



OPPORTUNITY DRIVE

Operations Study

December 2022

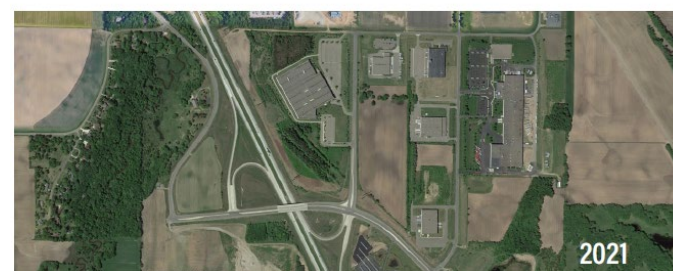
Contents

1.0	Introduction	1
2.0	Study Goals and Objectives.....	2
	Goals	2
	Objectives.....	2
3.0	Issues and Needs	3
	Safety and Crash History	3
	Traffic Volumes	5
	Vehicle Speeds	7
	Intersection Capacity	8
	Access.....	9
	Geometric Review.....	10
	Stakeholder Concerns	11
	Future Land Use	11
	Traffic Forecasts	13
	Issues and Need Summary.....	17
4.0	Alternative Development and Evaluation	17
	Process	17
	Corridor Speeds.....	18
	Corridor Capacity / Cross-Section	19
	Corridor Traffic Controls	20
	8 th Avenue (I-94 East Ramps) Intersection.....	21
	I-94 West Ramps Intersection.....	23
	West Area Connectivity	24
	8 th Avenue / 60 th Street.....	26
	Opportunity Drive (Glen Carlson Drive to 74 th Street).....	27
	Other Area Transportation Improvements and Strategies.....	29
5.0	Collaboration	30
6.0	Implementation and Costs.....	31

1.0 Introduction

The Saint Cloud Area Planning Organization (ST-APO), in partnership with the City of St. Cloud, Stearns County, and the Minnesota Department of Transportation (MnDOT) initiated the Opportunity Drive Operations Study to identify short- and long-term infrastructure needs to address existing issues, support future development, and provide strategic infrastructure guidance to agencies. The Opportunity Drive corridor, also known as County Road 75, has seen a significant amount of change dating back to 1990's. The adjacent I-94 Business Park began to take shape at that time, with several industrial developments occurring. Following construction of the I-94 interchange during 2004/2005 construction seasons, several additional developments were constructed in the business park soon after, including Anderson Trucking, Arctic Cat, and FedEx. However, development activity stalled for several years in this area, until more recently, as the industrial market experienced a significant rebound spurred on by a need for improved logistics and consumer changes. This renewed industrial development has brought significant investment to the area by key industries, including warehouse distribution and e-commerce fulfillment centers.

The change in business activity has highlighted the need to have a transportation system that supports the dynamic nature of today's business climate. Thus, the Opportunity Drive Operations Study quantified current conditions, identified existing and future infrastructure needs, and helped prioritize investments to ensure safe and efficient operations for area users. Engaging area stakeholders was also a critical component to developing an implementable and fully supported infrastructure plan. The following information provides an overview of the study process, findings, and recommendations.



2.0 Study Goals and Objectives

The study focuses on Opportunity Drive (CR 75) from approximately ¼-mile west of I-94 to approximately 222nd Street. However, land use and roadway connectivity within the St. Cloud I-94 Business Park is a critical component to understanding the overall impact and needs of the Opportunity Drive corridor. Thus, transportation infrastructure needs were identified for not only the Opportunity Drive corridor, but also within the entire I-94 Business Park.

Goals

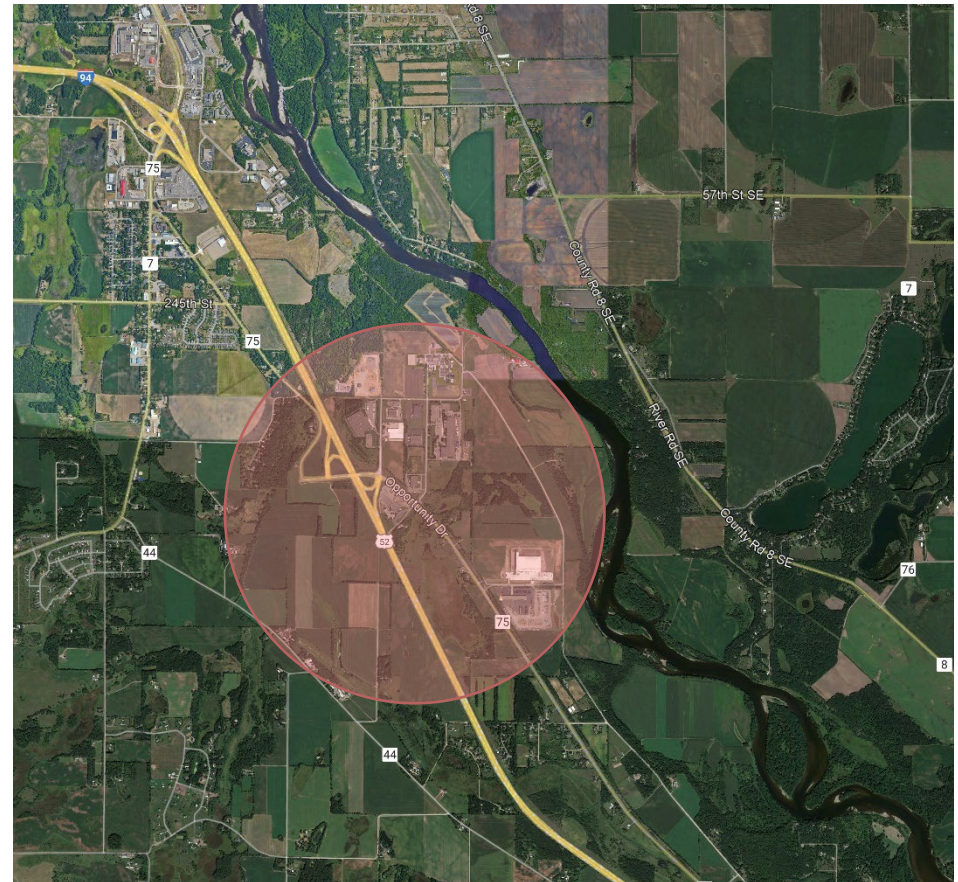
The following overarching study goals were used to guide the study:

- Identify existing and future issues and needs from a safety, mobility, and access perspective
- Develop and evaluate potential infrastructure improvements to address issues and needs, such as traffic controls, roadway connectivity, and geometric improvements
- Recommend short- and long-term improvements and identify associated implementation timeframes or decision metrics

Objectives

Based on discussion with the project team, area agencies, and key stakeholders, the following objectives were identified to help facilitate the overall study process and methods used to not only conduct the study but help facilitate and evaluate potential infrastructure improvements:

- Support freight activity and associated businesses
- Enable additional economic development
- Improve safety and mobility for all users
- Provide efficient local and regional connectivity
- Be proactive and prepared for future growth



3.0 Issues and Needs

An existing and future conditions assessment was conducted to understand issues and needs within the study area. This assessment process included a review of a wide variety of transportation characteristics, operations, and safety. The intent of this assessment was to identify and summarize key issues and needs, along with identifying an approximate timeline or metrics that would prompt infrastructure changes and/or considerations. The following information summarizes the issues and needs assessment process, assumptions, and overall findings, which informed the alternative development and evaluation phase of the study documented later in this report.



**SAFETY AND CRASH
HISTORY**



**TRAFFIC
OPERATIONS**



ACCESS



**GEOMETRIC
STANDARDS**



LAND USE



**FUTURE ROADWAYS &
VISION**

Safety and Crash History

Five years of crash history were obtained using the Minnesota Department of Transportation Crash Mapping Analysis Tool (MnCMAT2) along the Opportunity Drive corridor. This included data from January 2017 through December 2021. In review of the crash history, the following safety trends were identified:

- A total of 14-crashes occurred in the study area over the last 5-years (i.e., an average of 3 crashes per year)
- Most crashes occurred at the Opportunity Drive (CR 75) and 8th Avenue (I-94 East Ramp) intersection
- The predominant crash type included angle and run-off-road crashes
- 65% of crashes were property damage, 28% of crashes were possible or minor injury, and 7% of crashes were serious injury
- There were no fatal or pedestrian/bicycle crashes
- 30% of crashes occurred between 4 and 6 p.m.

The Opportunity Drive (CR 75) and 8th Avenue (I-94 East Ramp) intersection was the only location with crash and severity rates significantly higher than intersections with similar characteristics. The crashes at this location are primarily angle-type crashes where left-turning motorists along Opportunity Drive and/or motorists on the side-street approaches attempt to judge an adequate gap to make their desired maneuver. These decisions paired with vehicle speeds, appear to be contributing factors towards this safety issue. Pertinent crash statistics include the following:

**PROPERTY
DAMAGE**



9 crashes
64%

**POSSIBLE
INJURY**



2 crashes
14%

**MINOR
INJURY**



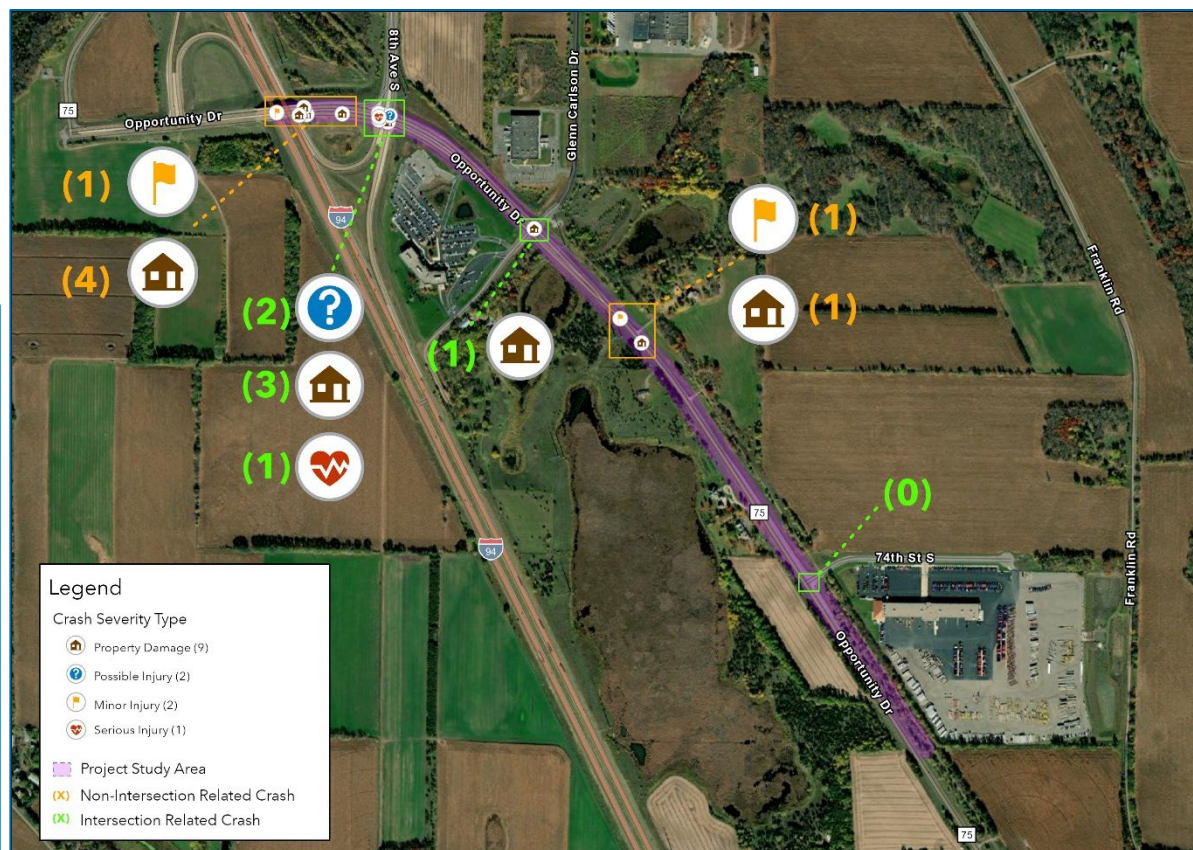
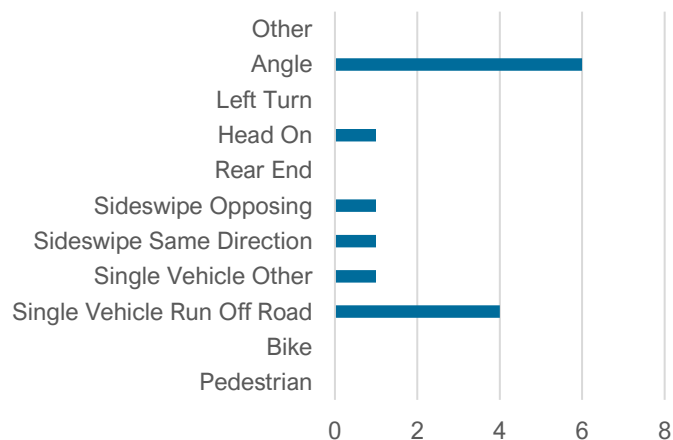
2 crashes
14%

**SERIOUS
INJURY**



1 crash
7%

Crash by Type



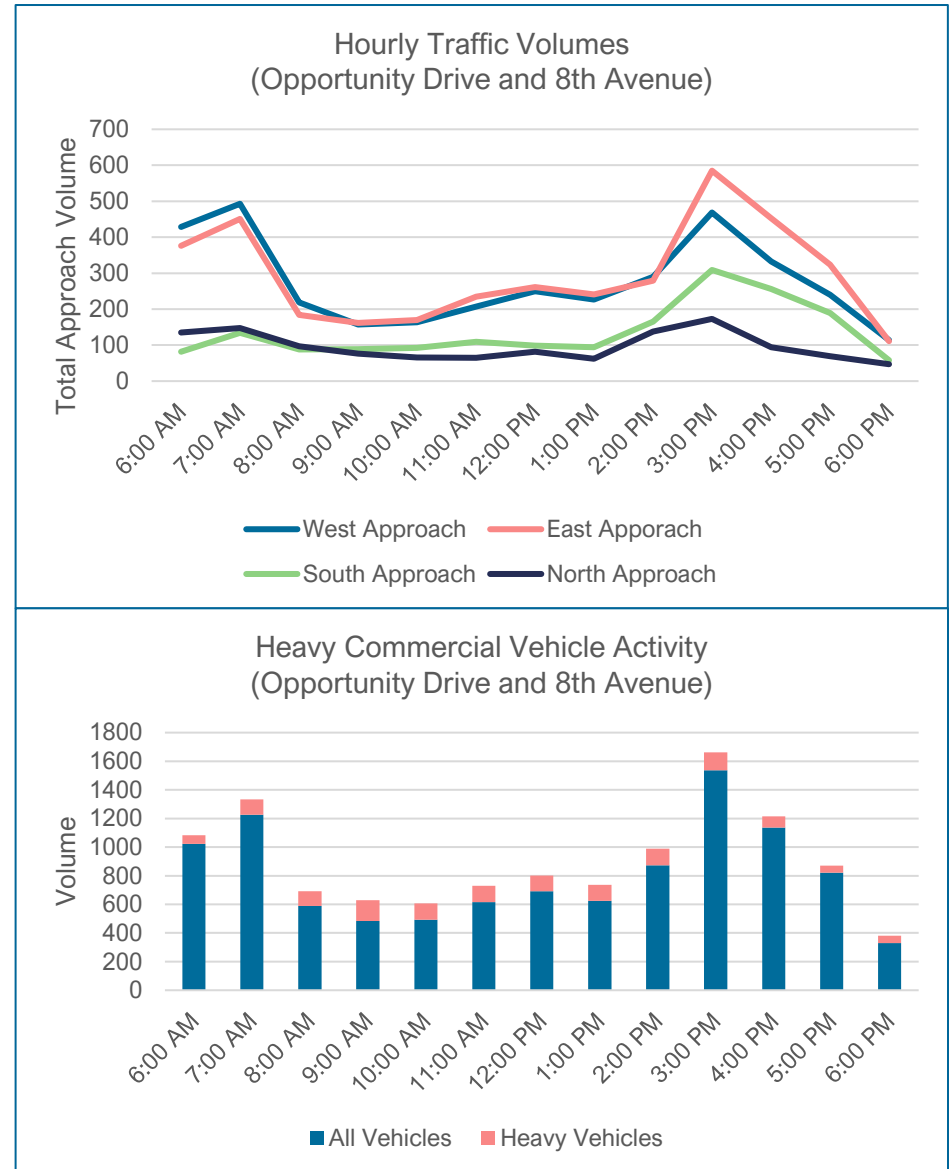
Intersection	Total Crashes	Fatal (K)	Serious Injury (A)	Minor Injury (B)	Possible Injury (C)	Property Damage Only (PDO)	Entering ADT	Total Crash Rate			Fatal & Serious Injury Crash Rate				
								Observed	Statewide Average	Critical Rate	Critical Index	Observed	Statewide Average	Critical Rate	Critical Index
CR 75 / I-94 East Ramp (8th Ave)	6	0	1	0	2	3	6100	0.538	0.128	0.450	1.2	8.973	0.311	6.940	1.29
CR 75 / Glen Carlson Drive	1	0	0	0	0	1	4800	0.114	0.128	0.500	0.230	0.000	0.311	8.430	0.000
CR 75 / 74th Street	0	0	0	0	0	0	2850	0.00	0.128	0.630	0.00	0.000	0.311	13.050	0.00

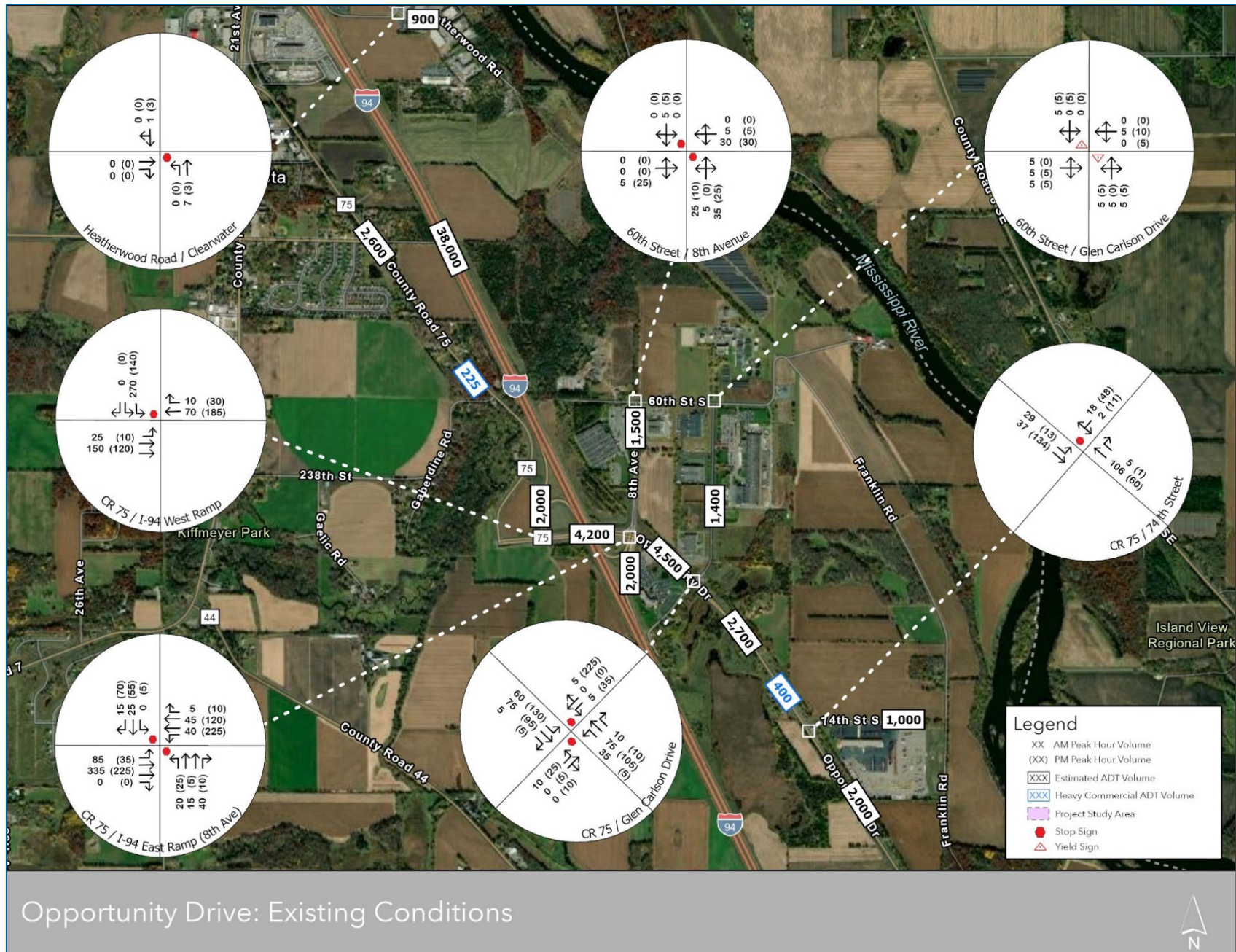
Traffic Volumes

To quantify current traffic operations within the study area, various data resources were leveraged. This included a combination of historical average daily traffic (ADT) volumes provided by MnDOT, Streetlight speed data obtained by the Saint Cloud APO, and intersection turning movement counts collected by the project team. A summary of the existing traffic conditions, which illustrates a.m. and p.m. peak hour intersection turning movements, estimated ADT volumes (including heavy commercial vehicles), traffic controls, and geometric configurations is shown in the corresponding graphic. Key traffic operational characteristics of note, include:

- Up to 13-hour of intersection turning movement counts were collected on Tuesday, April 12, 2022
- ADT volumes range from 2,000 to 4,500 vehicles per day
- The a.m. and p.m. peak hours occur between 6:45 and 7:45 a.m. and 3 to 4 p.m., respectively
 - These peak hours occur slightly early than typical roadway peak hours, which are attributed to the industrial nature of area businesses
- Heavy commercial vehicle activity represents between 8% and 14% of all vehicles along the study corridor
- Approximately 800 oversize-overweight (OSOW) permits were pulled over the last 5-years for the study corridor, which represents approximately 3-per week.

The traffic data indicates the Opportunity Drive corridor serves a significant amount of freight (i.e., heavy commercial activity) as compared to other corridors. As such, special considerations to ensure existing and future infrastructure within the area can support this elevated freight activity is a critical component to the long-term success of the area and its businesses.



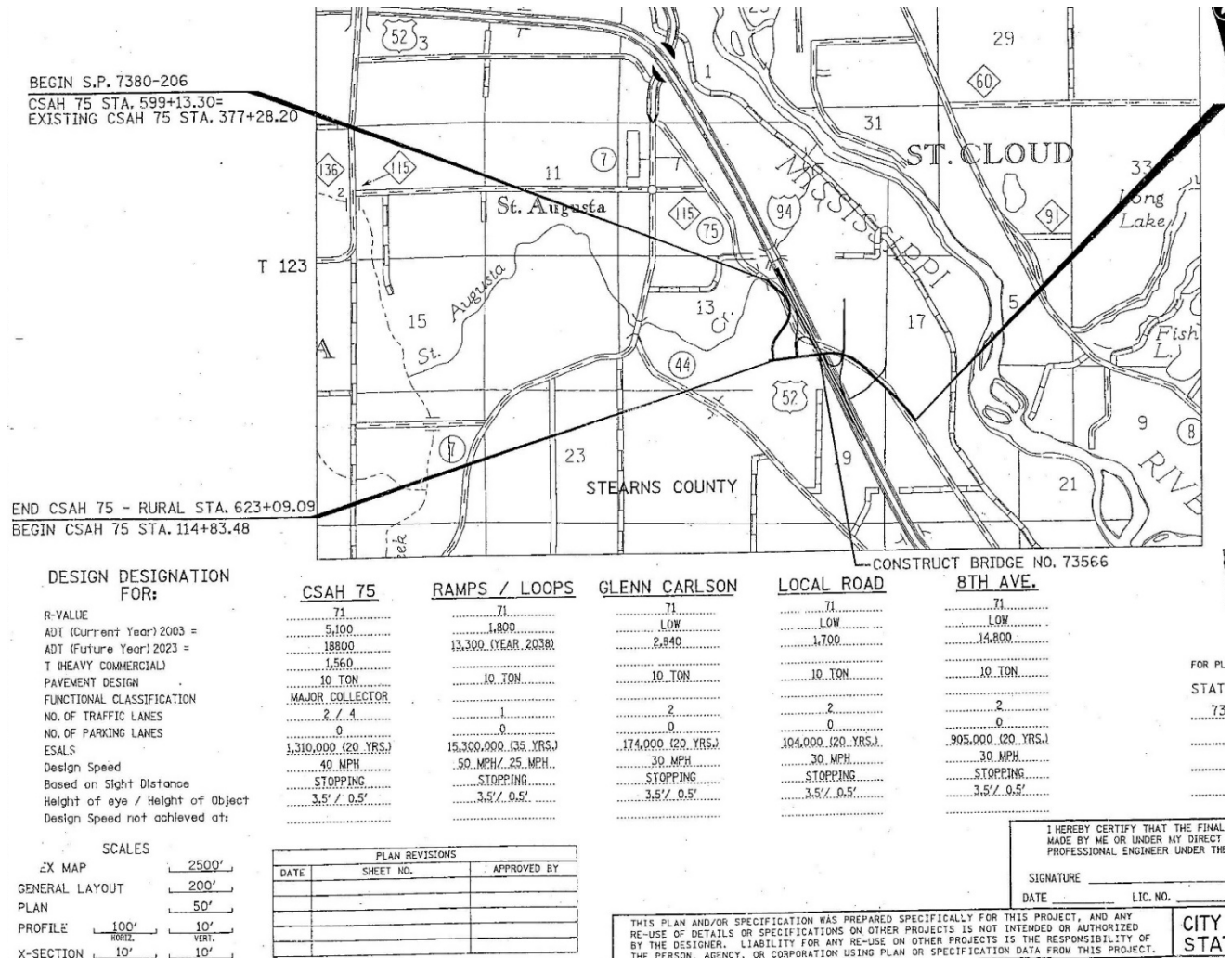


Vehicle Speeds

Vehicular speeds along the corridor have been a concern expressed by area businesses. A potential contributing factor is that there is not a posted speed limit along the corridor. A speed study had been previously completed which determined most vehicles were traveling at 55-mph or less and the speed limit should be 55-mph.

As part of this study, a preliminary review of vehicle speeds was conducted to understand current motorist behaviors, as well as the intended design speed. Historical design documents indicate the intended design speed of Opportunity Drive in the vicinity of I-94 was 40-mph. However, Streetlight speed data obtained by the Saint Cloud APO indicates that the average and 85th percentile speed of motorists is 45-mph and 60 mph, respectively.

It is important to note that motorists tend to travel along a corridor at speeds that feel comfortable, regardless of the posted speed limit. In this situation, motorists are traveling faster than the intended design speed but generally consistent with the previous speed study. Further discussion regarding vehicle speeds is provided as part of the alternative evaluation.



Intersection Capacity

Intersection capacity was evaluated using Synchro/SimTraffic Software (version 11), which incorporates methods outlined in the Highway Capacity Manual, 6th Edition. The software is used to develop calibrated models that simulate observed traffic operations and identify key metrics such as intersection Level of Service (LOS) and queues. These models incorporate collected traffic, freight, pedestrian, and bicyclist volumes, traffic controls, and driver behavior factors. Level of Service (LOS) quantifies how an intersection is operating. Intersections are graded from LOS A through LOS F, which corresponds to the average delay per vehicle values shown. An overall intersection LOS A through LOS D is generally considered acceptable in the study area. LOS A indicates the best traffic operation, while LOS F indicates a location where demand exceeds capacity.

For side-street stop-controlled intersections, special emphasis is given to providing an estimate for the level of service of the side-street approach. Traffic operations at an unsignalized intersection with side-street stop control can be described in two ways. First, consideration is given to the overall intersection level of service, which takes into account the total number of vehicles entering the intersection and the capability of the intersection to support the volumes.

Second, it is important to consider the delay on the minor approach. Since the mainline does not have to stop, most delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience

Level of Service	Average Delay / Vehicles	
	Stop, Yield, and Roundabout	Signalized Intersections
A	< 10 seconds	< 10 seconds
B	10 to 15 seconds	10 to 20 seconds
C	15 to 25 seconds	20 to 35 seconds
D	25 to 35 seconds	35 to 55 seconds
E	35 to 50 seconds	55 to 80 seconds
F	> 50 seconds	> 80 seconds

AM Peak Hour					
Intersection	Level of Service (Delay in Seconds)				
	EB	WB	NB	SB	Overall
Opportunity Drive (CR 75) and I-94 West Ramp	A (1)	A (2)	--	A (7)	A (4)
Opportunity Drive (CR 75) and 8 th Avenue (I-94 East Ramp)	A (2)	A (2)	A (8)	A (9)	A (3)
Opportunity Drive (CR 75) and Glen Carlson Drive	A (1)	A (1)	A (5)	A (4)	A (1)
Opportunity Drive (CR 75) and 74 th Street	A (1)	A (<1)	--	A (3)	A (1)
60 th Street and 8 th Avenue	A (0)	A (2)	A (2)	A (6)	A (2)
60 th Street and Glen Carlson Drive	A (1)	A (0)	A (1)	A (1)	A (1)
Heatherwood Road and Clearwater Road	--	--	A (<1)	A (<1)	A (<1)
PM Peak Hour					
Intersection	Level of Service (Delay in Seconds)				
	EB	WB	NB	SB	Overall
Opportunity Drive (CR 75) and I-94 West Ramp	A (1)	A (4)	--	A (7)	A (4)
Opportunity Drive (CR 75) and 8 th Avenue (I-94 East Ramp)	A (2)	A (3)	C (24)	B (11)	A (5)
Opportunity Drive (CR 75) and Glen Carlson Drive	A (1)	A (2)	A (7)	A (5)	A (3)
Opportunity Drive (CR 75) and 74 th Street	A (<1)	A (<1)	--	A (3)	A (1)
60 th Street and 8 th Avenue	A (<1)	A (2)	A (2)	A (6)	A (2)
60 th Street and Glen Carlson Drive	A (<1)	A (1)	A (<1)	A (2)	A (1)
Heatherwood Road and Clearwater Road	--	--	A (<1)	A (<1)	A (<1)

high-levels of delay (i.e., poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during peak hour conditions.

The existing intersection capacity analysis identified that all study intersections currently operate at an overall LOS A during the peak hours. In addition, all movements and/or approaches operate at LOS D or better during the peak hours and no queues over 100 feet were identified for any movement. Therefore, no significant intersection capacity issues currently exist within the study area.

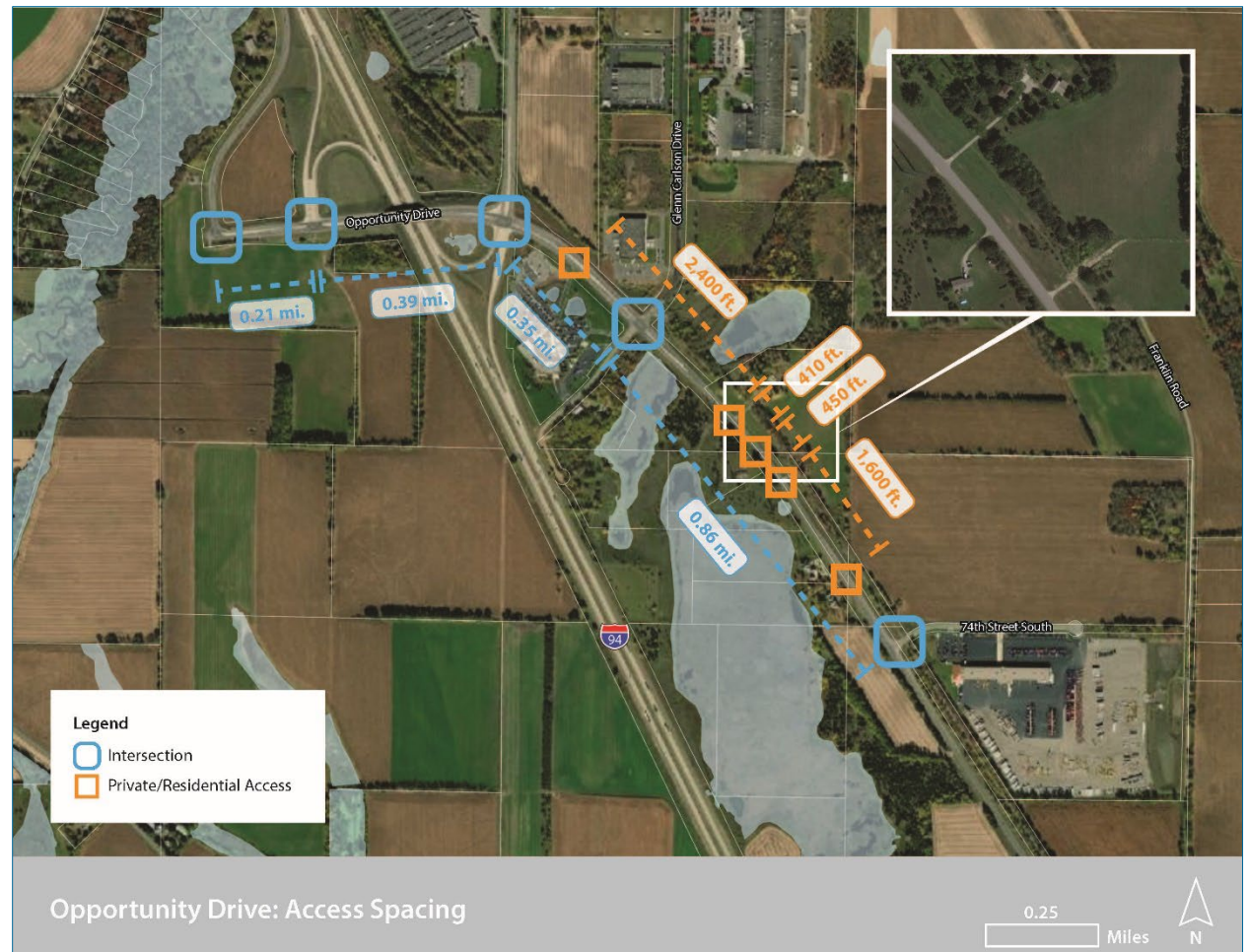
Access

Opportunity Drive is functionally classified as a “Collector” roadway and is generally in a “rural” setting although it could be considered more “urbanized” near I-94. County access guidance suggests:

- Intersection Spacing: minimum of 1/8-mile
- Driveway Spacing: 1/8- to 1/4-mile
- Signal Spacing: minimum of 1/4-mile

Existing access along the corridor is generally focused at the primary study intersections and public roadways. There is a partial access (i.e., right-in only) that serves Anderson Trucking Services (ATS) and several single-family residences/agricultural driveways within the study area. However, in general, the existing roadways are within existing Stearns County Access Spacing guidance.

When considering future access, these guidelines will be reviewed to ensure compliance, where possible.



Geometric Review

A preliminary geometric review of the current roadway configuration relative to design standards and truck maneuverability was completed to identify any conflicts or issue areas. Key metrics reviewed included:

- Existing Horizontal Alignments
- Turn Lane Lengths and Storage
- Truck Turning Maneuverability
- Lane and Shoulder Widths
- Sight Lines and Clear Zones

The geometric review identified the following issue areas or potential concerns needing further investigation:

- 60th Street: the curve near 4th Avenue does not meet existing horizontal standards
- Northbound Right-Turn Lane along 8th Avenue at 60th Street: the northbound right-turn lane is relatively short (~90 feet) relative to design speeds and standards.
- Truck Encroachment Areas:
 - I-94 East Ramps – Northbound to Westbound, Northbound to Eastbound, and Westbound to Northbound movements
 - Glen Carlson Drive – Eastbound to Southbound and Southbound to Westbound movements
 - 60th Street and 8th Avenue – Northbound to Eastbound movement
 - 60th Street and Glen Carlson Drive – Eastbound to Southbound and Northbound to Eastbound movements
- 60th Street Shoulder: does not meet the current standard shoulder width

Key assumptions, design criteria, parameters, and design details of the preliminary geometric review are available upon request.



Stakeholder Concerns

A focus group was established, primarily consisting of local businesses within or directly adjacent to the study area to gather feedback on how the transportation system is functioning, as well as to better understand future development/business plans and transportation needs. The first focus group occurred in June 2022 and included representatives from Anderson Trucking Service (ATS), Landwehr Construction, Associated Wholesale Grocers (AWG), and Rice Companies. The following is a summary of feedback relating to existing conditions along Opportunity Drive:



- Be mindful of **access** to each facility
- Consider a **better turnaround** for trucks at the end of 74th Street
- The I-94 East Ramp intersection is **difficult to cross** with large vehicles; is a new traffic control needed?
- Consider a **stop sign** at 8th Avenue & 60th Street
- **Congestion** at the Glen Carlson intersection
- The southbound left-turn lane at 74th Street is a bit short, **rear-end accident concerns**
- Traversing **roundabouts are challenging for trucks** – particularly OSOW vehicles
- Freight drivers prefer **longer acceleration and deceleration lanes**
- Drivers prefer **controlled left-turn movements**
- How will the **Heatherwood Road extension** impact area options?

In addition to these concerns, stakeholders shared feedback regarding business/expansion plans and potential timelines. This information was leveraged to help identify future traffic forecasts and shape the implementation plan discussed later in this report.

Future Land Use

There are currently various developments within the I-94 Business Park that are under construction, have been recently approved, and/or are in the early development planning stages. This includes developments both west and east of I-94, as well as several significantly sized projects. A key component of this study is to identify the future remaining development potential and their overall impact and need on adjacent transportation infrastructure. Therefore, understanding future business plans, remaining development potential, and developing realistic traffic forecasts is a critical step in the study process.

With any development, market conditions often influence development and their timeframes. Therefore, a specific horizon year (i.e., year 2040) was not assumed to coincide with the future land use contemplated as part of this study. The future land use assumptions represent a full build out of the area / I-94 Business Park to help identify the long-term infrastructure needs and key metrics / development levels which may necessitate area infrastructure changes.

Through discussions with the project team, the City of St. Cloud, St. Augusta, and area businesses, future land use assumptions were developed for each undeveloped parcel within the I-94 Business Park as well as portions of St. Augusta. As noted, this area is already experiencing considerable growth and additional large-scale developments are in the planning process. At the pace of development, full build out could happen within the next 5 to 10 years or depending on market conditions may take 20+ years to materialize.

A summary of both near-term and full build out development assumptions are illustrated in the adjacent figure and the trip generation table on the following page. These land use assumptions were used to develop detailed trip generation estimates and traffic forecasts for the entire study area. Key development assumptions include:

- Approximately 1 million square feet of industrial development is expected to be constructed within the next 2 years
- There is approximately 6.5 million square feet of remaining developable area within the I-94 Business Park (i.e., full build out)

To provide additional context, assumptions used as part of the St. Cloud Regional Travel Demand Model (TDM) represent an estimated 2.6 million square feet of development that is estimated to occur by the year 2045. This equates to about 1/3 of the full build development assumptions used as part of this study. However, as noted earlier, this study is intended to understand the long-term infrastructure needs, while also putting together an implementation strategy to support future development. Current development patterns suggest that more development is likely to occur within the area than assumed within the regional travel demand model.



Traffic Forecasts

Rather than utilize traffic forecasts developed using assumptions within the regional travel demand model, a more detailed trip generation approach was utilized to develop the full build out condition traffic forecasts. This approach leveraged the following steps:

- 1) Compare traffic counts to known land uses and their estimated trip generation
- 2) Identify future land use potential sizes and types
- 3) Compare socio-economic allocations for the area
- 4) Develop remaining trip generation estimates
- 5) Route new trips throughout the study area

Using this approach, the I-94 Business Park has the potential to generate approximately 35,000 daily trips to/from the area upon full build out. This assumes that future developments will continue to generate trips at a rate that is consistent with current traffic generation patterns.

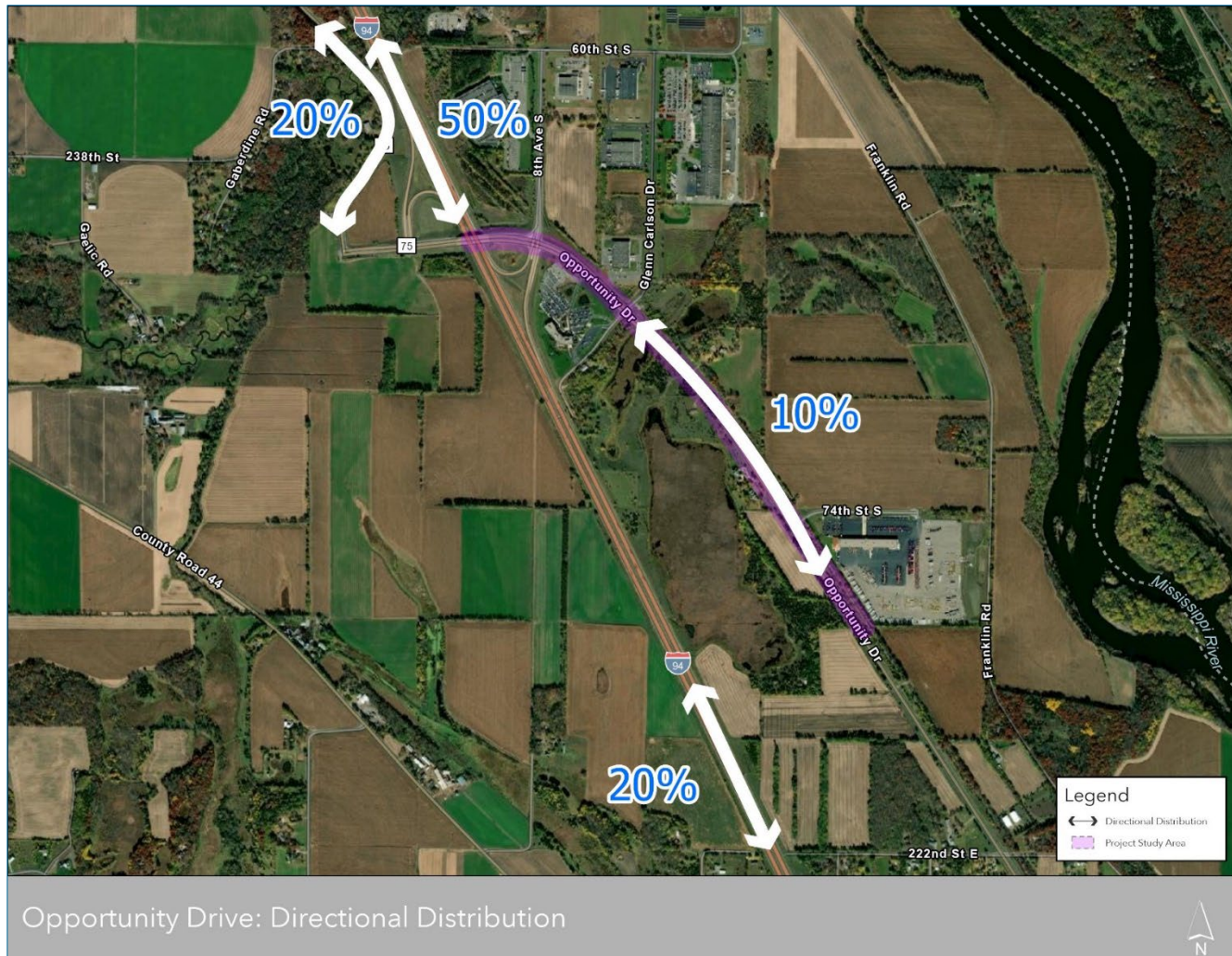
Note that the current trip generation rate of area development is generally consistent with estimates developed utilizing the ITE Trip Generation Manual. Although with industrial type developments, the trip generation during the peak hours can vary based on shift-change times and overall business logistics (i.e., delivery timeframes, business needs, etc.). Additional details regarding traffic forecasts are included later in this report.

REMAINING DEVELOPMENT POTENTIAL AND TRIP GENERATION
Data corresponds to the Adjacent Development Opportunities figure.

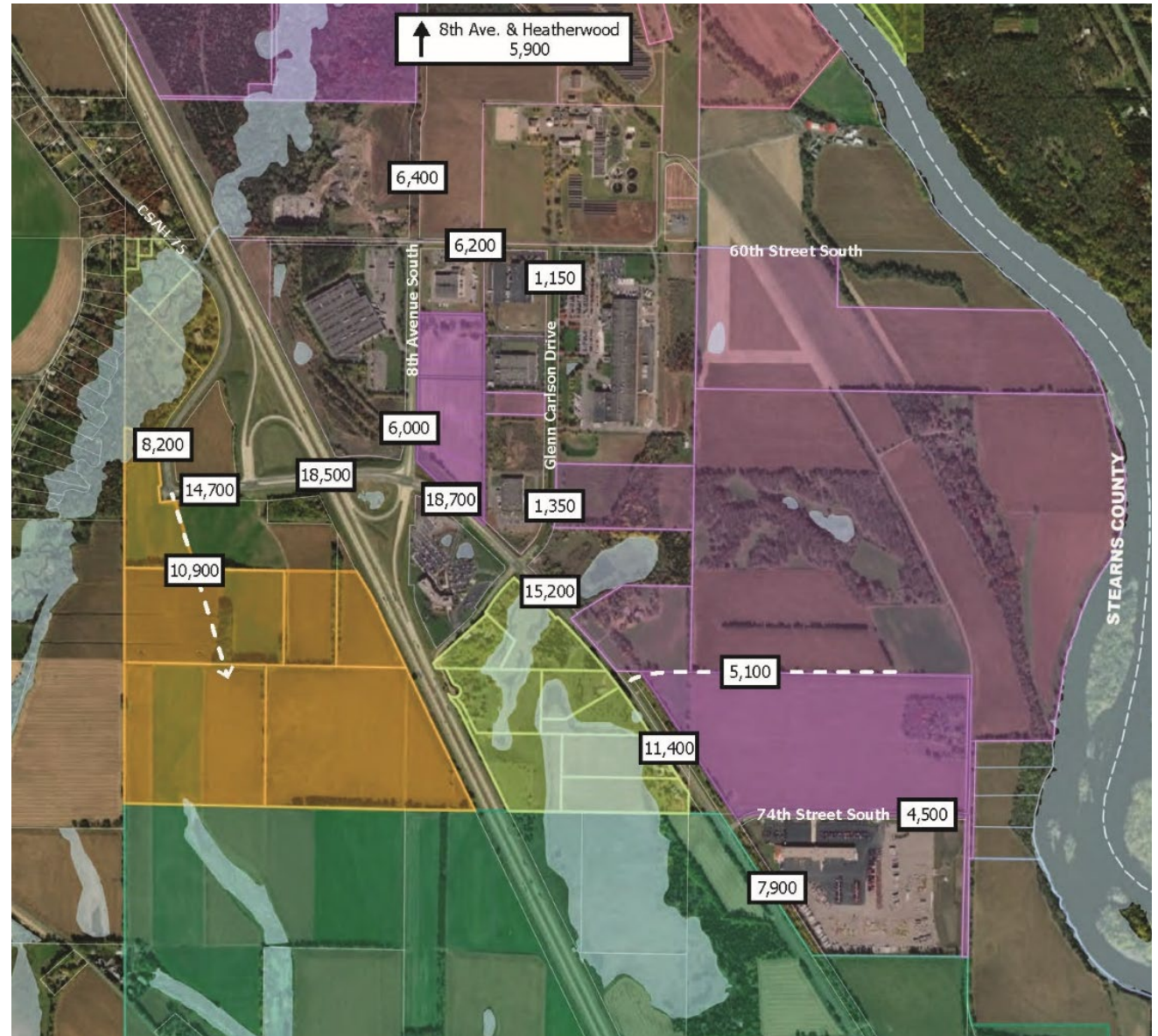
Zone/ID	Name	Type (ITE Code)	Size (SF)	AM Peak Hour		PM Peak Hour		Daily
				In	Out	In	Out	
A	Potential	General Light Industrial (110) - 65% Industrial Park (130) - 35%	490,000	255	39	42	224	2129
B	Dayton	General Light Industrial (110) - 65% Industrial Park (130) - 35%	24,660	13	2	2	11	107
C	Augusta	General Light Industrial (110) - 65% Industrial Park (130) - 35%	162,500	84	13	14	74	706
		8th Avenue Traffic Subtotal	677,160	352	54	58	309	2942
D	Potential	General Light Industrial (110) - 65% Industrial Park (130) - 35%	27,000	14	2	2	12	117
E	Potential	General Light Industrial (110) - 65% Industrial Park (130) - 35%	187,000	97	15	16	85	813
F	Potential	General Light Industrial (110) - 65% Industrial Park (130) - 35%	145,000	75	12	12	66	630
Existing	ATS HQ Expansion	Office (710)	600 employees	259	35	46	224	2000
		Glen Carlson Drive Traffic Subtotal	359,000	445	64	76	387	3560
G	Potential	General Light Industrial (110) - 65% Industrial Park (130) - 35%	650,000	338	52	55	297	2824
H	Potential	General Light Industrial (110) - 65% Industrial Park (130) - 35%	1,500,000	780	120	128	684	6518
		Need to Determine Routing Traffic Subtotal	2,150,000	1,118	172	183	981	9,342
I	Associated Wholesale Grocers	General Light Industrial (110) - 65% Industrial Park (130) - 35%	800,000	416	64	68	365	3476
		74th Avenue Traffic Subtotal	800,000	416	64	68	365	3,476
J	Potential	General Light Industrial (110) - 65% Industrial Park (130) - 35%	1,000,000	520	80	85	456	4345
		Direct to Opportunity Drive Traffic Subtotal	1,000,000	520	80	85	456	4,345
K	Potential	General Light Industrial (110) - 65% Industrial Park (130) - 35%	1,000,000	520	80	85	456	4345
L	Potential	General Light Industrial (110) - 65% Industrial Park (130) - 35%	1,500,000	780	120	128	684	6518
		Direct to Opportunity Drive Traffic Subtotal	2,500,000	1,300	200	213	1,140	10,863
TOTAL (Remaining Area Development)			7,486,160	4,151	634	683	3,638	34,528

Development West of I-94
Development East of I-94

The trip generation for the remaining developments were generally routed throughout the study area utilizing the directional distribution illustrated. This distribution was developed using a combination of existing travel patterns, employee/demographic data from area businesses, and engineering judgment. Note that the majority of area development (i.e., approximately 70%) traffic is destined to/from I-94 or CSAH 75. This travel pattern influences the need and timeline for the Heathwood Road extension contemplated by the City, as well as the overall I-94 interchange configuration.



The resultant traffic forecasts are illustrated in the adjacent graphic. The forecasts indicate that ADT volumes along Opportunity Drive are expected to range from approximately 7,900 to 18,700 vehicles per day, while ADTs along most other roadways are expected to be approximately 6,500 vehicles per day or less. In addition to the ADT volumes, traffic forecasts were developed for the a.m. and p.m. peak hours, which were leveraged as part of the future traffic operations analysis.



Full Build Traffic Operations

Using the full build out traffic forecasts, a multi-pronged approach was leveraged to understand future corridor and intersection capacity issues and needs. In other words, how is the existing infrastructure able to support projected traffic forecasts.

The first approach was a planning level review of forecasted ADT volumes using typical planning level capacity thresholds as shown. This approach indicates that in general, the existing 4-lane facility near the I-94 interchange (i.e., ADT volume ~ 18,500 vpd) can likely support the long-term capacity from a roadway cross-section perspective. However, segments of Opportunity Drive (west of I-94 and immediately east of Glen Carlson Drive) likely warrant expansion to a four-lane facility to function at acceptable levels of service. Note that this approach doesn't fully account for the level of heavy commercial activity present within the corridor; heavy commercial vehicles use more intersection capacity relative to passenger vehicles due to their size and maneuverability limitations.

Facility Type	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
5-lane	< 11,400	< 18,200	< 29,100	< 32,600	< 36,300	< 36,300
4-lane	< 7,600	< 12,100	< 19,400	< 23,300	< 27,600	< 27,600
3-lane	< 4,900	< 7,900	< 12,700	< 17,000	< 21,100	< 21,100
2-lane	< 3,100	< 5,000	< 8,000	< 12,000	< 15,900	< 15,900

The second method included a detailed intersection capacity analysis conducted using Synchro/SimTraffic software, which better accounts for the heavy commercial activity. Using this approach, most of the study intersections and/or approaches are expected to operate at an unacceptable level of service during the peak hours.

This is primarily due to a lack of traffic controls which provide increased capacity, such as a traffic signal or roundabout.

However, traffic control changes alone are not expected to provide sufficient capacity to support full build out conditions in most locations. Therefore, additional capacity analyses were conducted as part of the alternative development process to understand the long-term infrastructure and traffic control needs to support full build out of the area.

Level of Service (Overall / Worst Approach)				
Intersection	AM Peak Hour		PM Peak Hour	
	Existing	Full Build	Existing	Full Build
Opportunity Drive (CR 75) and I-94 West Ramp	A / A	F / F	A / A	F / F
Opportunity Drive (CR 75) and 8 th Avenue (I-94 East Ramp)	A / B	F / F	A / C	F / F
Opportunity Drive (CR 75) and Glen Carlson Drive	A / B	F / F	A / C	F / F
Opportunity Drive (CR 75) and 72nd Street	Future	F / F	Future	F / F
Opportunity Drive (CR 75) and 74th Street	A / A	C / F	A / B	F / F
60th Street and 8th Avenue	A / B	C / F	A / A	F / F
60th Street and Glen Carlson Drive	A / A	A / C	A / A	A / D
Heatherwood Road and Clearwater Road	A / A	A / B	A / A	A / B

Issues and Need Summary

The following high-level issues and needs were identified for the Opportunity Drive corridor and surrounding roadway network within the I-94 Business Park:

- Increase safety at the Opportunity Drive (CR 75) and 8th Avenue (I-94 East Ramp) intersection
- Address the lack of a posted speed limit along the Opportunity Drive corridor
- Improve accommodations for heavy commercial vehicles
- Identify traffic control, geometric, and roadway connection improvements to ensure adequate long-term capacity

These issues and needs served as a guide for the alternative development and evaluation process.

4.0 Alternative Development and Evaluation

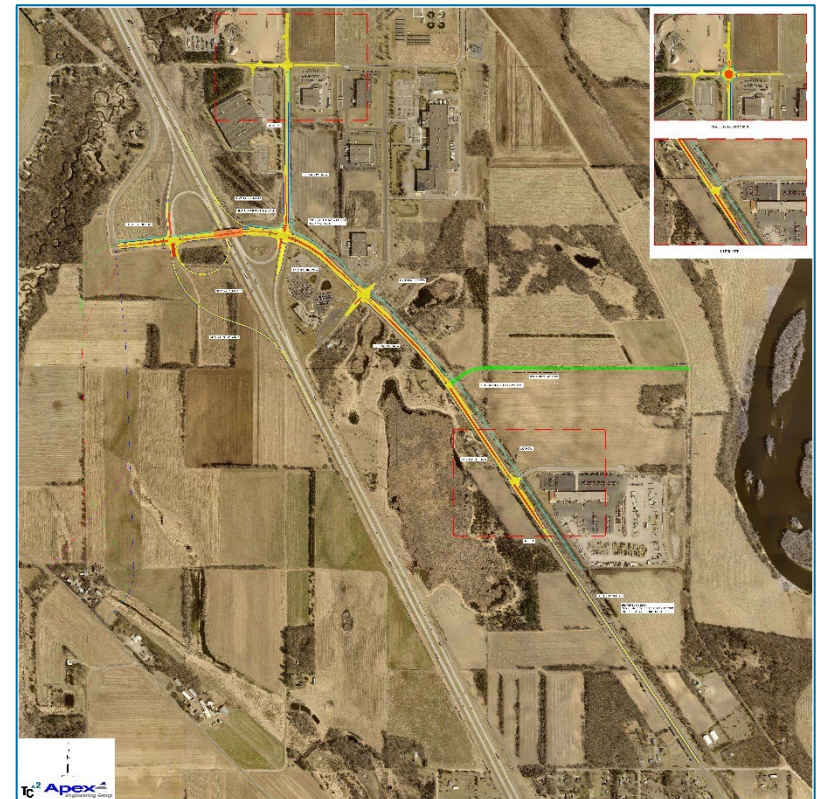
Based on the issues and needs identified, a range of potential alternatives were identified and evaluated. The following sections provide an overview of the process, each alternative and the associated evaluation, and the subsequent findings and recommendations.

Process

A range of alternatives were developed and evaluated to address each of the identified issues. The overarching goals of the alternative development and evaluation process focused on the following strategic goals:

- Forecasts: Focus on full build out conditions, with strategic sensitivity testing
- Alternatives: Provide flexibility to accommodate unknown development or assumption changes
- Implementation: Leverage decision metrics to assist planning staff

The following sections outline the alternative development and evaluation process conducted for each of the issues and needs identified. This information includes feedback and discussions, as well as various technical data which support the study recommendations. The process focuses on the Opportunity Drive corridor and key aspects such as corridor cross-section, traffic controls, intersection capacity, and implementation/need timelines.



Corridor Speeds

Issue(s): No posted speed limit; the existing average and 85th percentile speeds of motorists are 45 and 60 mph, respectively.

Evaluation: The evaluation included a review of design plans and coordination/discussion with the project team, including Stearns County and MnDOT, who ultimately have jurisdiction over Opportunity Drive in this area.

Findings: The Opportunity Drive corridor was originally designed with a 40-mph design speed in the vicinity of the I-94 interchange. In particular, the curve along Opportunity Drive at the 8th Avenue (I-94 East Ramps) intersection is the controlling location, where the curve radius and roadway super-elevation meet the design requirements for a 40-mph curve. However, to increase the design speed of this curve would require a larger curve radius and/or additional roadway super-elevation, which would have significant cost implications.



Slower vehicular speeds along Opportunity Drive would help improve intersection safety by increasing gaps in traffic along Opportunity Drive, as well as reducing the severity of potential crashes. However, the project team recognizes that changing the speed limit alone will not change driver behavior and not likely result in a noticeable change in vehicular speeds along the corridor. In general, a change in context (i.e., a more urban roadway cross-section) and/or traffic controls (such as a roundabout) would be expected to have more influence in slowing vehicular speeds than changing the speed limit.

Recommendation: Given the level of development occurring within the I-94 Business Park, coordination with Stearns County staff should occur to collect additional vehicular speed data in 2023 to determine if a formal speed study should be requested through MnDOT. This approach will allow area stakeholders to understand how travel speeds and volumes have changed due to recent development activity, as well as to determine a likely outcome (i.e., the speed limit) before requesting a formal speed study, if desired.

Corridor Capacity / Cross-Section

Issue(s): What is the long-term capacity needed for the corridor and various segments.

Evaluation: The evaluation focused on a planning level review of the projected traffic volumes relative to typical planning level thresholds by facility type (i.e., 2-lane versus 4-lane, etc.). A factor of safety was also considered given the planning level approach does not directly account for the higher level of heavy commercial vehicle activity associated with the Opportunity Drive corridor. The roadway cross-section was also considered with respect to the existing center median and rural drainage patterns.

Opportunity Drive Segment	Full Build ADT Volume	Existing Configuration LOS	Recommended Configuration LOS	Comment / Consideration
Western Study Limits to I-94	14,700	3-lane / LOS D	5-lane / LOS B	
I-94 to Glen Carlson Drive	18,700	5-lane / LOS C	5-lane / LOS C	
Glen Carlson Drive to 72 nd Street	15,200	2-lane / LOS E	5-lane / LOS B	LOS D as a 3-lane
72 nd Street to 74 th Street	11,400	2-lane / LOS D	3-lane / LOS C	
74 th Street to Southern Study Limits	7,900	2-lane / LOS C	3-lane / LOS B	

Findings: The existing Opportunity Drive corridor does not provide a consistent cross-section throughout the study area; the corridor varies from a 2-lane rural section to a 4-lane+ hybrid section near the 8th Avenue (I-94 East Ramps) intersection. In general, to provide a consistent experience for area users, as well as adequate long-term capacity, a 5-lane section (or a 4-lane with turn lanes) is needed from the western study limits through Glen Carlson Drive and potentially to 72nd Street and beyond. A 3-lane facility (or a 2-lane with turn lanes) is expected to provide adequate long-term capacity from 72nd Street to the southern study limits, but is ultimately dependent upon the type, location, and intensity of future area developments.

From a roadway cross-section perspective, preserving the existing hybrid cross-section (i.e., a center median with outside ditch sections) appears most advantageous. This allows for efficient roadway expansion when needed, while also limiting additional capital expenditures (as compared to converting the corridor to a fully urban roadway cross-section).



Recommendation: Plan for a 5-lane facility from the western study limits through 74th Street, by considering right-of-way preservation as opportunities arise. In the near term, consider implementation of segments as part of other infrastructure projects, such as the upcoming 72nd Street construction project identified within the City of St. Cloud's capital improvement program. The existing hybrid cross-section should be maintained.

Corridor Traffic Controls

Issue(s): As development continues, new traffic controls will be needed to provide additional intersection capacity.

Evaluation: In general, new traffic controls would likely focus on either traffic signals or roundabouts. Mixing traffic signals and roundabouts along a corridor such as Opportunity Drive is relatively uncommon and therefore identifying a consistent traffic control vision was considered. This evaluation focused on comparing key criteria such as Freight Compatibility, Safety, Roadway Capacity, Implementation, Capital Costs, and Stakeholder Feedback.

Findings: Based on this evaluation, a traffic signal corridor provides improved freight compatibility related to over-size over-weight (OSOW) vehicles, more flexibility in long-term roadway capacity, can be easier implemented and at a lower capital cost, and is more favored by area business representatives. A roundabout corridor would provide a safety advantage over a signal corridor by helping reduce vehicular speeds but comes with more implementation challenges and capital costs.

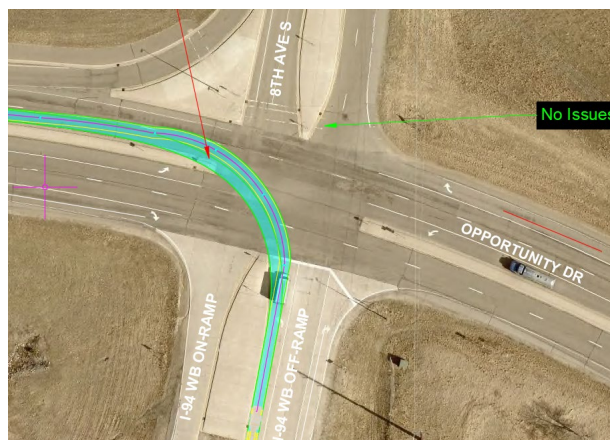
Recommendation: Plan for traffic signal implementation as opportunities arise and/or warrants are met.

Evaluation Criteria	Signals	Roundabouts
Freight Compatibility		
Safety		
Roadway Capacity		
Implementation		
Capital Costs		
Stakeholder Feedback		

Issue(s): History of angle-crashes and significant crash and severity rates relative to intersections with similar characteristics; substandard radii for truck maneuverability; need for additional intersection capacity from both a traffic control and geometric roadway configuration perspective.

Findings (Signal Need): Based on this evaluation, traffic volumes do not currently meet any signal warrants, however warrants are expected to be met between approximately 25 to 50% of the full build out condition. A traffic signal is expected to result in a 5% reduction in overall crashes and a 67% reduction in angle-crashes (per crash modification factors). Note that the extension of Heatherwood Road has the potential to impact the need and timing of future signalization of this location. As part of a signal implementation project, minor geometric modifications could be incorporated to improve turning radii to limit encroachment and/or overtopping of medians, etc.

Recommendation: Monitor development and traffic volume changes and plan for signal installation in the next 2 to 5 years.



Warrants 1 - 3 (Volume Warrants)

Project Name	Opportunity Drive Operations Study		
Project/File #	22-023		
Scenario	Existing Conditions		

Intersection Information			
Major Street (E/W Road)	Opportunity Drive	Minor Street (N/S Road)	8th Avenue / I-94 Off Ramp
Analyzed with	2 or more approach lanes	Analyzed with	2 or more approach lanes
Total Approach Volume	4163 vehicles	Total Approach Volume	1057 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings
Right turn reduction of	100 percent applied	Right turn reduction of	100 percent applied

Reduction applied to Volume Warrant threshold due to isolated community.

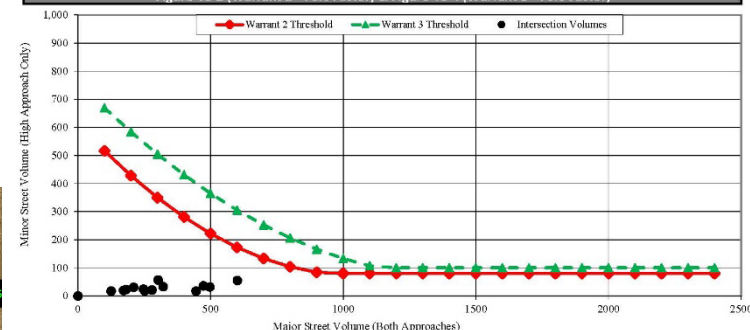
Warrant 1, Eight Hour Vehicular Volume			
	Condition A	Condition B	Condition A+B*
Condition Satisfied?	Not Satisfied	Not Satisfied	Not Satisfied
Required values reached for	0 hours	0 hours	0 (Cond. A) & 0 (Cond. B)
Criteria - Major Street (veh/hr)	420	630	336 (Cond. A) & 504 (Cond. B)
Criteria - Minor Street (veh/hr)	120	70	112 (Cond. A) & 56 (Cond. B)

* Should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Warrant 2, Four Hour Vehicular Volume	
Condition Satisfied?	Not Satisfied
Required values reached for	0 hours
Criteria	See Figure Below

Warrant 3, Peak Hour Vehicular Volume		
	Condition A	Condition B
Condition Satisfied?	Not Satisfied	Not Satisfied
Required values reached for	0 total, minor, 0 delay	0 hours
Criteria - Total Approach Volume (veh in one hour)	650	
Criteria - Minor Street High Side Volume (veh in one hour)	150	See Figure Below
Criteria - Minor Street High Side Delay (veh-hrs)	5	

Figure 4C-2 (Warrant 2 - 70% Factor) & Figure 4C-4 (Warrant 3 - 70% Factor)

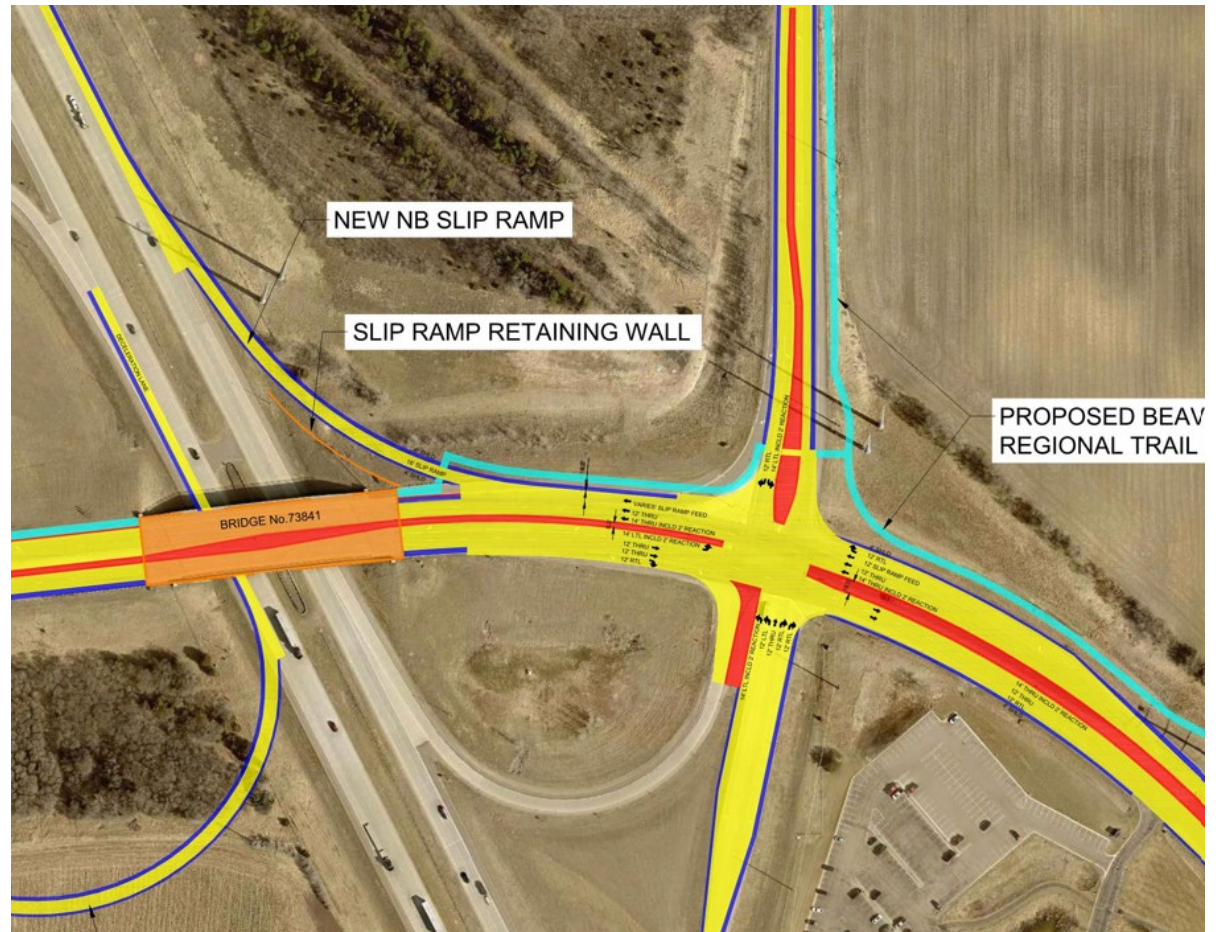


Findings (Additional Capacity): Even with signalization, the existing intersection geometric layout is expected to reach its current capacity between 50 and 75% of full-build out conditions. In particular, the northbound I-94 on-ramp is the controlling movement during the p.m. peak hour, which includes a combination of the westbound left-turn, eastbound right-turn, and southbound through movements all of which contribute to its capacity limitation. Furthermore, the westbound left-turn movement is projected to approach approximately 600 left-turning vehicles during the p.m. peak hour at approximately 50% of full-build out. At this number of left-turning motorists, queues beyond the existing turn lane would be expected and thus, consideration of dual left-turn would be needed.

An evaluation comparing the impacts of adding a westbound left-turn lane (i.e., dual lefts) relative to a new northbound slip ramps was completed. An example of a new slip ramp configuration is shown in the illustration; additional turn lanes on the off-ramp may also be needed, as illustrated. Note that to implement the dual westbound left-turn lanes, significant corridor widening would be needed and the dual lefts may still not provide sufficient long-term capacity. The slip ramp would provide additional long-term capacity (as compared to the dual lefts), while requiring some widening to accommodate an advance through lane and new westbound right-turn lane. The southbound to westbound channelized right-turn lane, along with modifications to the existing multi-use trail would be needed. There is also the potential need for a retaining wall, collector-distributor lanes along northbound I-94, and/or utility (i.e., overhead power) impacts that would need further vetting if the additional capacity were to be eventually needed.

The slip ramp would provide additional long-term capacity (as compared to the dual lefts), while requiring some widening to accommodate an advance through lane and new westbound right-turn lane. The southbound to westbound channelized right-turn lane, along with modifications to the existing multi-use trail would be needed. There is also the potential need for a retaining wall, collector-distributor lanes along northbound I-94, and/or utility (i.e., overhead power) impacts that would need further vetting if the additional capacity were to be eventually needed.

Recommendation: Monitor development, traffic volumes, and intersection operations to determine if/when additional capacity is needed; Consider budgeting for future capital improvements.



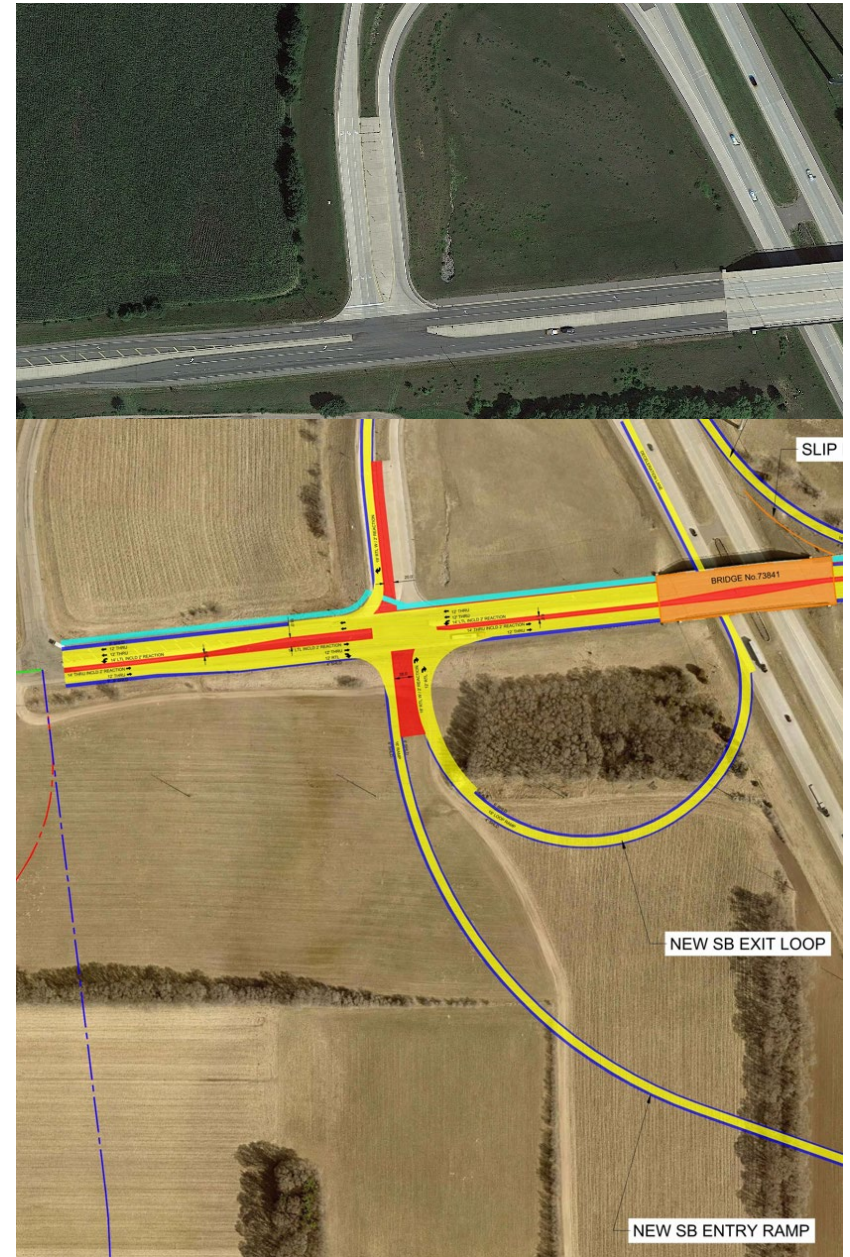
I-94 West Ramps Intersection

Issue(s): As development continues, new traffic control and capacity will be needed; the existing dual left-turn lane configuration on the off-ramp creates some unique conflicts with the stop-controlled configuration (i.e., it is not common for dual left-turn lanes to be controlled by a stop condition).

Evaluation: Two specific evaluations were completed for this location, one of which looked at the need and timing of a traffic control change (i.e., signal need). The second evaluation focused on the need and timing of when the signal and current geometric configuration is expected to no longer provide adequate intersection capacity and the identification of what additional infrastructure is needed to support full build-out of the area (i.e., additional capacity).

Findings: Based on the evaluation, traffic volumes do not currently meet any signal warrants. However, warrants are expected to be met at approximately 25% of the full build out condition. If/when the southbound off-ramp and particularly the southbound left-turn movement reaches its capacity (even with a traffic signal), adding a southbound to eastbound loop in the southwest quadrant of the interchange would be a logical improvement to better serve this predominant movement, particularly during the a.m. peak hour. In tandem, a new southbound on-ramp could be provided, as well as other ramp and geometric modifications as shown. The need for additional capacity beyond a traffic control change is expected to occur between approximately 75 to 100% of full build out conditions.

Recommendation: Monitor development and traffic volume changes and plan for signal installation in the next 2 to 5 years. Preclude development from encroaching on the potential southwest quadrant interchange footprint to maintain future flexibility with respect to interchange capacity and operations.



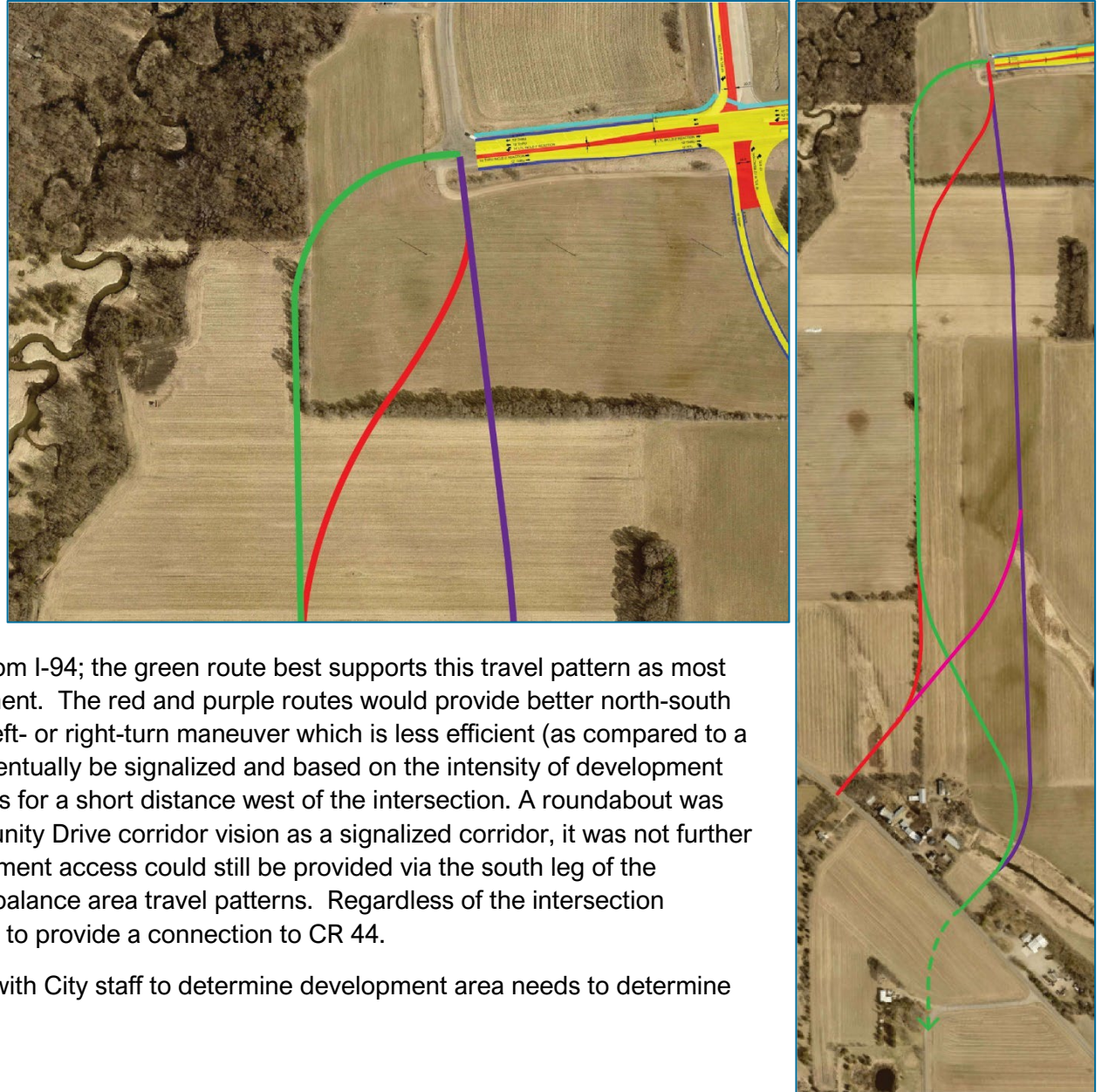
West Area Connectivity

Issue(s): As development begins west of I-94, new connectivity west of the study corridor is expected to be needed to serve area development. The question is how to continue the Opportunity Drive corridor at the western study limit, as well as how to eventually provide connectivity to County Road 44.

Evaluation: This evaluation looked at multiple aspects, including the traffic control need, intersection orientation (north-south connectivity versus east-west connectivity), roadway alignment, design speed, and CR 44 connection locations. To assess varying aspects, travel patterns, preliminary capacity, development connectivity, parcel and water resource impacts, and overall system connectivity were considered.

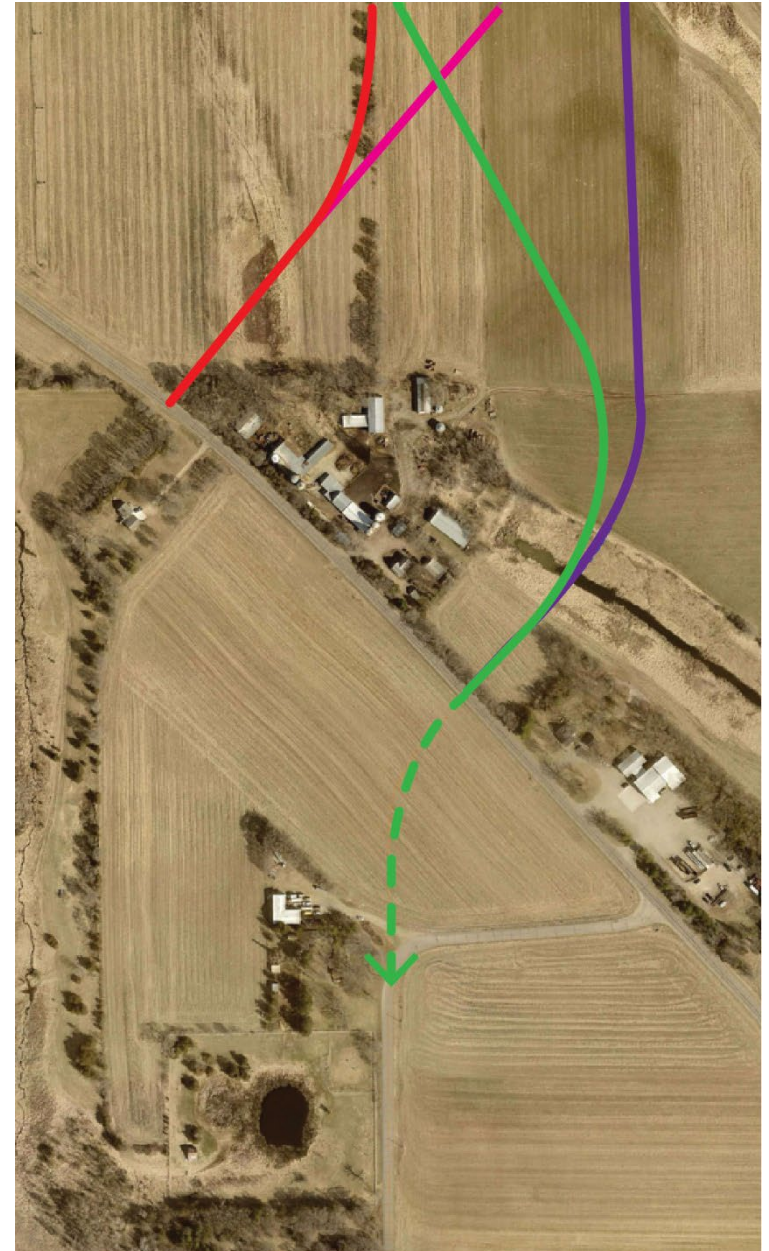
Findings (North Intersection): The predominant travel pattern for western area development is to/from I-94; the green route best supports this travel pattern as most motorists traverse the intersection as a thru-movement. The red and purple routes would provide better north-south connectivity but require most motorists to make a left- or right-turn maneuver which is less efficient (as compared to a thru movement). The intersection is expected to eventually be signalized and based on the intensity of development west of I-94, the green route may need to be 4-lanes for a short distance west of the intersection. A roundabout was looked at preliminarily but given the overall Opportunity Drive corridor vision as a signalized corridor, it was not further investigated. If the green route is selected, development access could still be provided via the south leg of the intersection (i.e., the red or purple connections) to balance area travel patterns. Regardless of the intersection configuration, all the options still have the capability to provide a connection to CR 44.

Recommendation (North Intersection): Coordinate with City staff to determine development area needs to determine the optimal intersection configuration.



Findings (South Intersection): Both locations would provide good connectivity to County Road 44. Given area travel patterns, a new connection to County Road 44 is expected to primarily serve area development and is not expected to serve as a cut-through route. The red and magenta routes have less water resource impacts, but they don't provide the same level of north-south connectivity with 13th Avenue. The green and purple routes provide better north-south connectivity with 13th Avenue but have more water resource impacts.

Recommendation (South Intersection): Preserve both connection options and re-evaluate if/when development occurs to determine the best fit.



8th Avenue / 60th Street

Issue(s): The extension of Heatherwood Road is expected to connect to this intersection, creating the north approach. In addition, this intersection is expected to reach capacity under full-build out conditions.

Evaluation: This evaluation looked at two intersection configurations, a traditional four-legged intersection with corresponding left- and right-turn lanes, where appropriate, as well as a single-lane roundabout. The traditional intersection was evaluated with both side-street stop and all-way stop control.

Findings: The capacity analysis for each of the alternatives, as shown, indicates that under full build out conditions the single lane roundabout is expected to provide more capacity (i.e., a better level of service) as compared to a traditional intersection with stop control. Although capacity at the traditional intersection could be increased by the addition of a traffic signal, the future traffic forecasts are not expected to meet any signal warrants. It should be noted that this intersection is located adjacent to Landwehr Construction, who operates several large commercial crane rigs and construction equipment through this intersection on a daily basis. Based on feedback during the focus group meetings, Landwehr Construction, along with other area businesses did not fully support the roundabout concept given the complexity for them to maneuver their larger vehicles.

Recommendation: When Heatherwood Road is constructed, upgrade the entire intersection with the corresponding turn lanes as shown and evaluate the traffic control need as part of the design effort (i.e., side-street stop or all-way stop).

Alternative	Full Build	
	AM	PM
Side-Street Stop	B / F (85 sec)	C / E (44 sec)
All-Way Stop	C (23)	E (44 sec)
Single Lane Roundabout	C (15)	C (15)



Opportunity Drive (Glen Carlson Drive to 74th Street)

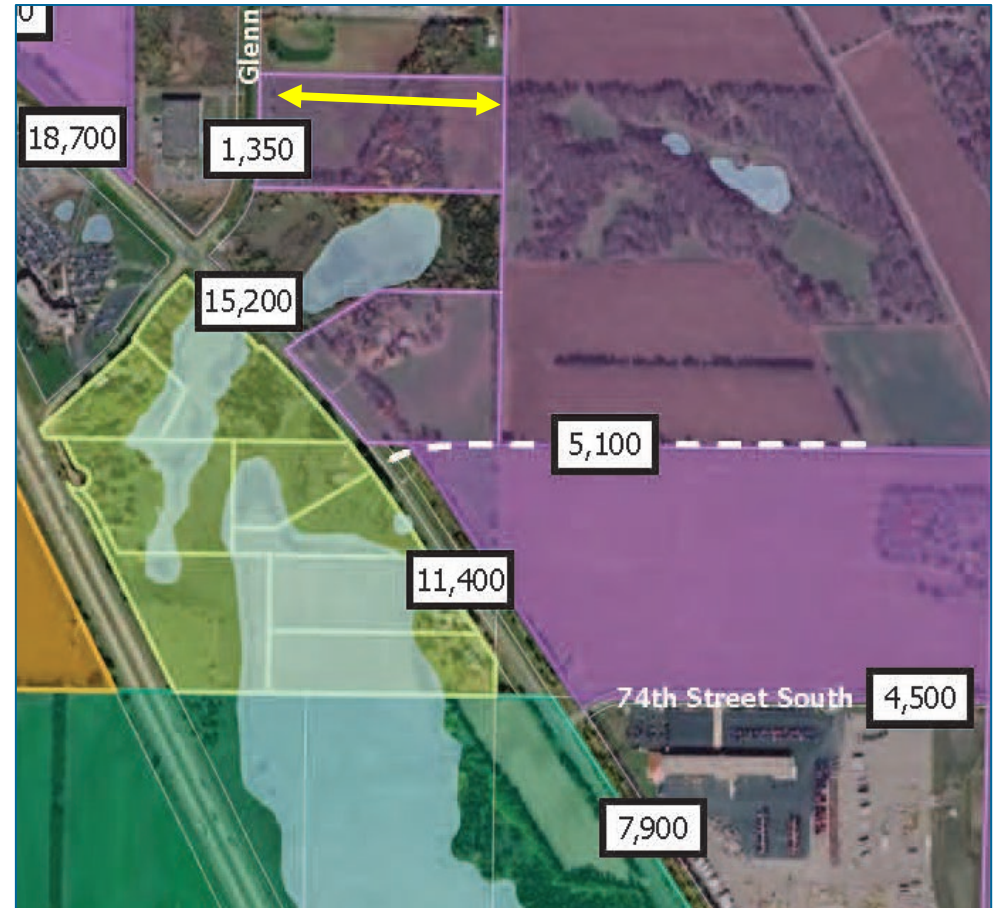
Issue(s): When and where to extend the 4-lane section of Opportunity Drive to the east?

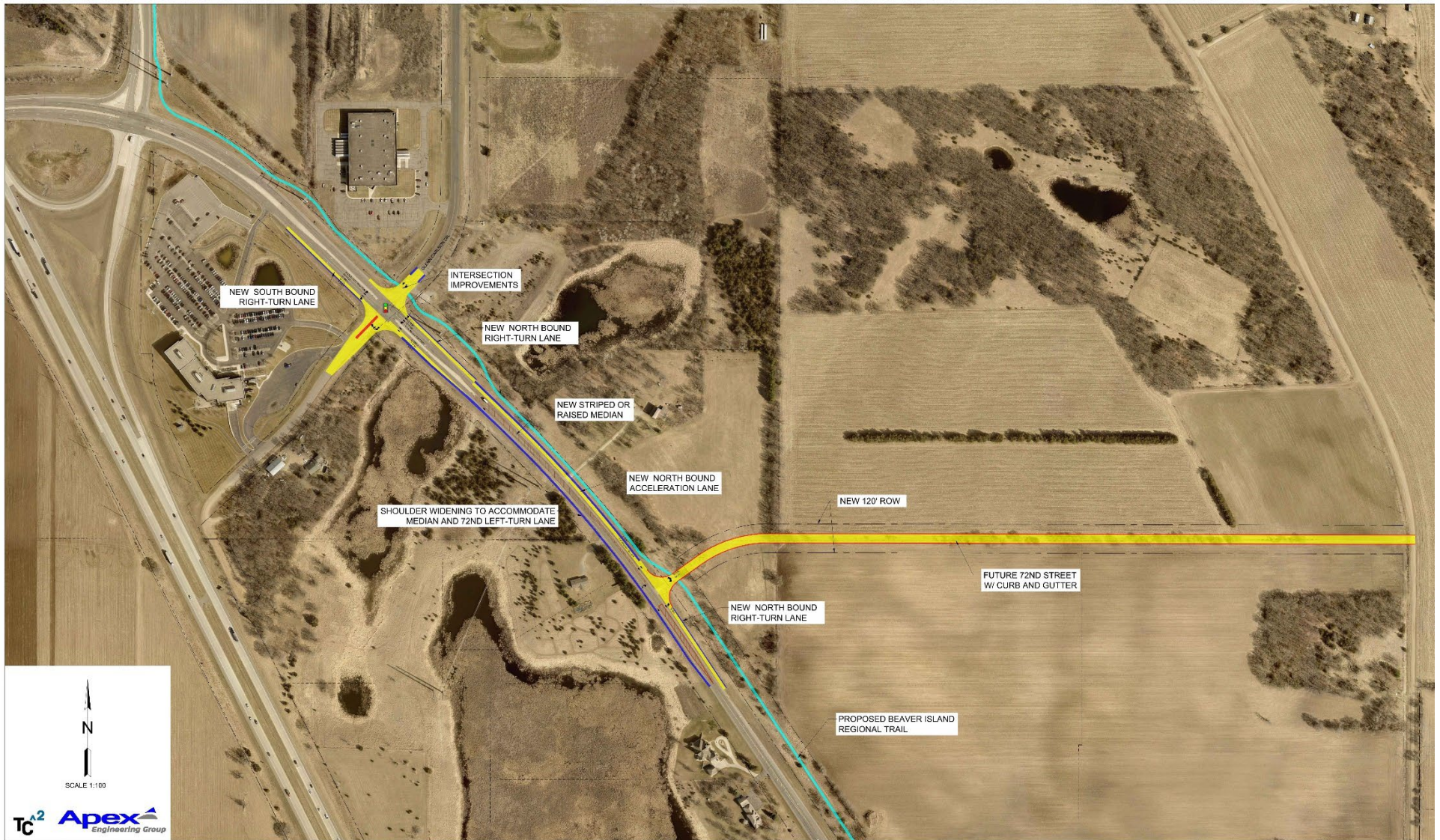
Evaluation: The planning level evaluation identified the 4-lane section should at least be extended through the Glen Carlson Drive intersection. This evaluation adds additional detail and context with respect to intersection operations to understand the need, timing, intersection capacity, and any other improvements that could help alleviate the need for additional expansion of Opportunity Drive.

Findings: The peak hour capacity analysis identified that a 4-lane facility is likely needed through 72nd Street between 50 and 75% of full build out and through 74th Street between 75 and 100% of full build out. However, a new connection to Glen Carlson Drive that would serve future development (as illustrated by the yellow arrow) has the potential to reduce the need to extend Opportunity Drive beyond 72nd Street by better utilizing Glen Carlson Drive which has a significant amount of reserve capacity.

Note that the City of St. Cloud has 72nd Street programmed for construction in 2024. Therefore, the project team discussed the possibility of adding capacity (i.e., a 4-lane facility) along Opportunity Drive between Glen Carlson Drive and 72nd Street. This project not only would add the needed long-term capacity within the area, but also address the near-term Opportunity Drive and Glen Carlson Drive intersection capacity issues. This is a critical component given that intersection improvements at this location would directly benefit Anderson Trucking Services (ATS), who are currently expanding their campus.

Recommendation: As part of the 72nd Street project, create a similar westbound 72nd Street to northbound Opportunity Drive acceleration lane as recently constructed at 74th Street; this acceleration lane should become the second northbound lane along Opportunity Drive and connect with the second through lane at Glen Carlson Drive. Additional intersection capacity at the Opportunity Drive and Glen Carlson Drive intersection, along with signalization, should also be considered. On the following page is an illustration of the 72nd Street project for consideration.





Other Area Transportation Improvements and Strategies

In addition to the alternatives noted, the following other transportation improvements, considerations, and/or strategies were discussed during the study process. Area planners should continue to be mindful of such items and their impact on area operations and future developments.

60th Street: As development in the eastern portion of the I-94 Business Park occurs, the City should look for opportunities to extend 60th Street due east to connect with Franklin Road, as opposed to the current 4th Avenue alignment. This will improve connectivity and utilization of 60th Street.

Franklin Road: Consider relocation of Franklin Road as far east towards the scenic river boundary to maximize the development potential in this area.

Heatherwood Road: The City is planning to complete the extension of Heatherwood Road to the 8th Avenue / 60th Street intersection; the project is currently looking to identify final funding. The project will be a vital link that connects the I-94 Business Park and St. Cloud without motorists having to utilize I-94. The project will be generally a 2- or 3-lane roadway, depending on environmental impact areas; additional improvements along 8th Avenue (i.e., a 3-lane facility) to Opportunity Drive could also be considered as part of this project if funding is available.

Multimodal Improvements / Beaver Island Regional Trail: Construction of this trail began in 2022 and is expected to be completed in 2023. Additional multimodal connections should be considered as opportunities arise.

Future Access (74th Street to 222nd Street): Although no developments are currently in the planning process south of 74th Street, future access along Opportunity Drive in this area should be given special care. Based on county access spacing guidance, only one (1) additional full access should be provided between 74th Street and 222nd Street. This access should generally be located at the midpoint, which is approximately ¼-mile spacing; appropriate left- and right-turn lanes should be considered as part of the design.

Development Management: Area stakeholders should continue to monitor development activity and conduct traffic impact studies as appropriate to quantify current operations, as well as to identify any potential infrastructure improvements that may be needed. Other management strategies, such as limiting shift-change times to outside of typical peak periods and providing carpool, transit, and/or multimodal based incentives to reduce the dependance on single-occupancy vehicles should be investigated as part of any development approval process.

Elective Vehicle (EV) Fast Charging Locations: The Opportunity Drive interchange was identified as a potential candidate for a future interstate electric vehicle (EV) fast charging site. No additional information is currently available, but impacts should be evaluated in the future.



5.0 Collaboration

Project Management Team

Throughout the study process, the consultant project team (Transportation Collaborative & Consultants and Apex Engineering Group) worked closely with area agencies to understand key study goals and objectives, review technical methodology, assumptions, and findings, and assist with stakeholder outreach. As part of the process, a Project Management Team (PMT) was developed consisting of the following agency representatives.

- Saint Cloud Area Planning Organization (Brian Gibson, Executive Director)
- City of St. Cloud (Matt Glaesman, Community Development Director)
- Stearns County (Jodi Teich, County Engineer)
- MnDOT (Tom Cruikshank, Principal Planner)

Four (4) PMT meetings were held throughout the study process. A summary of key topics discussed during each meeting is as follows:

- PMT Meeting 1: Kick-Off Meeting (Goals/Objectives, Data Needs, Preliminary Existing Conditions, Schedule)
- PMT Meeting 2: Issues and Needs (PMT 1 Recap, Issues and Needs Summary, Visioning Workshop)
- PMT Meeting 3: Alternative Development (PMT 2 Recap, Traffic Forecasts, Alternative Development, Evaluation Methodology)
- PMT Meeting 4: Evaluation / Implementation (PMT 3 Recap, Alternative Evaluations, Implementation, Documentation, Schedule)

Specific PMT meeting minutes and materials are available upon request.

Focus Groups

The I-94 Business Park is presently occupied by several businesses, although there is a significant amount of remaining development potential within the area. Ensuring the Opportunity Drive corridor and adjacent transportation network can support both existing and future businesses is critical to the success of the business park. Thus, a focus group was established to solicit feedback and input from area businesses and/or developers to help guide and inform the overall study process and specific infrastructure recommendations. Members of the focus group included representatives from Anderson Trucking Services (ATS), Arctic Cat Inc., New Flyer, Landwehr Construction Inc., Associated Wholesale Grocers (AWG), and Rice Companies. Two focus groups meetings were held. A summary of key topics discussed during each meeting, included:

- Focus Group Meeting 1: Goals/Objectives, Issues/Needs, Interactive Workshop, Business Operations/Plans
- Focus Group Meeting 2: Data Needs, Preliminary Existing Conditions, Schedule)

Specific Focus Group meeting minutes and materials are available upon request.

6.0 Implementation and Costs

Based on the alternative development and evaluation process, the following improvements and their respective development timeframes or decision metrics were identified. The costs were developed in collaboration with the project team leveraging current year unit prices. Costs were rounded given the planning nature of this study to provide a range of potential costs. Additional cost estimate details would be determined through the design development process. An illustration of the potential long-term transportation vision is provided on the following page.

Improvement / Location	Development Timeframe / Decision Metrics	Construction Cost Range
West Area Extension (Opportunity Drive to County Road 44)	Development Driven	\$2M to \$3M
I-94 West Ramp Intersection – Signalization	2024 to 2027	\$500,000
I-94 West Ramp Intersection – Geometric Improvements (Southwest quadrant of the interchange)	75 to 100% of Full Build Out	\$3M to \$4M
8 th Avenue / I-94 East Ramp Intersection – Signalization	2024 to 2027	\$500,000
8 th Avenue / I-94 East Ramp Intersection – Geometric Improvements (Slip ramp and turn lane improvements)	50 to 75% of Full Build Out	\$4M to \$6M
72 nd Street Construction (72 nd Street only)	2024	\$1M to \$2M
72 nd Street Construction with Opportunity Drive Improvements (4-Lane extension through Glen Carlson Drive and signalization)	2024 (Optional)	\$2M to \$3M
8 th Avenue / 60 th Street Intersection Improvements (Traditional intersection)	Tied to the Heatherwood Road Extension	\$1M to \$2M

