estimated construction cost (Million \$)
2	Benefit/cost ratio
TOTAL (Sum of Individual Scores)	

Mn 220 at 17th					
No Build		Alternative A Signal Installation (Intersection-level analysis)		Alternative B Single-lane Roundabout	
Analysis	Score	Analysis	Score	Analysis	Score
	2.0		4.0		4.0
--	2	--	4	--	4
	3.0		3.0		4.7
A/B	5	A/B	5	A/A	5
D/F	1	D/D	2	A/A	5
\$ -	3	#REF!	2	\$ 1.49	4
	3.0		3.6		3.2
--	3	--	4	--	2
OK	3	OK	3	OK	3
OK	3	OK	3	OK	3
NA	3	NA	3	NA	3
--	3	--	5	--	5
	3.0		3.0		3.4
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	5
--	3	--	3	--	4
	2.0		3.5		2.8
--	1	--	4	--	3
--	1	--	4	--	3
--	3	--	3	--	2
--	3	--	3	--	3
	3.0		3.3		4.0
0.71	3	0.58	4	0.32	5
15%	3	15%	3	15%	3
\$ -	3	\$ 0.22	3	\$ 0.65	4
	2.5		3.0		4.0
--	2	--	3	--	5
--	3	--	3	--	3
	4.0		4.3		3.8
None	1	me paveme	4	nal/Paveme	5
Comfort	5	Comfort	5	Unfamiliar	2
--	3	--	4	--	4
--	5	--	3	--	2
0	5	0	5	0	5
0	5	0	5	0	5
	3.5		2.5		2.5
\$ 0.05	4	\$ 0.50	4	\$ 2.60	2
NA	3	<0	1	1.18	3
	100.0		113.0		117.0

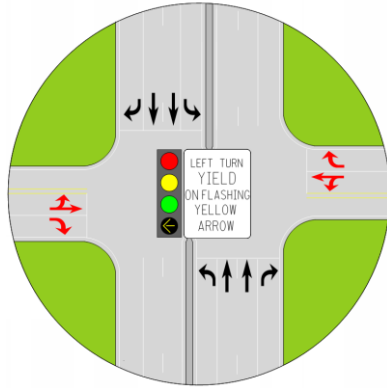
Intersection Alternatives

14th Street

- Alternative A: Rebuild Signal System
- Alternative B: Install Multilane (2x1) Roundabout

Intersection Alternatives – 14th Street

Rebuild Signal System

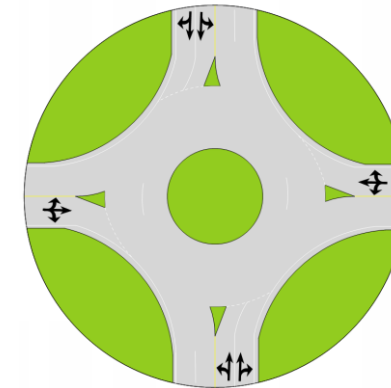


Considerations:

- Minor/no impact to street width and curbs
- Most efficient operation over a full day

Cost: Approximately \$300,000 with Traffic Signal Interconnection to US 2
Mobility: LOS B (2045)
Safety: 29% reduction in crash rate and 33% reduction in crash severity rate.
R/W: None
20-year Traffic Operation Benefit: \$371,482
20-year Safety Benefit: \$1,955,479
Benefit/Cost: 9.50

Install Multilane (2x1) Roundabout



Considerations:

- Frontage road spacing likely problematic (may not be feasible)
 - Destination Access
 - Motorists needing to make U-turns onto frontage roads
- Most efficient operation during peak periods

Cost: Approximately \$3,000,000
Mobility: LOS A (2045)
Safety: 9% increase in crash rate. 1% reduction in crash severity rate (large reduction in Type A, Type B)
R/W: None
20-year Traffic Operation Benefit: \$8,805,855
20-year Safety Benefit: \$1,803,378
Benefit/Cost: 5.20

Intersection Alternatives – 14th Street

Evaluation Scoring Comparison

MN-220 Preliminary Alternatives Evaluation Matrix	
Purpose and Need	
1	Compatible with project purpose and needs
Intersection Capacity	
1	Intersection level of service (2045 AM/PM)
2	Worst approach level of service (2045 AM/PM)
3	Delay Benefit (Million \$; 20 Years Present Value)
Transportation Demand/System Linkage	
1	Side-street accessibility
2	Connectivity within the study area
3	Connectivity to the greater region
4	Dependence on 5th Ave NW or 2nd St NE connections
5	Ability to accommodate future corridor volumes
Social or Economic Demand	
1	Compatibility with future land development
2	Existing business impact
3	Ability to accommodate harvest season heavy commercial traffic volumes and movements
4	Ability to accommodate year-round heavy commercial traffic movements
5	Farmland impact
6	Corridor visual quality impact
7	Environmental impacts
Modal Interrelationships	
1	Pedestrian network compatibility
2	Ease of pedestrian crossing
3	Bicycle network compatibility
4	Transit service impacts
Safety	
1	Crash rate (crashes / million entering vehicles)
2	Injury Crash Percentage
3	Crash benefit (Million \$; 20 Years Present Value)
Roadway Deficiencies	
1	Infrastructure lifetime
2	Public street and driveway spacing
Roadway Design and Complexity	
1	Addresses known roadway deficiencies
2	Easiness to navigate / driver familiarity
3	Coordination with planned project
4	Favorable construction timeline
5	Right-of-way impact area
6	Number of potential property acquisitions
Cost	
1	Estimated construction cost (Million \$)
2	Benefit/cost ratio
TOTAL (Sum of Individual Scores)	

Mn 220 at 14th					
No Build		Alternative A Signal Improvements (Intersection-level analysis)		Alternative B 2x1 Roundabout	
Analysis	Score	Analysis	Score	Analysis	Score
	2.0		4.0		4.0
--	2	--	4	--	4
	4.0		3.7		4.7
A/B	5	A/B	5	A/A	5
B/B	4	C/C	3	A/A	5
\$ -	3	#REF!	3	\$ 8.81	4
	3.4		3.6		3.2
--	3	--	4	--	2
OK	3	OK	3	OK	3
OK	3	OK	3	OK	3
NA	3	NA	3	NA	3
--	5	--	5	--	5
	3.0		3.0		3.4
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	5
--	3	--	3	--	4
	2.8		2.8		2.5
--	2	--	2	--	2
--	3	--	3	--	3
--	3	--	3	--	2
--	3	--	3	--	3
	3.0		4.0		3.3
0.70	3	0.50	4	0.76	2
22%	3	20%	4	19%	4
\$ -	3	\$ 1.96	4	\$ 1.80	4
	2.0		3.0		3.5
--	1	--	3	--	5
--	3	--	3	--	2
	3.8		4.2		3.7
None	1	Signal	3	Signal/Pavement	5
Comfort	5	Comfort	5	Unfamiliar	2
--	2	--	3	--	3
--	5	--	4	--	2
0	5	0	5	0	5
0	5	0	5	0	5
	4.0		4.0		3.0
\$ -	5	\$ 0.30	4	\$ 3.00	2
NA	3	#REF!	4	5.20	4
	107.0		116.0		113.0

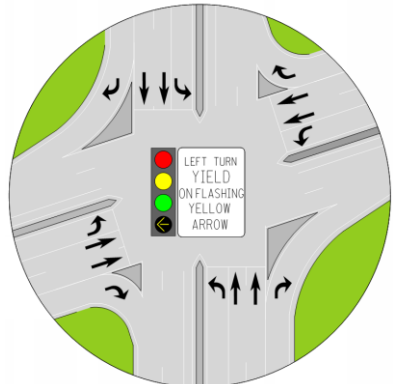
Intersection Alternatives

US 2

- Alternative A: Rebuild Signal System
 - Alternative A-0: Offset EB/WB Left Turn Lanes + Alternative A
 - Alternative A-1: Dual EB Left Turn Lanes + Alternative A
 - Alternative A-2: Right Turn Channelization Improvements + Alternative A
 - Alternative A-3: Offset EB/WB Left Turn Lanes + Right Turn Channelization Improvements + Alternative A
- Alternative B: Install Roundabout
- Alternative C: Displaced EB Left Turn
- Alternative D: Grade Separated Interchange
- Alternative E: System Improvements – 5th Avenue NW Access

Intersection Alternatives – US 2

A: Rebuild Signal System



Considerations:

- FYA provides operational flexibility
- Expected to improve intersection operation (minimal)
- Expected to improve motorist safety
 - However, does not address right turn related crashes or pedestrian comfort

Cost: Approximately \$350,000 including communication to US 2/5th Avenue NE

Mobility: LOS D (2045)

Safety: 25% decrease in crash rate. 23% decrease in severity rate.

R/W: None

20-year Traffic Operation Benefit: (-\$1,922,257)

20-year Safety Benefit: \$2,111,426

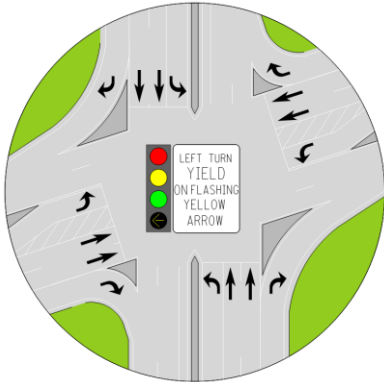
Benefit/Cost: 0.66

Traffic Signal System Improvements (All Rebuild Options)

- Install FYA on all approaches
 - Operate eastbound/westbound protected only 11 am to 6 pm and northbound protected/permissive all day
 - Implement FYA Omit logic for pedestrian actuations
- Install communication and coordinate signal timing with 14th Street NW and 5th Avenue NE
- Implement a southbound right turn overlap (concurrent with the eastbound left turn)
- Install pedestrian countdown timers
- Update the pedestrian and vehicle clearance intervals to current standards
- Add an additional overhead signal indication for each approach to improve visibility and provide yellow backplate for FYA left turn indications

Intersection Alternatives – US 2

A-0: Offset EB/WB Left Turn Lanes



Considerations:

- FYA provides operational flexibility
- Expected to improve intersection operation (minimal)
- Expected to improve motorist safety
 - However, does not address right turn related crashes or pedestrian comfort

Cost: Approximately \$2,350,000

Mobility: LOS D (2045)

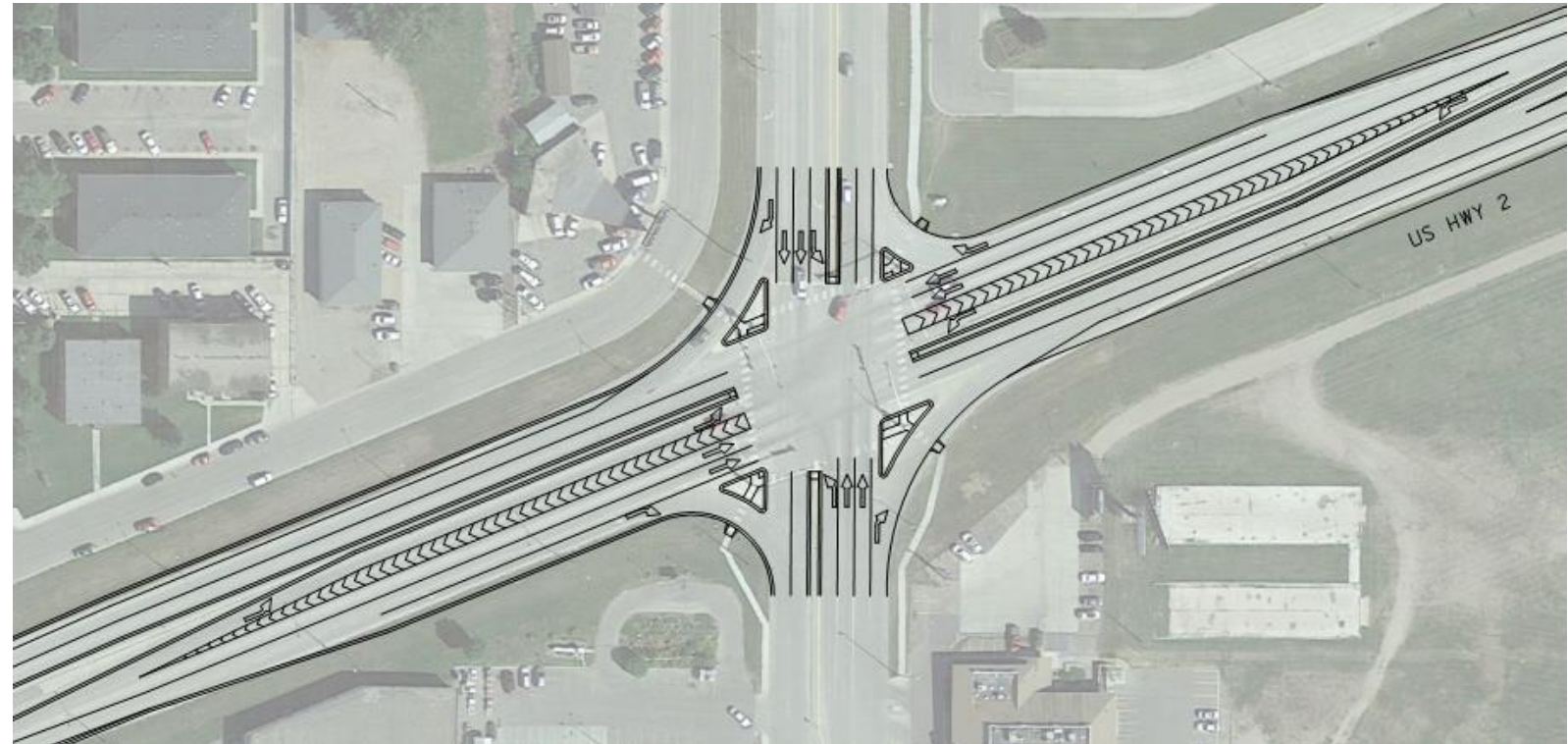
Safety: 31% decrease in crash rate. 28% decrease in severity rate.

R/W: None

20-year Traffic Operation Benefit: (-\$1,922,257)

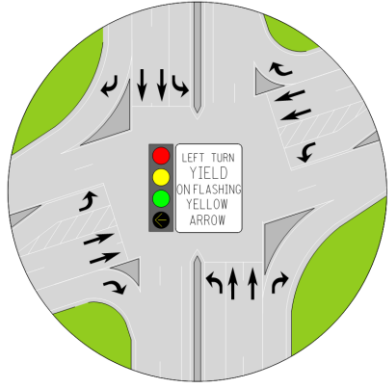
20-year Safety Benefit: \$2,721,822

Benefit/Cost: 0.48



Intersection Alternatives – US 2

A-1: Dual EB Left Turn Lanes



Considerations:

- FYA provides operational flexibility
- LOS C in 2045
- Minimizes need for 5th Ave NW full access
- Does not address right turn related crashes or pedestrian comfort

Cost: Approximately \$2,350,000

Mobility: LOS C (2045) or LOS D if No Connection at 5th Ave

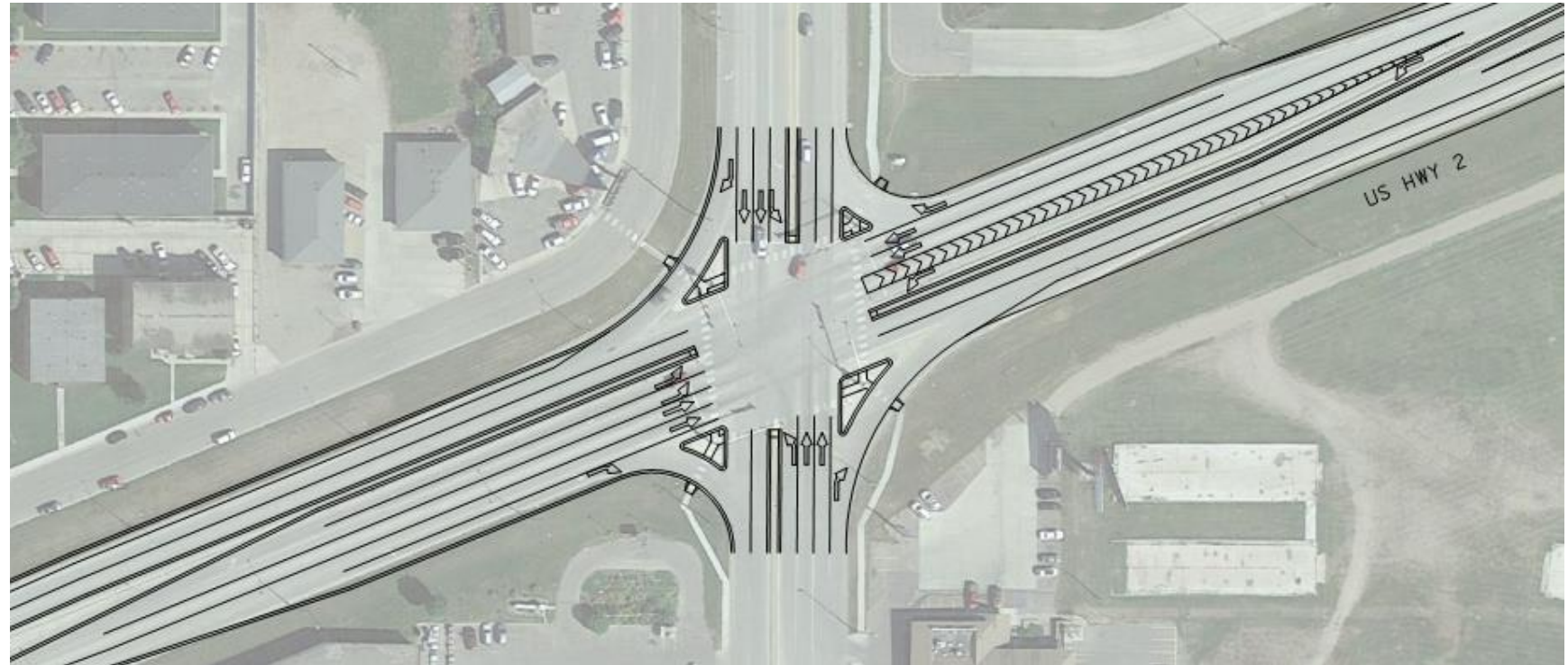
Safety: 27% decrease in crash rate. 25% decrease in severity rate.

R/W: None

20-year Traffic Operation Benefit: \$5,095,230

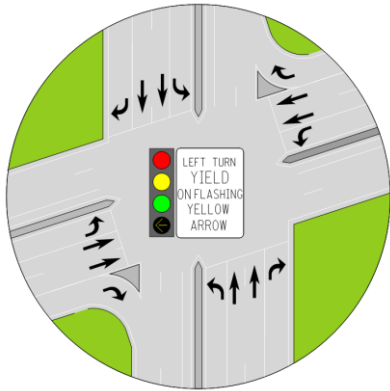
20-year Safety Benefit: \$2,363,174

Benefit/Cost: 4.47



Intersection Alternatives – US 2

A-2: Right Turn Channelization



Considerations:

- Operational improvement is minimal by itself. Best if coupled with other geometric improvements
- LOS D expected in 2045

Cost: Approximately \$875,000

Mobility: LOS D (2045)

Safety: 26% decrease in crash rate. 23% reduction in severity rate.

R/W: None

20-year Traffic Operation Benefit: (-\$2,038,918)

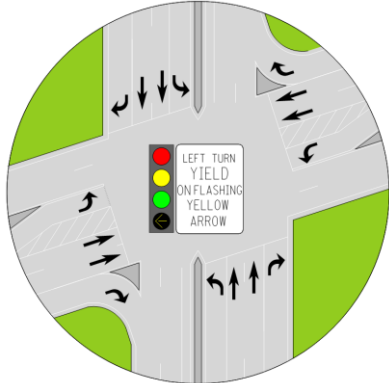
20-year Safety Benefit: \$2,085,539

Benefit/Cost: 0.07



Intersection Alternatives – US 2

A-3: RT Channelization + Offset LT Lanes



Considerations:

- Additional Operational improvement is minimal
- LOS C/D expected in 2045

Cost: Approximately \$2,650,000

Mobility: LOS D (2045) or LOS E if No Connection at 5th Ave

Safety: 32% decrease in crash rate. 29% reduction in severity rate.

R/W: None

20-year Traffic Operation Benefit: (-\$2,038,918)

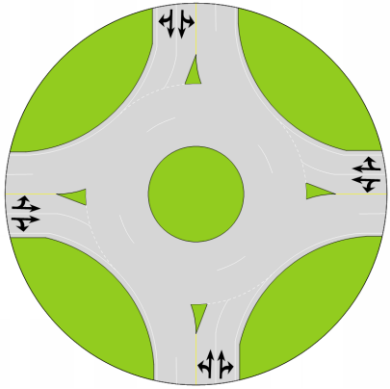
20-year Safety Benefit: \$2,746,728

Benefit/Cost: 0.38



Intersection Alternatives – US 2

B: Install Roundabout



Considerations:

- Fits within existing intersection footprint
- Expected to increase crashes but significantly reduce severity of injury crashes
- Not ideal control device if 14th remains signal

Cost: Approximately \$3,600,000

Mobility: LOS A (2045) or LOS C if No Connection at 5th Ave

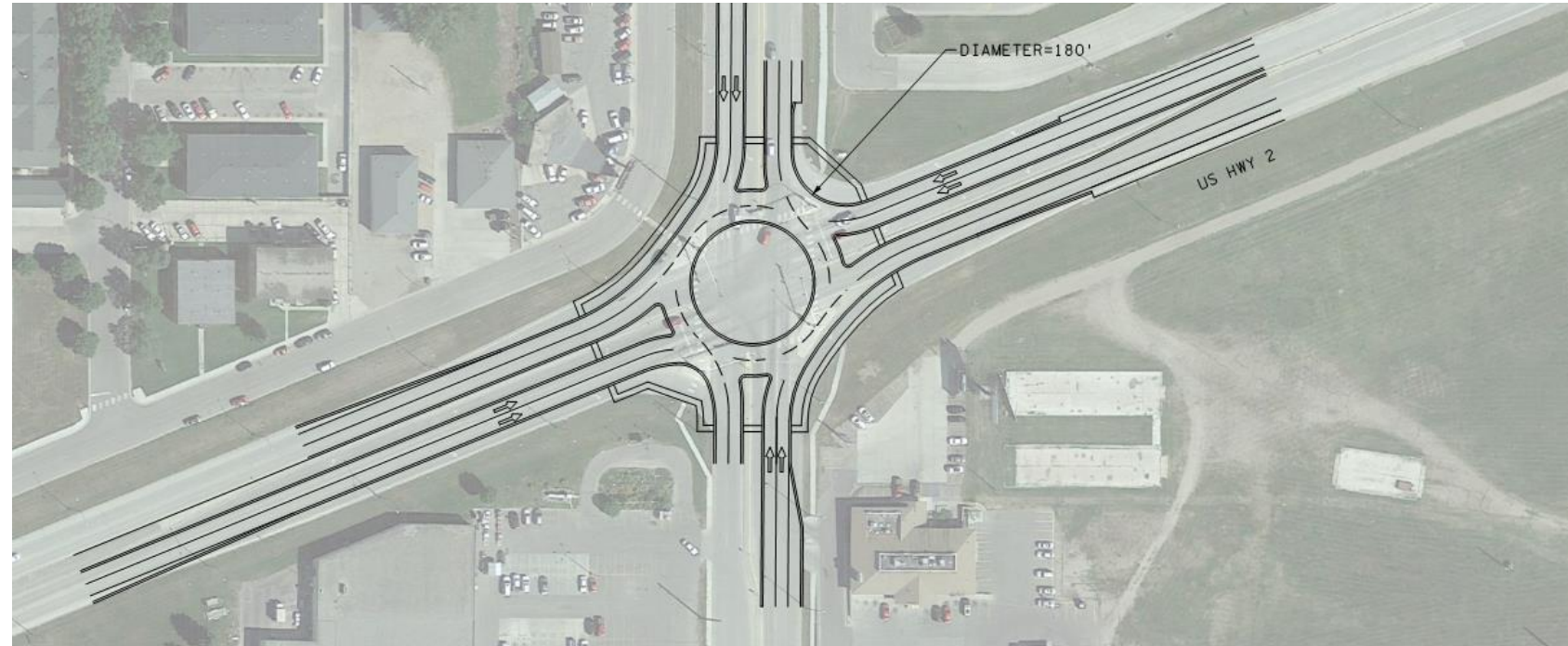
Safety: 71% increase in crash rate. 35% increase in severity rate.

R/W: None

20-year Traffic Operation Benefit: \$38,510,513

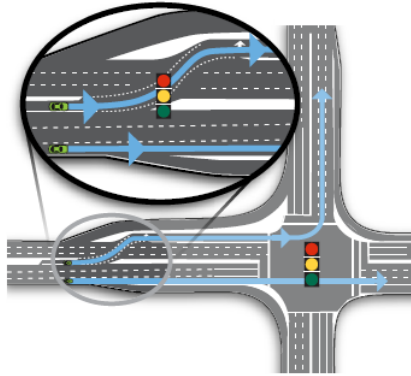
20-year Safety Benefit: \$4,255,888

Benefit/Cost: 17.34



Intersection Alternatives – US 2

Displaced EB Left Turn



Considerations:

- Improves intersection capacity by removing high volume conflicting movement
- Adds additional traffic signal
- Requires substantial roadway space (expected to have R/W and frontage road impacts)

Cost: Approximately \$2,900,000

Mobility: LOS C (2045)

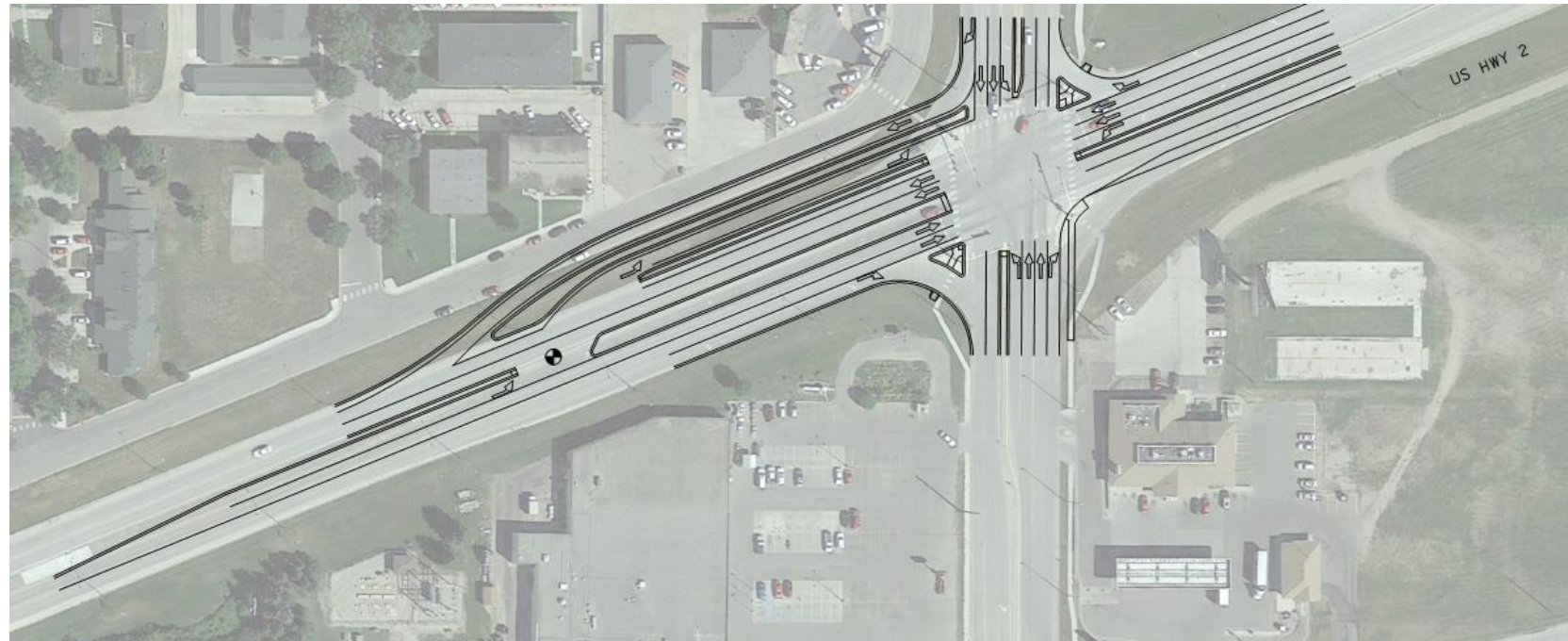
Safety: 25% decrease in crash rate. 23% reduction in severity rate.

R/W: Frontage Road Impact

20-year Traffic Operation Benefit: \$9,010,428

20-year Safety Benefit: \$2,111,426

Benefit/Cost: 5.41



Intersection Alternatives – US 2

Grade Separated Interchange (Tight Diamond)



Considerations:

- May impact businesses and local resident properties
- Significant cost for comparable benefit to other alternatives
- Overpass could significantly impact visibility and presence of remaining businesses
- Other non-traditional interchange options could be explored to minimize property or R/W acquisition – Seem Feasible
- Frontage Road Operation/Property Access
- Peak Hour in 2045 LOS D (or LOS C w/5th Ave) – Worth it?

Cost: High. > \$15,000,000 to 20M excluding R/W and property acquisition costs

Mobility: NA

Safety: NA

R/W: Significant Impact

20-year Traffic Operation Benefit: NA

20-year Safety Benefit: NA

Benefit/Cost: NA



⊗ Signal
⊙ Thru-Stop

Grade Separated Interchange (US 2 WB Over Partial)



Grade Separated Interchange (US 2 Over w/ Ramps)

Intersection Alternatives – US 2

System Improvements (5th Ave NW)



Considerations:

- Volumes on Mn 220
 - Maintaining existing 5th Ave NW configuration results in approx. 1,900 ADT on Mn 220
 - Streetlight O-D found existing EB left turn at Mn 220 & US 2 would decrease by 33% during AM and 18% during PM
 - North of 14th Street, marginal change in overall ADT of Mn 220
- ¾ access or full access signalize intersection overall provides a positive benefit to the transportation system (viable long term alternative)
- Without 5th Ave NW access, single EB left turn lane at MN 220/US may not be feasible (i.e., LOS D operation at US 2/Mn 220)



Intersection Alternatives – US 2

Evaluation Scoring Comparison

MN-220 Preliminary Alternatives Evaluation Matrix		Mn 220 at US 2																					
		No Build		Alternative A Signal Improvements (Intersection-level analysis)		Alternative A-0 Alternative A + Offset EB/WB LT Lanes		Alternative A-1 Alternative A + Dual EB LT Lanes		Alternative A-2 Alternative A + RT Channelization Improvements		Alternative A-3 Alternative A + Offset EB/WB LT Lanes + RT Channelization		Alternative B 2-lane Roundabout		Alternative C Displaced EB LT		Alternative D Grade Separation (Tight Diamond)		Alternative D-2 Grade Separation (Partial Ramps)		Alternative D-3 Grade Separation (WB Overpass)	
		Analysis	Score	Analysis	Score	Analysis	Score	Analysis	Score	Analysis	Score	Analysis	Score	Analysis	Score	Analysis	Score	Analysis	Score	Analysis	Score	Analysis	Score
Purpose and Need		--	1	--	4	--	4	--	4	--	4	--	4	--	4	--	4	--	4	--	4	--	4
1 Compatible with project purpose and needs		--	1	--	4	--	4	--	4	--	4	--	4	--	4	--	4	--	4	--	4	--	4
Intersection Capacity		2.3	2.0	2.0	2.0	2.0	3.0	2.0	2.0	2.0	4.7	3.3	4.7	3.3	4.7	3.3	4.7	3.3	4.7	3.3	4.7	3.3	4.7
1 Intersection level of service (2045 AM/PM)		D/D	D/D	D/D	D/D	D/D	C/C	D/D	D/D	D/D	A/A	C/C	C/C	NA	5	NA	5	NA	5	NA	5	NA	5
2 Worst approach level of service (2045 AM/PM)		D/E	D/E	D/E	D/E	D/D	D/D	D/D	D/D	D/D	B/C	C/C	C/C	NA	4	NA	4	NA	4	NA	4	NA	4
3 Delay Benefit (Million \$; 20 Years Present Value)		\$ -	\$ (1.92)	\$ (1.92)	\$ (1.92)	\$ 5.10	\$ (2.04)	\$ (2.04)	\$ (2.04)	\$ (2.04)	\$ 38.51	\$ 9.01	\$ 9.01	\$ 9.01	\$ 4	Large	\$ 5	Large	\$ 5	Large	\$ 5	Large	\$ 5
Transportation Demand/System Linkage		2.4	2.6	2.6	2.6	3.2	2.6	2.6	2.6	2.6	3.6	3.2	3.2	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6
1 Side-street accessibility		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
2 Connectivity within the study area		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
3 Connectivity to the greater region		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
4 Dependence on 5th Ave NW or 2nd St NE connections		NA	1	NA	1	NA	1	C/D	3	NA	1	D/E	1	B/C	4	A-1	3	NA	4	NA	4	NA	4
5 Ability to accommodate future corridor volumes		--	2	--	3	--	3	--	4	--	3	--	3	--	5	--	4	--	5	--	5	--	5
Social or Economic Demand		3.0	3.0	3.0	3.0	2.9	3.1	2.9	3.1	2.9	3.4	2.7	2.7	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4
1 Compatibility with future land development		--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	2	--	3
2 Existing business impact		--	3	--	3	--	3	--	3	--	3	--	3	--	2	--	1	--	2	--	2	--	3
3 Ability to accommodate harvest season heavy commercial traffic volumes and movements		--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3
4 Ability to accommodate year-round heavy commercial traffic movements		--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3
5 Farmland impact		--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3
6 Corridor visual quality impact		--	3	--	3	--	3	--	3	--	3	--	5	--	3	--	1	--	1	--	1	--	1
7 Environmental impacts		--	3	--	3	--	2	--	4	--	2	--	4	--	2	--	1	--	1	--	1	--	1
Modal Interrelationships		2.8	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.5	2.8	1.8	1.8	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
1 Pedestrian network compatibility		--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	1	--	3	--	3	--	3
2 Ease of pedestrian crossing		--	2	--	4	--	4	--	4	--	4	--	2	--	2	--	2	--	4	--	4	--	4
3 Bicycle network compatibility		--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	1	--	3	--	3	--	3
4 Transit service impacts		--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3	--	3
Safety		3.0	3.7	4.0	3.7	3.7	3.7	3.7	3.7	4.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
1 Crash rate (crashes / million entering vehicles)		1.27	3	0.95	4	0.88	5	0.93	4	0.94	5	2.18	1	0.95	4	NA	4	NA	4	NA	4	NA	4
2 Injury Crash Percentage		29%	3	30%	3	30%	3	30%	3	31%	3	14%	5	30%	3	NA	3	NA	3	NA	3	NA	3
3 Crash benefit (Million \$; 20 Years Present Value)		\$ -	\$ 3	\$ 2.11	\$ 4	\$ 2.72	\$ 4	\$ 2.36	\$ 4	\$ 2.09	\$ 4	\$ 2.75	\$ 4	\$ 4.26	\$ 5	\$ 2.11	\$ 4	NA	\$ 4	NA	\$ 4	NA	\$ 4
Roadway Deficiencies		2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	2.5	3.0	3.0	4.0	2.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1 Infrastructure lifetime		--	1	--	3	--	3	--	3	--	3	--	5	--	3	--	4	--	4	--	4	--	4
2 Public street and driveway spacing		--	3	--	3	--	3	--	3	--	3	--	3	--	2	--	2	--	2	--	2	--	2
Roadway Design and Complexity		3.8	4.3	4.2	4.2	4.2	4.2	4.2	4.2	4.2	3.7	2.2	2.2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0
1 Addresses known roadway deficiencies		None	1	Signal	4	Signal	4	Signal	4	Signal	4	Signal/Pavement	5	Signal	4	Signal/Pavement	5	Signal/Pavement	5	Signal/Pavement	5	Signal/Pavement	5
2 Easiness to navigate / driver familiarity		Comfort	5	Familiar	4	Familiar	4	Familiar	4	Familiar	4	Unfamiliar	2	Very Unfamiliar	1	Comfort	5	Comfort	5	Comfort	5	Comfort	4
3 Coordination with planned project		--	2	--	5	--	4	--	4	--	5	--	2	--	2	--	2	--	2	--	2	--	2
4 Favorable construction timeline		--	5	--	3	--	3	--	3	--	3	--	2	--	2	--	1	--	1	--	1	--	1
5 Right-of-way impact area		0	5	0	5	0	5	0	5	0	5	0	5	0	5	Some	2	Large	1	Large	1	Large	3
6 Number of potential property acquisitions		0	5	0	5	0	5	0	5	0	5	0	5	0	5	Some	2	Large	1	Large	1	Large	3
Cost		4.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	2.0	3.5	3.0	1.0	1.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0
1 Estimated construction cost (Million \$)		\$ -	\$ 5	\$ 0.35	\$ 4	\$ 2.35	\$ 2	\$ 2.35	\$ 2	\$ 0.88	\$ 4	\$ 2.65	\$ 2	\$ 3.60	\$ 2	\$ 2.90	\$ 2	>\$15m	\$ 1	>\$15m	\$ 1	>\$5m	\$ 2
2 Benefit/cost ratio		NA	3	0.66	2	0.48	2	4.47	4	0.07	2	0.38	2	17.34	5	5.41	4	NA	1	NA	2	NA	2
TOTAL (Sum of Individual Scores)		96.0	106.0	104.0	110.0	107.0	103.0	118.0	95.0	92.0	99.0	105.0											

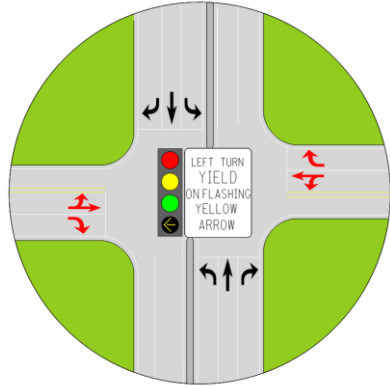
Intersection Alternatives

23rd Street

- Alternative A: Install Traffic Signal System
- Alternative B: Install Single Lane Roundabout

Intersection Alternatives – 23rd Street

Install Traffic Signal System



Considerations:

- Warrants not met until 2045
- Expected to increase overall delay
- Expected to increase overall crash rate and potentially severity

Cost: Approximately \$500,000 with ADA Improvements

Mobility: LOS B (2045)

Safety: 10% Increase in crash and severity rate

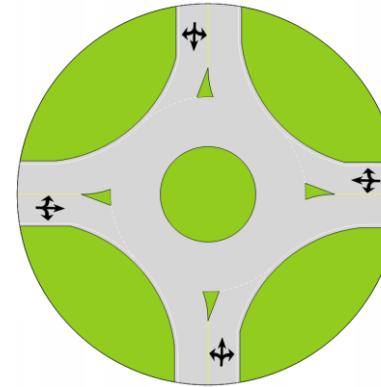
R/W: None

20-year Traffic Operation Benefit: (-\$3,050,616)

20-year Safety Benefit: (-\$171,503)

Benefit/Cost: <0

Install Single Lane Roundabout



Considerations:

- Frontage road spacing may present design and/or operation challenges
- Existing ditches, drainage design and storm sewer system needs

Cost: Approximately \$2,950,000

Mobility: LOS A (2045)

Safety: 41% reduction in crash rate. 48% reduction in severity rate

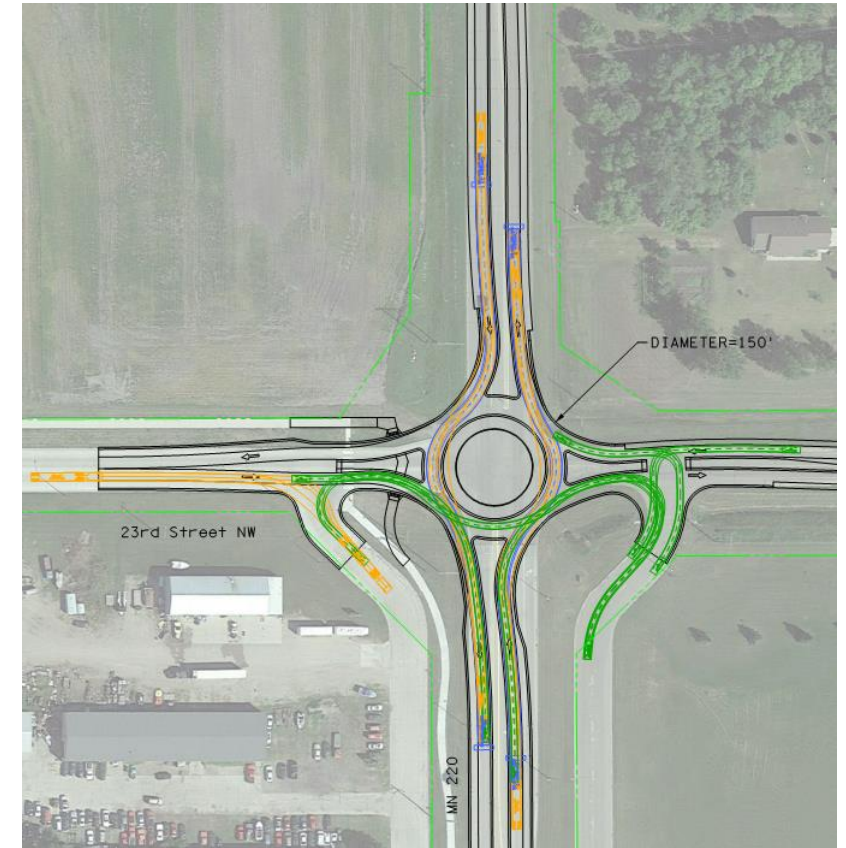
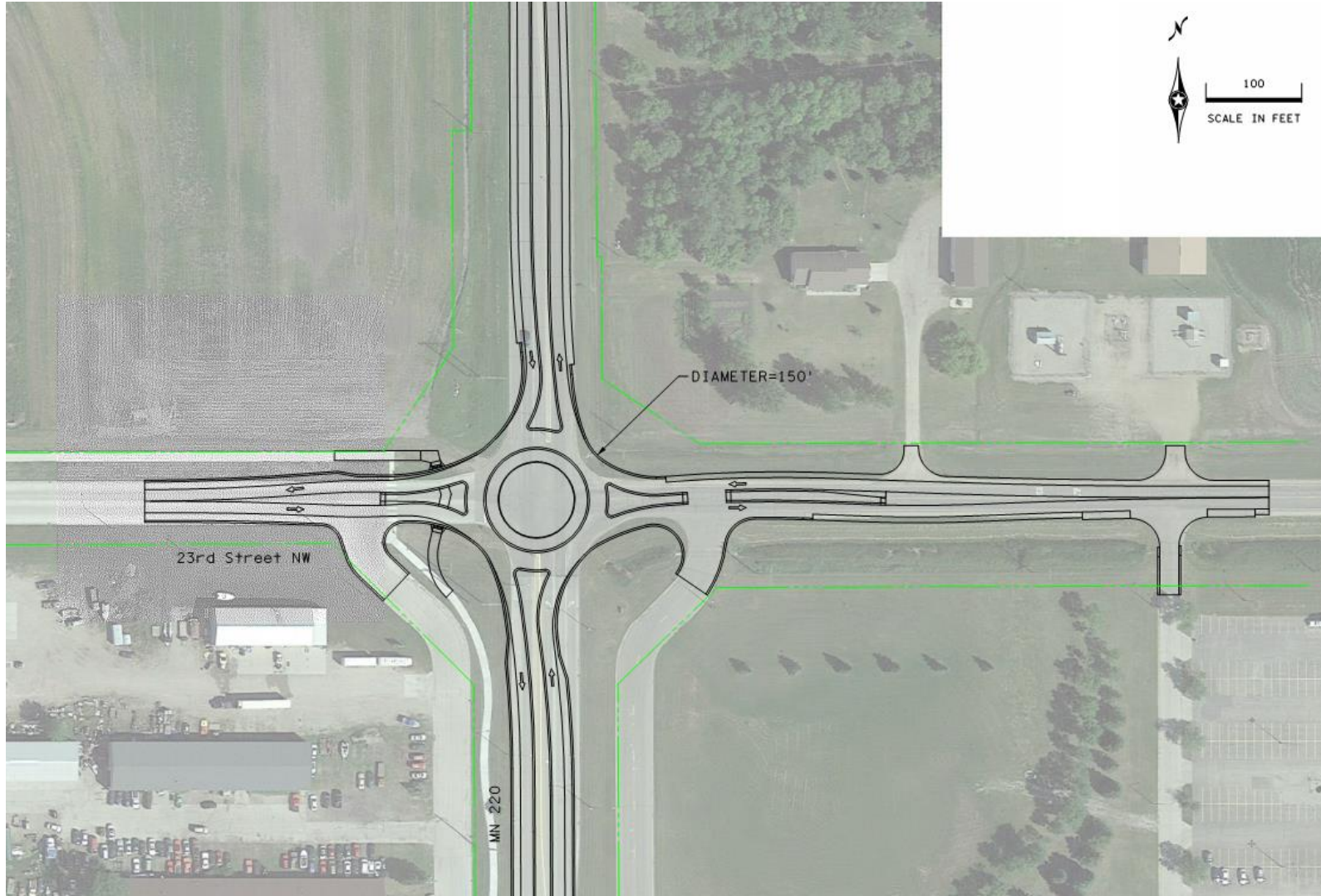
R/W: None

20-year Traffic Operation Benefit: \$1,026,765

20-year Safety Benefit: \$990,747

Benefit/Cost: 0.98

Intersection Alternatives – 23rd Street



Intersection Alternatives – 23rd Street

Evaluation Scoring Comparison

MN-220 Preliminary Alternatives Evaluation Matrix	
Purpose and Need	
1	Compatible with project purpose and needs
Intersection Capacity	
1	Intersection level of service (2045 AM/PM)
2	Worst approach level of service (2045 AM/PM)
3	Delay Benefit (Million \$; 20 Years Present Value)
Transportation Demand/System Linkage	
1	Side-street accessibility
2	Connectivity within the study area
3	Connectivity to the greater region
4	Dependence on 5th Ave NW or 2nd St NE connections
5	Ability to accommodate future corridor volumes
Social or Economic Demand	
1	Compatibility with future land development
2	Existing business impact
3	Ability to accommodate harvest season heavy commercial traffic volumes and movements
4	Ability to accommodate year-round heavy commercial traffic movements
5	Farmland impact
6	Corridor visual quality impact
7	Environmental impacts
Modal Interrelationships	
1	Pedestrian network compatibility
2	Ease of pedestrian crossing
3	Bicycle network compatibility
4	Transit service impacts
Safety	
1	Crash rate (crashes / million entering vehicles)
2	Injury Crash Percentage
3	Crash benefit (Million \$; 20 Years Present Value)
Roadway Deficiencies	
1	Infrastructure lifetime
2	Public street and driveway spacing
Roadway Design and Complexity	
1	Addresses known roadway deficiencies
2	Easiness to navigate / driver familiarity
3	Coordination with planned project
4	Favorable construction timeline
5	Right-of-way impact area
6	Number of potential property acquisitions
Cost	
1	Estimated construction cost (Million \$)
2	Benefit/cost ratio
TOTAL (Sum of Individual Scores)	

Mn 220 at 23rd					
No Build		Alternative A Signal Installation (Intersection-level analysis)		Alternative B Single-lane Roundabout	
Analysis	Score	Analysis	Score	Analysis	Score
	2.0		4.0		4.0
--	2	--	4	--	4
	3.7		3.0		4.7
A/A	5	B/B	4	A/A	5
C/C	3	B/B	4	A/A	5
\$ -	3	#REF!	1	\$ 1.03	4
	3.2		3.6		3.8
--	3	--	4	--	5
OK	3	OK	3	OK	3
OK	3	OK	3	OK	3
NA	3	NA	3	NA	3
--	4	--	5	--	5
	3.0		3.1		3.6
--	3	--	4	--	4
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	5
--	3	--	3	--	4
	3.0		3.3		3.0
--	3	--	3	--	3
--	3	--	4	--	4
--	3	--	3	--	2
--	3	--	3	--	3
	3.0		2.3		4.0
0.54	3	0.59	3	0.32	4
33%	3	38%	2	25%	4
\$ -	3	\$ (0.17)	2	\$ 0.99	4
	2.5		3.0		4.0
--	2	--	3	--	5
--	3	--	3	--	3
	3.8		4.5		3.5
None	1	me paveme	4	nal/Paveme	5
Comfort	5	Comfort	5	Unfamiliar	2
--	2	--	5	--	2
--	5	--	3	--	2
0	5	0	5	0	5
0	5	0	5	0	5
	4.0		2.5		2.0
\$ -	5	\$ 0.50	4	\$ 2.95	2
NA	3	<0	1	0.98	2
	107.0		111.0		119.0

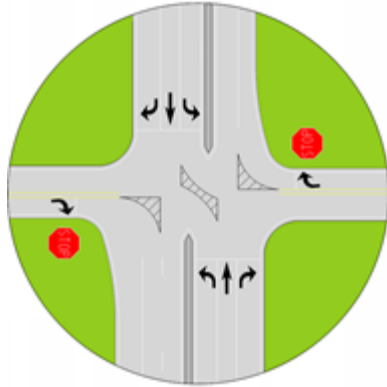
Intersection Alternatives

20th Street – (Existing Crosswalk)

- Alternative A: Convert to $\frac{3}{4}$ Access
- Alternative B: Convert to $\frac{3}{4}$ Access and also Prohibit Southbound Left Turns

Intersection Alternatives – 20th Street

Convert to ¾ Access



Considerations:

- Option: improve crosswalk on north leg (or remove crosswalk with construction of sidewalk on east side of Mn 220)
 - Consider curb extensions on north leg
- Minimal inconvenience due to frontage road connectedness
- Public/business perception of reduced access
- May need full access if frontage road at 17th is disconnected with RAB

Cost: Approximately \$350,000

Mobility: LOS A

Safety: Reduced Crash Rate (Reduces Right Angle Crashes)

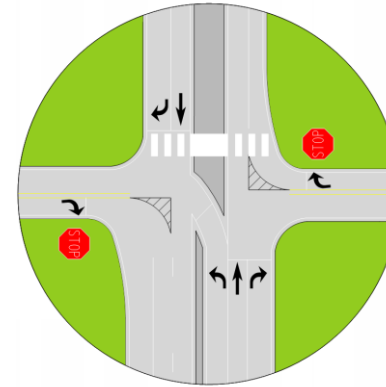
R/W: None

20-year Traffic Operation Benefit: NA

20-year Safety Benefit: NA

Benefit/Cost: NA

Convert to ¾ Access and Prohibit Southbound Left Turns



Considerations:

- Improve crosswalk on north side
 - Consider curb extensions on north leg
 - Removal of SB left turn allows for wide refuge median
- Minimal inconvenience due to frontage road connectedness
- Public/business perception of reduced access
- May need full access if frontage road at 17th is disconnected with RAB

Cost: Approximately \$600,000

Mobility: LOS A

Safety: Reduced Crash Rate (Reduces Right Angle Crashes)

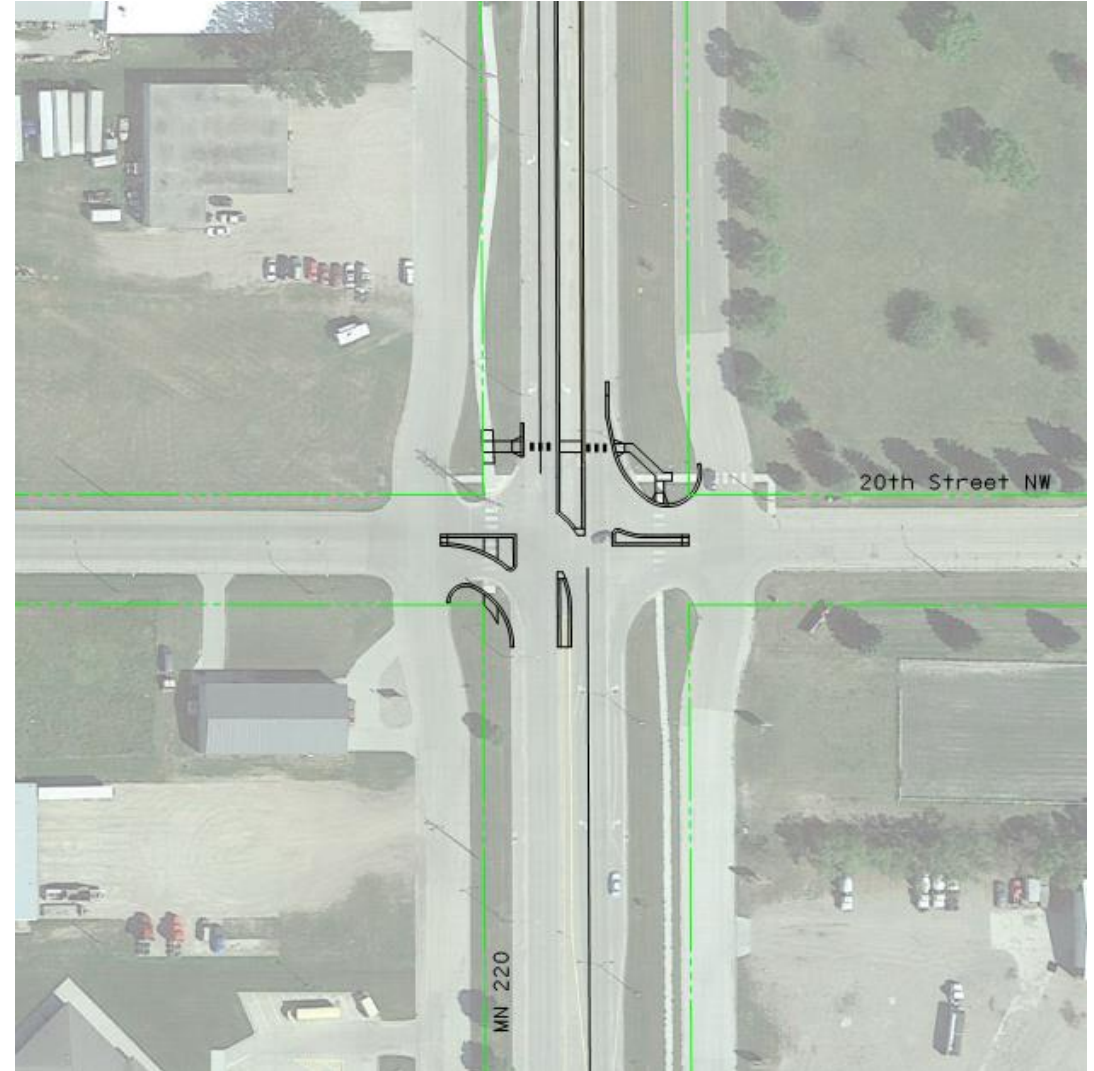
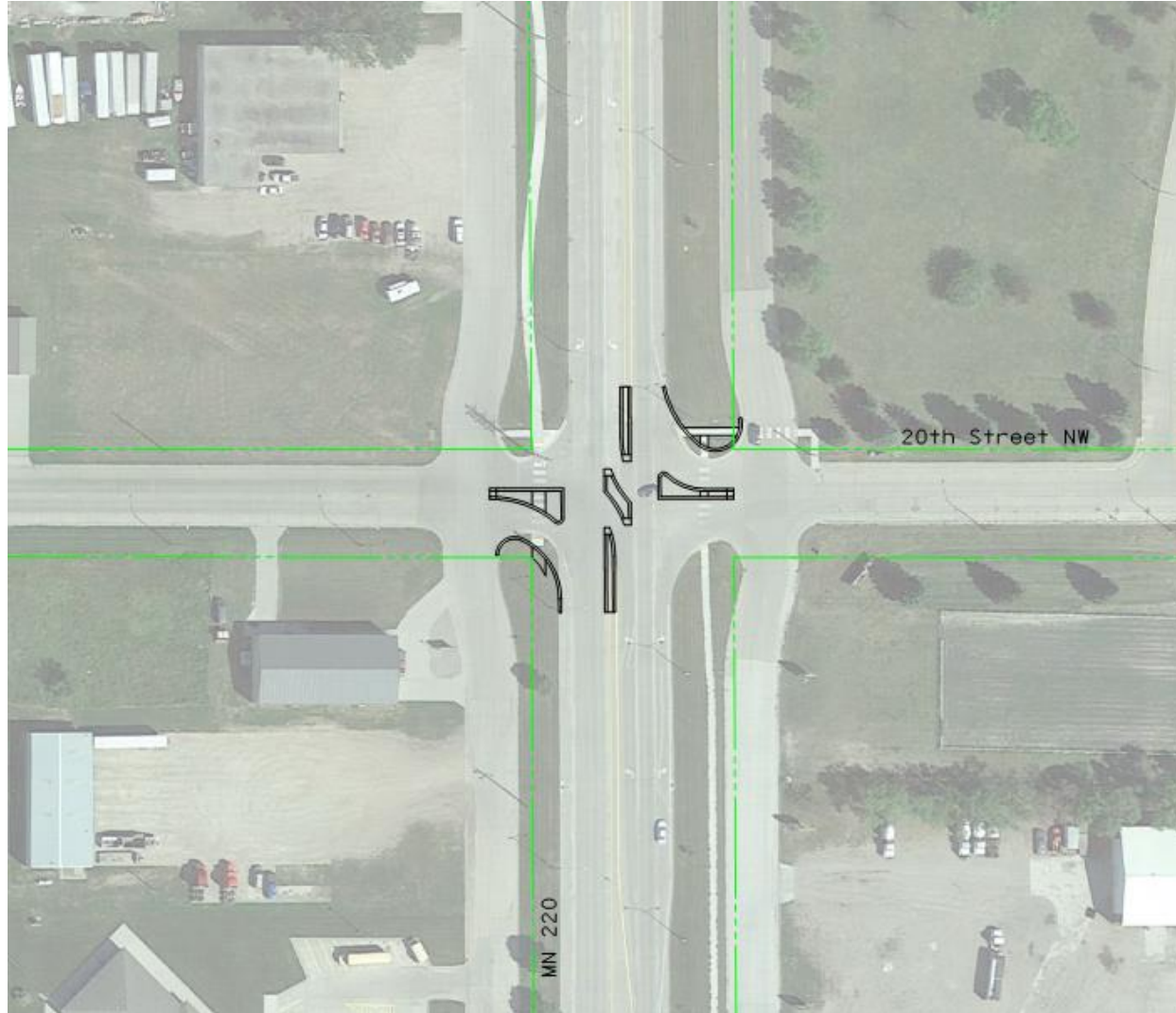
R/W: None

20-year Traffic Operation Benefit: NA

20-year Safety Benefit: NA

Benefit/Cost: NA

Intersection Alternatives – 20th Street



Intersection Alternatives – 20th Street

Evaluation Scoring Comparison

MN-220 Preliminary Alternatives Evaluation Matrix	
Purpose and Need	
1	Compatible with project purpose and needs
Intersection Capacity	
1	Intersection level of service (2045 AM/PM)
2	Worst approach level of service (2045 AM/PM)
3	Delay Benefit (Million \$; 20 Years Present Value)
Transportation Demand/System Linkage	
1	Side-street accessibility
2	Connectivity within the study area
3	Connectivity to the greater region
4	Dependence on 5th Ave NW or 2nd St NE connections
5	Ability to accommodate future corridor volumes
Social or Economic Demand	
1	Compatibility with future land development
2	Existing business impact
3	Ability to accommodate harvest season heavy commercial traffic volumes and movements
4	Ability to accommodate year-round heavy commercial traffic movements
5	Farmland impact
6	Corridor visual quality impact
7	Environmental impacts
Modal Interrelationships	
1	Pedestrian network compatibility
2	Ease of pedestrian crossing
3	Bicycle network compatibility
4	Transit service impacts
Safety	
1	Crash rate (crashes / million entering vehicles)
2	Injury Crash Percentage
3	Crash benefit (Million \$; 20 Years Present Value)
Roadway Deficiencies	
1	Infrastructure lifetime
2	Public street and driveway spacing
Roadway Design and Complexity	
1	Addresses known roadway deficiencies
2	Easiness to navigate / driver familiarity
3	Coordination with planned project
4	Favorable construction timeline
5	Right-of-way impact area
6	Number of potential property acquisitions
Cost	
1	Estimated construction cost (Million \$)
2	Benefit/cost ratio
TOTAL (Sum of Individual Scores)	

Mn 220 at 20th					
No Build		Alternative A 3/4 Access		Alternative B 3/4 Access + no SB LT	
Analysis	Score	Analysis	Score	Analysis	Score
	1.0		3.0		3.0
--	1	--	3	--	3
	4.0		4.3		4.3
A/A	5	NA	5	NA	5
B/C	4	NA	5	NA	5
\$ -	3	\$ -	3	\$ -	3
	3.4		3.2		3.2
--	3	--	2	--	2
OK	3	OK	3	OK	3
OK	3	OK	3	OK	3
NA	3	NA	3	NA	3
--	5	--	5	--	5
	3.0		2.9		2.9
--	3	--	3	--	3
--	3	--	2	--	2
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
	2.3		2.5		3.8
--	2	--	3	--	5
--	2	--	3	--	5
--	2	--	2	--	3
--	3	--	2	--	2
	3.0		3.7		3.7
0.15	3	reduced	4	reduced	4
0%	3	reduced	4	reduced	4
\$ -	3	\$ -	3	\$ -	3
	3.0		3.0		3.0
--	3	--	3	--	3
--	3	--	3	--	3
	4.2		4.2		4.2
none	3	me paveme	3	me paveme	3
Comfort	5	Familiar	4	Familiar	4
--	2	--	5	--	5
--	5	--	3	--	3
0	5	0	5	0	5
0	5	0	5	0	5
	4.0		3.5		3.5
\$ -	5	\$ 0.35	4	\$ 0.60	4
NA	3	NA	3	NA	3
	108.0		111.0		116.0

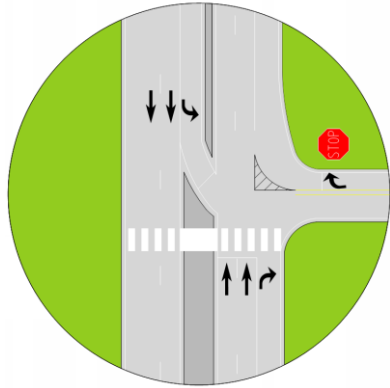
Intersection Alternatives

15th Street

- Alternative A: Convert to $\frac{3}{4}$ Access
- Alternative B: Establish Crosswalk with Pedestrian Refuge

Intersection Alternatives – 15th Street

Convert to ¾ Access



Considerations:

- Public/business perception of reduced access
- Crosswalk on south leg
 - Consider west side curb extension
 - Widen median for ped refuge

Cost: Approximately \$490,000

Mobility: LOS A (2045)

Safety: Reduced Right Angle Crashes

R/W: None

20-year Traffic Operation Benefit: NA

20-year Safety Benefit: NA

Benefit/Cost: NA

Establish Crosswalk with Pedestrian Refuge



Considerations:

- Maintain full access if frontage road median closure necessary at 17th (roundabout)
- Widen median for ped refuge
- Does not meet ¼ mile full access spacing guidelines

Cost: Approximately \$350,000

Mobility: LOS C (2045)

Safety: No Change

R/W: None

20-year Traffic Operation Benefit: NA

20-year Safety Benefit: NA

Benefit/Cost: NA

Intersection Alternatives – 15th Street



Intersection Alternatives – 15th Street

Evaluation Scoring Comparison

MN-220 Preliminary Alternatives Evaluation Matrix	
Purpose and Need	
1	Compatible with project purpose and needs
Intersection Capacity	
1	Intersection level of service (2045 AM/PM)
2	Worst approach level of service (2045 AM/PM)
3	Delay Benefit (Million \$; 20 Years Present Value)
Transportation Demand/System Linkage	
1	Side-street accessibility
2	Connectivity within the study area
3	Connectivity to the greater region
4	Dependence on 5th Ave NW or 2nd St NE connections
5	Ability to accommodate future corridor volumes
Social or Economic Demand	
1	Compatibility with future land development
2	Existing business impact
3	Ability to accommodate harvest season heavy commercial traffic volumes and movements
4	Ability to accommodate year-round heavy commercial traffic movements
5	Farmland impact
6	Corridor visual quality impact
7	Environmental impacts
Modal Interrelationships	
1	Pedestrian network compatibility
2	Ease of pedestrian crossing
3	Bicycle network compatibility
4	Transit service impacts
Safety	
1	Crash rate (crashes / million entering vehicles)
2	Injury Crash Percentage
3	Crash benefit (Million \$; 20 Years Present Value)
Roadway Deficiencies	
1	Infrastructure lifetime
2	Public street and driveway spacing
Roadway Design and Complexity	
1	Addresses known roadway deficiencies
2	Easiness to navigate / driver familiarity
3	Coordination with planned project
4	Favorable construction timeline
5	Right-of-way impact area
6	Number of potential property acquisitions
Cost	
1	Estimated construction cost (Million \$)
2	Benefit/cost ratio
TOTAL (Sum of Individual Scores)	

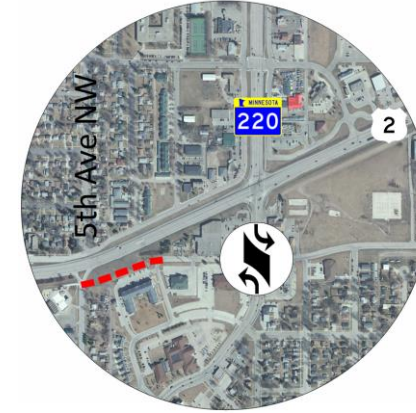
Mn 220 at 15th					
No Build		Alternative A 3/4 Access		Alternative B Establish Crosswalk with Pedestrian Refuge	
Analysis	Score	Analysis	Score	Analysis	Score
	1.0		3.0		3.0
--	1	--	3	--	3
	4.3		4.3		4.3
A/A	5	NA	5	NA	5
A/A	5	NA	5	NA	5
\$ -	3	\$ -	3	\$ -	3
	3.4		3.2		3.4
--	3	--	2	--	3
OK	3	OK	3	OK	3
OK	3	OK	3	OK	3
NA	3	NA	3	NA	3
--	5	--	5	--	5
	3.0		2.9		3.0
--	3	--	3	--	3
--	3	--	2	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
--	3	--	3	--	3
	2.3		3.5		3.5
--	1	--	4	--	4
--	2	--	4	--	4
--	3	--	3	--	3
--	3	--	3	--	3
	3.0		3.7		3.7
0.11	3	reduced	4	reduced	4
0%	3	reduced	4	reduced	4
\$ -	3	\$ -	3	\$ -	3
	3.0		3.0		3.0
--	3	--	3	--	3
--	3	--	3	--	3
	4.2		4.2		4.2
none	3	ccess spac	4	none	3
Comfort	4	Familiar	4	familiar	4
--	3	--	3	--	3
--	5	--	4	--	5
0	5	0	5	0	5
0	5	0	5	0	5
	4.0		3.5		3.5
\$ -	5	\$ 0.49	4	\$ 0.35	4
NA	3	NA	3	NA	3
	109.0		115.0		117.0

Intersection Alternatives

10th Street

- Alternative A: Convert to $\frac{3}{4}$ Access

Convert to $\frac{3}{4}$ Access



Considerations:

- Business access potentially impacted significantly
- Would likely require 10th St NW extension

Cost: NA

Mobility: LOS A

Safety: Reduced Right Angle Crashes

R/W: None

20-year Traffic Operation Benefit: NA

20-year Safety Benefit: NA

Benefit/Cost: NA

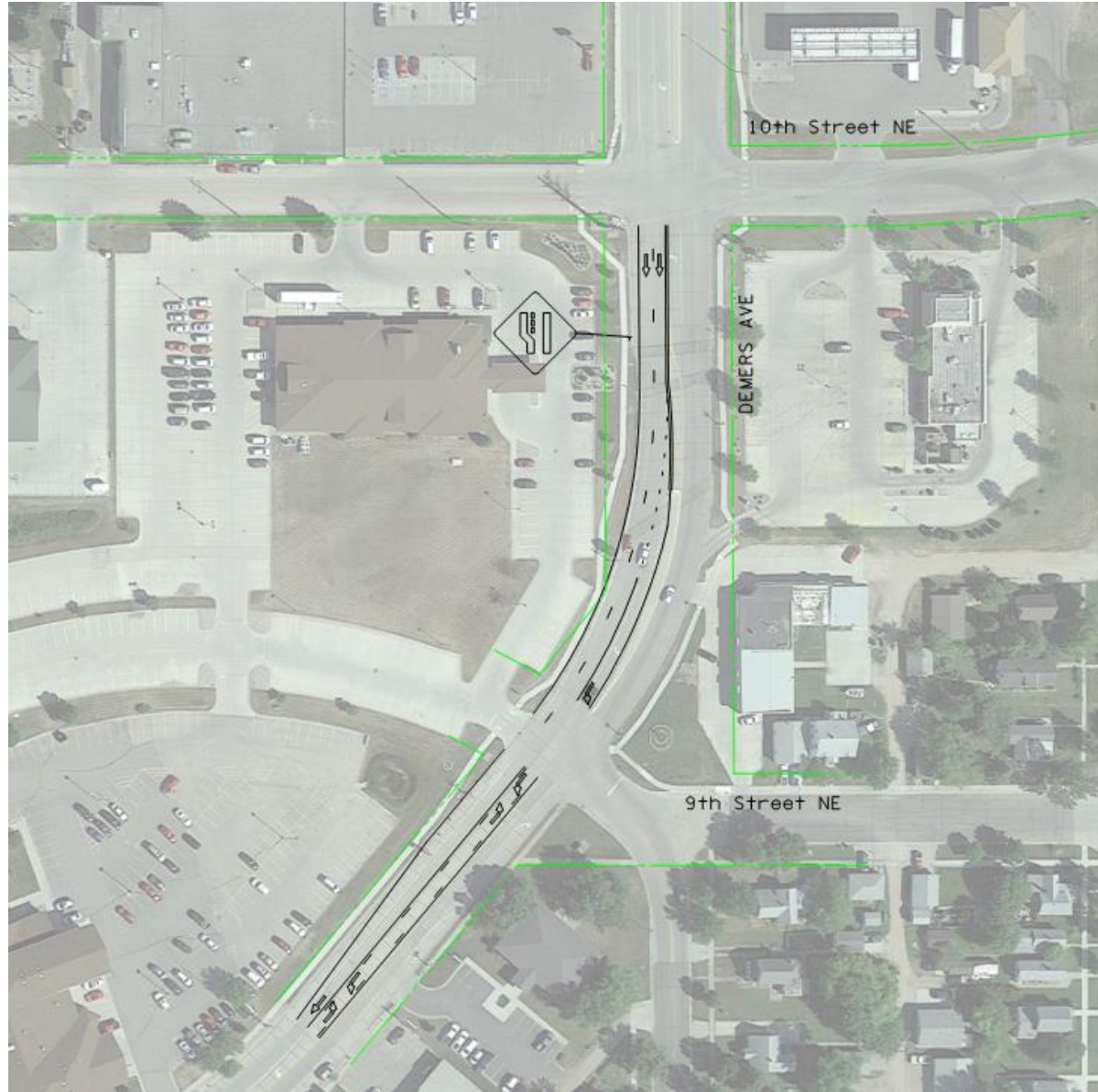
Intersection Alternatives – 10th Street

Evaluation Scoring Comparison

MN-220 Preliminary Alternatives Evaluation Matrix	
Purpose and Need	
1	Compatible with project purpose and needs
Intersection Capacity	
1	Intersection level of service (2045 AM/PM)
2	Worst approach level of service (2045 AM/PM)
3	Delay Benefit (Million \$; 20 Years Present Value)
Transportation Demand/System Linkage	
1	Side-street accessibility
2	Connectivity within the study area
3	Connectivity to the greater region
4	Dependence on 5th Ave NW or 2nd St NE connections
5	Ability to accommodate future corridor volumes
Social or Economic Demand	
1	Compatibility with future land development
2	Existing business impact
3	Ability to accommodate harvest season heavy commercial traffic volumes and movements
4	Ability to accommodate year-round heavy commercial traffic movements
5	Farmland impact
6	Corridor visual quality impact
7	Environmental impacts
Modal Interrelationships	
1	Pedestrian network compatibility
2	Ease of pedestrian crossing
3	Bicycle network compatibility
4	Transit service impacts
Safety	
1	Crash rate (crashes / million entering vehicles)
2	Injury Crash Percentage
3	Crash benefit (Million \$; 20 Years Present Value)
Roadway Deficiencies	
1	Infrastructure lifetime
2	Public street and driveway spacing
Roadway Design and Complexity	
1	Addresses known roadway deficiencies
2	Easiness to navigate / driver familiarity
3	Coordination with planned project
4	Favorable construction timeline
5	Right-of-way impact area
6	Number of potential property acquisitions
Cost	
1	Estimated construction cost (Million \$)
2	Benefit/cost ratio
TOTAL (Sum of Individual Scores)	

Mn 220 at 10th			
<u>No Build</u>		<u>Alternative A</u> 3/4 Access	
Analysis	Score	Analysis	Score
	2.0		4.0
--	2	--	4
	3.7		4.3
A/A	5	NA	5
C/D	3	NA	5
\$ -	3	\$ -	3
	3.2		2.6
--	3	--	2
OK	3	OK	3
OK	3	OK	3
OK	3	needed	1
--	4	--	4
	3.3		2.7
--	3	--	3
--	5	--	1
--	3	--	3
--	3	--	3
--	3	--	3
--	3	--	3
--	3	--	3
	2.3		2.3
--	2	--	2
--	2	--	2
--	2	--	2
--	3	--	3
	3.0		4.0
0.34	3	Reduced	4
0%	3	Reduced	4
\$ -	3	\$ -	4
	2.5		3.5
--	3	--	3
--	2	--	4
	4.0		3.7
none	1	me paveme	3
Comfort	5	Familiar	4
--	3	--	2
--	5	--	3
0	5	0	5
0	5	0	5
	4.0		2.5
\$ -	5	NA	2
NA	3	NA	3
	107.0		104.0

Intersection Alternatives – 9th to 10th Street



Segment Alternatives

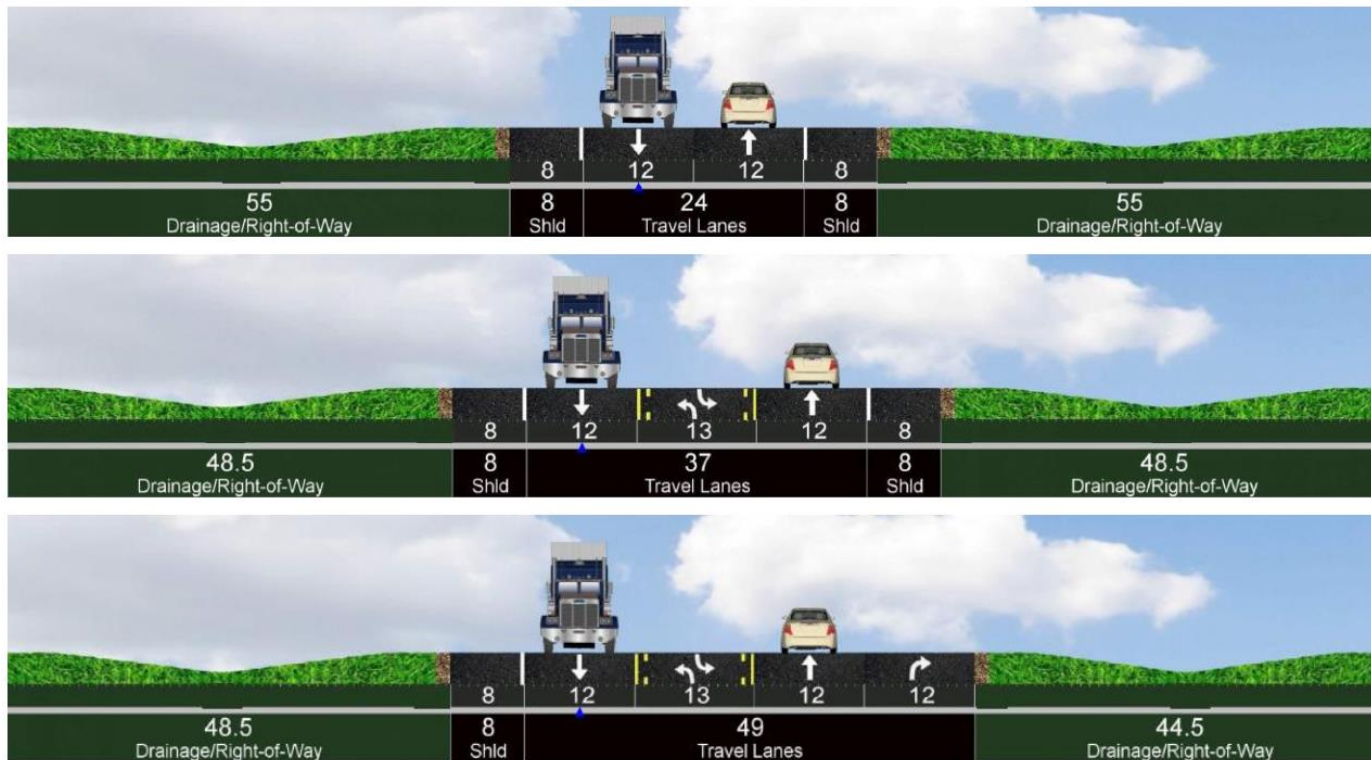
Key Segments

- Segment A: 23rd Street NW to 140th Street SW
- Segment B: 17th Street NW to 23rd Street NW

Segment Alternatives – Segment A

23rd Street NW to 140th Street SW

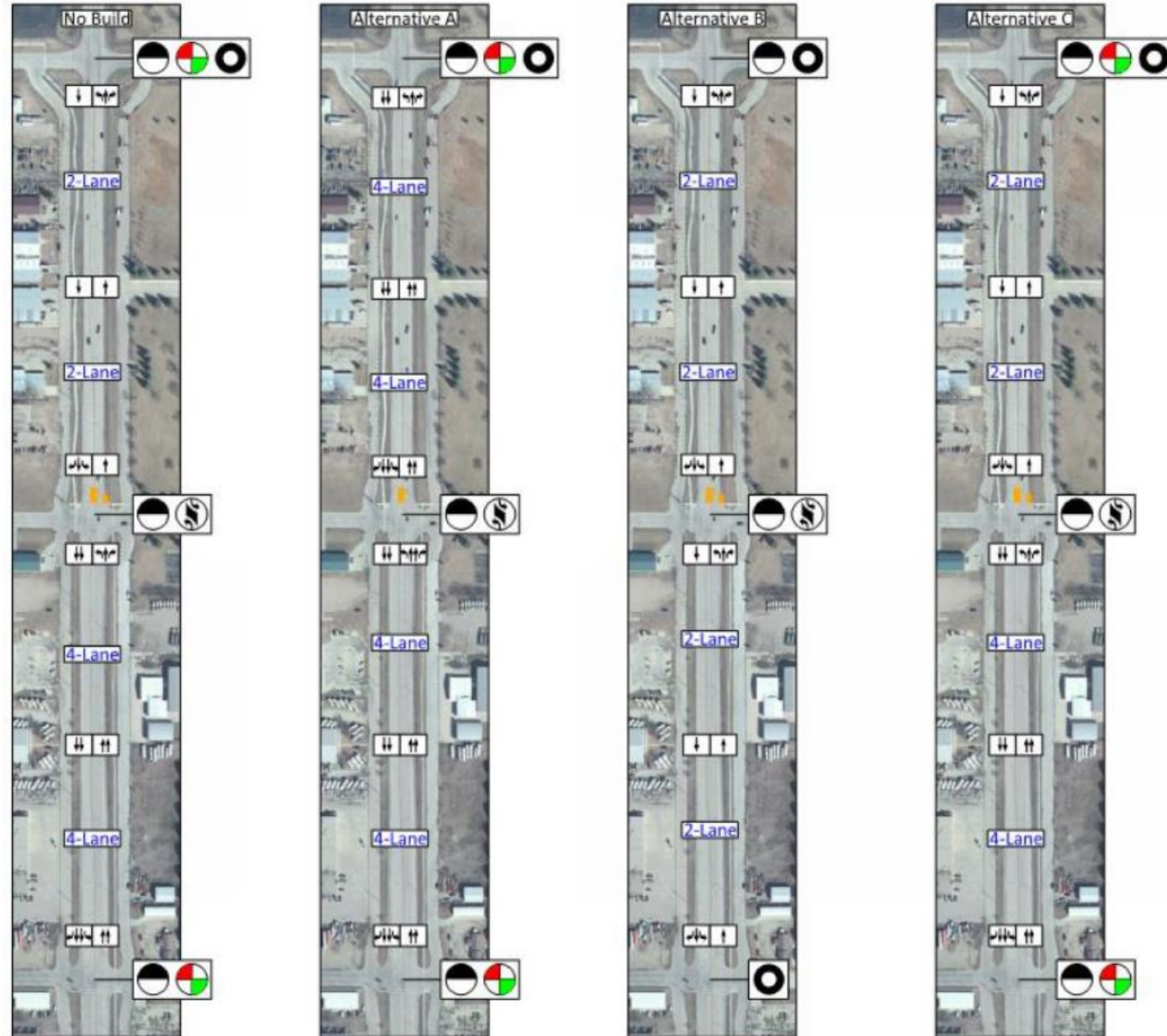
- No Build
 - No impact to property
 - Maintains LOS C or better through 2045
- Alternative A: 2-Lane Roadway w/ Left Turn Lanes
 - Requires reconstruction of 50% of roadway, estimated to fit within existing R/W
 - Expected to improve safety and operations
 - Can be incrementally implemented as development occurs
 - Right Turn lanes only add 4 more feet
- Alternative B: 3-Lane Roadway (Two-Way Center Left Turn Lane)
 - Requires reconstruction of full length of roadway, estimated to fit within existing R/W
 - Expected to improve safety and provide most efficient accommodation of private driveways



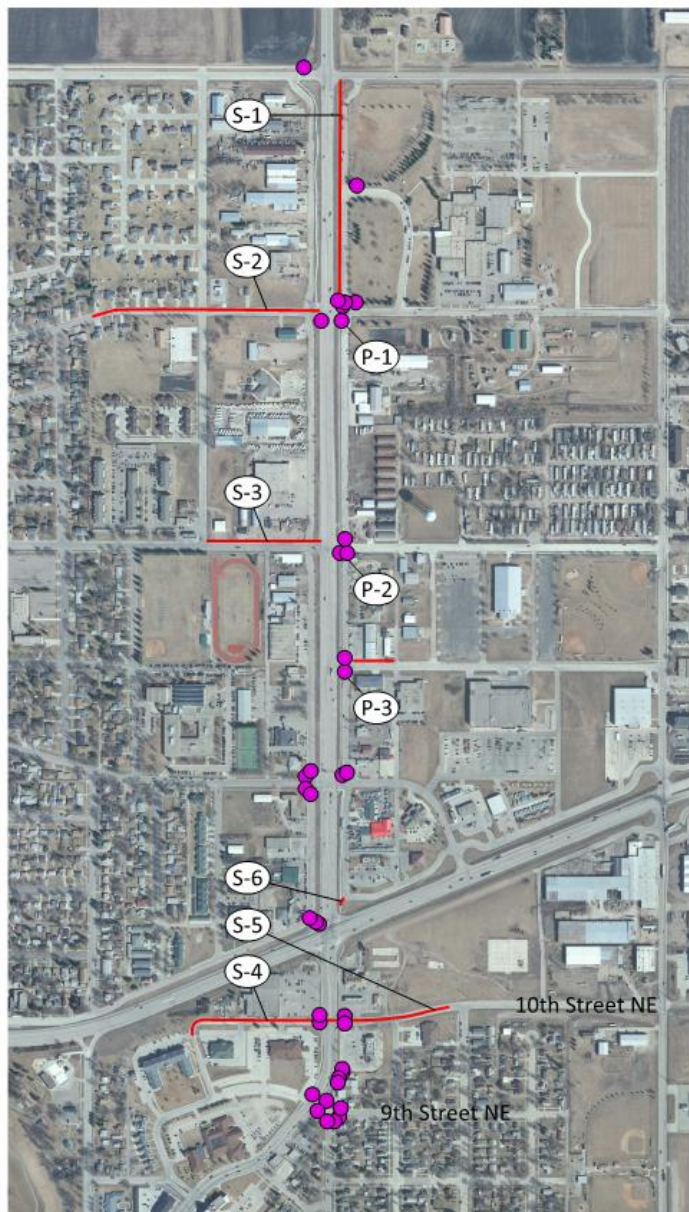
Segment Alternatives – Segment B

17th Street NW to 23rd Street NW

- No Build
 - Expected to operate at LOS C or better
- Alternative A: Extend 4-Lane Segment to 23rd St NW
 - Currently illustrative project in 2045 MTP
 - Requires roadway widening, adds capacity that is not needed
- Alternative B: Convert entire segment to 2-Lane
 - Best compatibility with roundabouts, possibly also compatible with signals
 - Improves safety
 - Low to moderate cost
- Alternative C: Extend 4-Lane Segment to 20th St NW
 - Currently illustrative project in 2045 MTP
 - Compatibility with a wide variety of alternatives
 - Low reconstruction cost



Pedestrian Accessibility



Sidewalks

- (S-1) Mn 220 - E Side (20th St to 23rd St)
- (S-2) 20th Street NW - Both Sides (5th Ave NW to Mn 220)
- (S-3) 17th Street NW - North Side (3rd Ave NW to Mn 220)
- (S-4) 10th Street NW - Both Sides (Terrace Dr to Mn 220)
- (S-5) 10th Street NE - Both Sides (Mn 220 to 2nd Ave NE)
- (S-6) Mn 220 & US 2 - NW Corner (to Frontage Road)

Pedestrian Crossing Improvements

- (P-1) Improve Pedestrian Crossing
(see Intersection 2 Alternatives A and B)
- (P-2) Improve Pedestrian Crossing
 - Add curb extension
 - Upgrade ped pamps with ADA compliant directional ramps
- (P-3) Improve Pedestrian Crossing
(see Intersection 4 Alternatives A and B)

NEXT STEPS / OTHER DISCUSSION

- Any Other Discussion?
- SRC Meeting 4 – Early April (TBD)
 - Preferred Alternatives / Prioritization