



414 Nicollet Mall
Minneapolis, MN 55401

April 21, 2022

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

—Via Electronic Filing—

RE: SHERCO SOLAR PROJECT
TRAFFIC ANALYSIS – SRF CONSULTING
DOCKET NOS. E002/M-20-891, E002/TL-21-189, E002/TL-21-190,
E002/GS-21-191

Dear Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, submits to the Minnesota Public Utilities Commission the attached letter and results of a traffic analysis conducted by SRF Consulting for the proposed Sherco Solar Project as provided on April 20, 2022 to the Becker Township Board in Becker, Minnesota.

We have electronically filed this document with the Commission, and copies have been served on the parties on the attached service lists. Please contact Mary Martinka at mary.a.martinka@xcelenergy.com or (612) 330-6737 or me at bria.e.shea@xcelenergy.com or (612) 330-6064 if you have any questions regarding this filing.

Sincerely,

/s/

BRIA E. SHEA
DIRECTOR, REGULATORY & STRATEGIC ANALYSIS

Attachments

c: Service Lists



401 Nicollet Mall
Minneapolis, MN 55401

April 20, 2021

Dear Becker Township Board,

As additional follow-up to the information you provided to us at the June 3rd, 2021 meeting and the June 23, 2021 meeting regarding traffic and related safety concerns for the business park and County Rd 11 (165th Ave SE) and 149th St SE we commissioned additional analysis to better understand those concerns and prudent solution options. We are pleased to share the results of that study work completed by SRF (see Attachment 1).

We submitted this study as well as corresponding testimony as part of the Site and Route permit review process on April 6th, 2022.

We recognize many stakeholders are impacted by transportation decisions related to County Rd 11. We would like to continue discussions with other regional stakeholders to identify the best solution to the benefit of the region. We'd like to emphasize our commitment to maintaining an ongoing dialogue regarding the Township's concerns as we continue to pursue the development of the Sherco Solar Project.

Regards,

A handwritten signature in black ink that reads 'Trisha A. Duncan'.

Trisha A. Duncan
Director, Minnesota Community Relations



Memorandum

SRF No. 14929

To: William Risse, Permitting Specialist
National Grid Renewables

From: Josh Maus, PE, Principal
Collin Schroeder, PE, Senior Engineer

Date: January 19, 2022

Subject: Proposed Solar Development Traffic Analysis
CSAH 11 and Becker Township Business Park, Minnesota

Introduction

SRF has completed a traffic study for the Sherco solar project proposed by Xcel Energy, a portion of which will be in Becker Township located south of Highway 10 and west of County State Aid Highway (CSAH) 11 (see Figure 1: Project Location). Becker Township has expressed concerns about the solar project and the impacts it would have on the Township's ability to create traffic solutions that would make the Business Park more accessible for users. The study includes two intersections: the Highway 10/CSAH 11 intersection and the CSAH 11/149th Street SE intersection. The main objectives of the study are to evaluate the existing operations at the two study intersections, identify any transportation impacts associated with the proposed development, identify the impacts the proposed development has on the accessibility of the Business Park, and recommend improvements to address any issues, if necessary. The following information provides the assumptions, analysis, and study recommendations offered for consideration.

Executive Summary

As documented throughout this memorandum, a traffic analysis has been completed to better understand the existing and projected future operational issues at the study intersections, the impact the proposed development has on the accessibility of the Becker Township Business Park, and potential strategies to improving the Business Park accessibility. The following describes a summary of the results from this analysis:

- There are operational issues today on 149th Street SE, but these issues are caused by the lack of northbound approach lanes on CSAH 11 at Highway 10 and the BNSF railroad crossing.
- The proposed development will have minimal impact on the Business Park accessibility during the development's construction or after the construction. However, as traffic volumes increase over time, the operational issues present at the study intersections under existing conditions will worsen.
- The previous *Highway 10/CSAH 11 Intersection Study* conducted by Sherburne County indicated that a grade separated interchange would significantly improve operations at the two study

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II - Internal Information

intersections. The County is currently pursuing funding opportunities for implementing improvements at Highway 10/CSAH 11.

- The township expressed interest in providing an alternative exit to 137th Street via a new local roadway extension. Thus, an evaluation of a new local roadway was completed. While the new roadway would provide an option for traffic exiting the Business Park going west on Highway 10, those vehicles would still have to cross the BNSF railroad at 137th Street or at Liberty Lane. Based on the traffic volumes, this roadway would only serve a relatively low amount of traffic.
- A return-on-investment evaluation and benefit-cost analysis was completed for this study. From this evaluation, the benefit-cost ratio for the new interchange is 1.8, and the benefit-cost ratio for the new roadway is 0.8. These results indicate that the new interchange is a cost-effective solution, and the new roadway is not a cost-effective solution.
- The new interchange fits within the long-term vision for the Highway 10 corridor as there is currently another grade separated interchange being designed on the west side of Becker for the *Highway 10 and Highway 25/County Road 52 Interchange Study*. This interchange study west of Becker is being conducted to address similar accessibility and delay issues at that intersection.

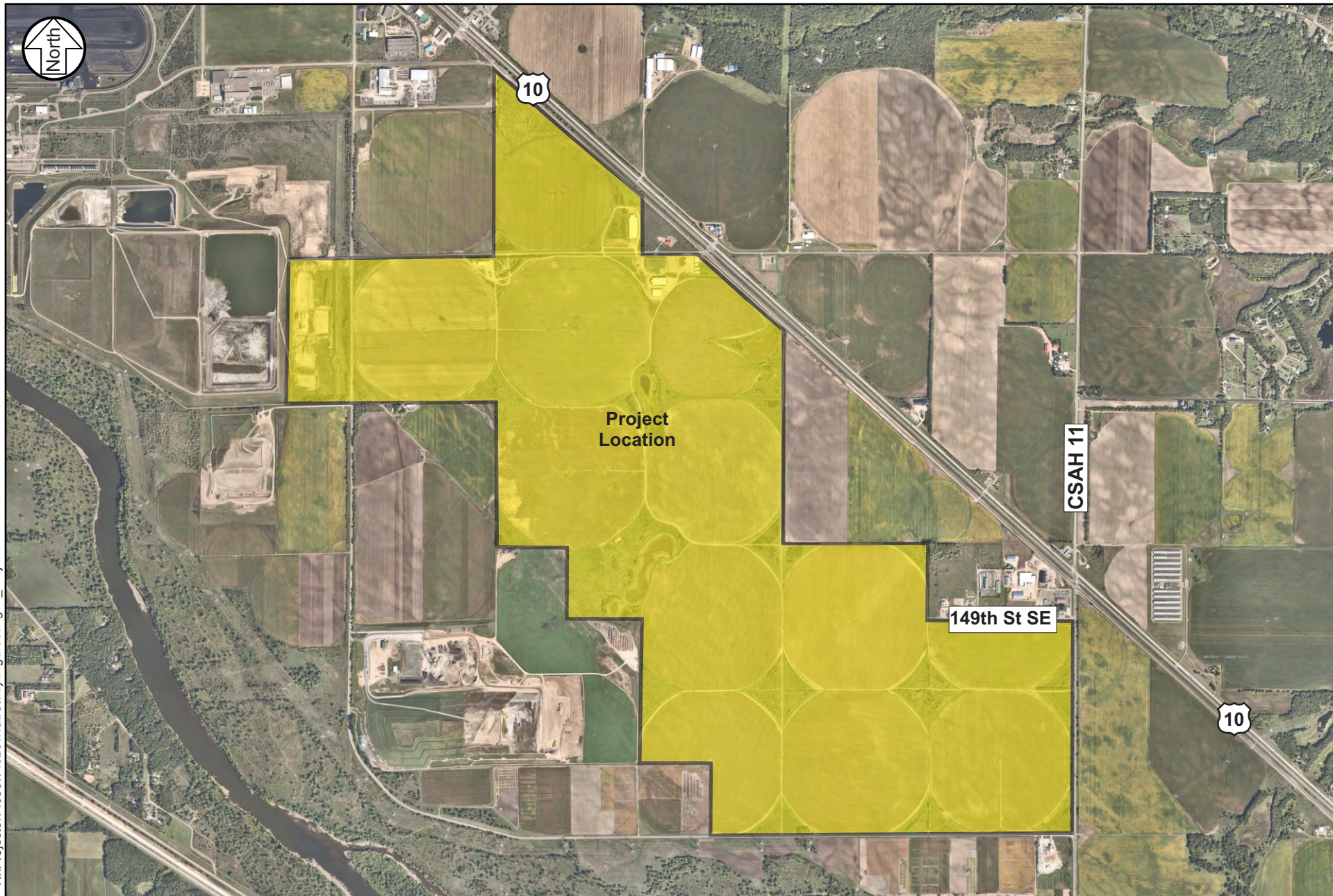
Previous Area Studies

The *Highway 10 and CSAH 11 Intersection Study* was completed by SRF Consulting Group in March 2020. The study was initiated by Sherburne County and focused on the operational and safety issues that are currently experienced at the Highway 10 and CSAH 11 intersection. The study identified several future improvement alternatives that would result in significant operational and safety benefits. The County is currently pursuing funding for future improvements at this location. Traffic data and modeling files from the *Highway 10 and CSAH 11 Intersection Study* were utilized for the study summarized in this report.

The *Highway 10 and Highway 25/County Road 52 Interchange Study* is a current project along Highway 10 on the west side of Becker, nearby the proposed solar development. This study is being initiated by Sherburne County to evaluate the transportation needs at the intersection and to proactively plan for the projected growth in the area. There are currently safety issues and accessibility and delay issues at this intersection. Interchange options will be evaluated based on their ability to address the existing issues, to accommodate the projected growth, and their impacts to the area. It is important to understand the long-term vision for the Highway 10 corridor in the area, and the *Highway 10 and Highway 25/County Road 52 Interchange Study* indicates that there are plans for the corridor to be grade separated.

Existing Conditions

Existing conditions were reviewed to establish a baseline to identify any future impacts associated with the proposed development. The evaluation of existing conditions includes a review of traffic volumes entering and exiting the Becker Township Business Park as well as the traffic using the Highway 10 and CSAH 11 intersection, associated roadway characteristics, and an intersection capacity analysis, which are summarized in the following sections.



Project Location

Becker Township Business Park and Solar Development Traffic Analysis
Sherburne County

02114929
December 2021

Figure 1

Study Intersections

The following study intersections represent the primary focus of the traffic analysis. These intersections were identified during discussions between Xcel Energy and Becker Township as having existing issues with back-ups that cause access issues for the existing Business Park. Thus, the following locations were identified for further study:

- Highway 10 and CSAH 11
- CSAH 11 and 149th Street SE (access to the Becker Township Business Park)

Traffic Data

New intersection turning movement count data was collected for the CSAH 11 and 149th Street SE intersection, which is the entrance and exit for the Becker Township Business Park. Traffic data for the Highway 10 and CSAH 11 intersection was available from the previous study.

Roadway Characteristics

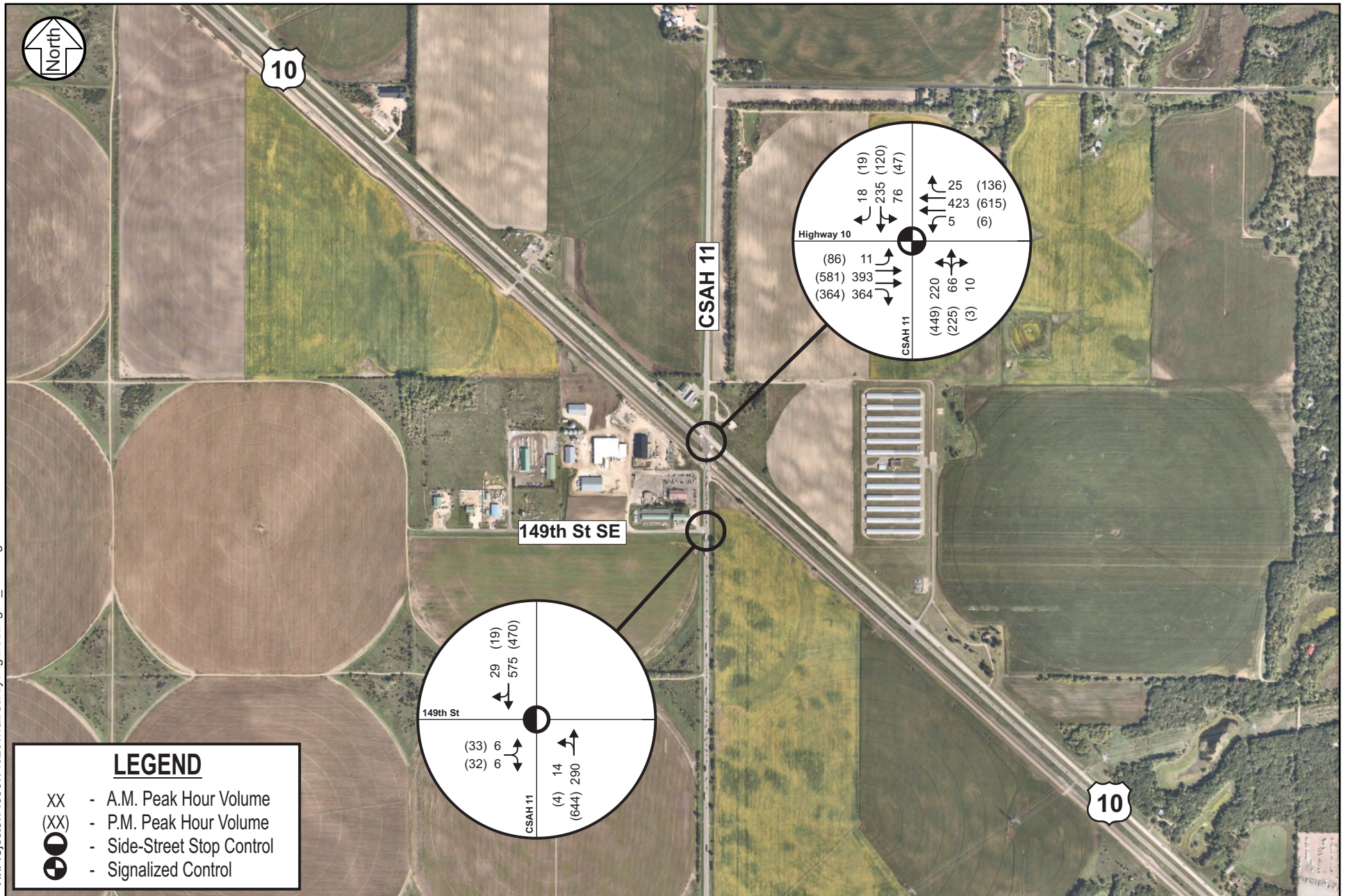
A field assessment was completed to identify various roadway characteristics for the study area, such as number of lanes, turn lanes and posted speed limits. From a traffic control perspective, the Highway 10/CSAH 11 intersection is controlled with a traffic signal. The CSAH 11/149th Street SE intersection is side-street stop controlled. Existing geometrics, traffic controls, and peak hour traffic volumes in the study area are shown in Figure 2.

Intersection Capacity Analysis

An existing intersection capacity analysis was completed using VISSIM software to establish a baseline condition to which future traffic operations could be compared. Capacity analysis results identify a Level of Service (LOS) which indicates how well an intersection is operating. Intersections are graded from LOS A through LOS F. The LOS results are based on average delay per vehicle, which correspond to the delay threshold values shown in Table 1. LOS A indicates the best traffic operation, while LOS F indicates an intersection where demand exceeds capacity. Overall intersection LOS A through LOS D is generally considered acceptable based on MnDOT guidelines.

Table 1. Level of Service Criteria for Signalized and Unsignalized Intersections

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection Average Delay/Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50



Existing Conditions

Becker Township Business Park and Solar Development Traffic Analysis
Sherburne County

For side-street stop/yield-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/yield control can be described in two ways. First, consideration is given to the overall intersection level of service. This considers the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor approach. Since the mainline does not have to stop, the majority of delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience 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.

Results of the existing capacity analysis, shown in Table 2, indicate that during the p.m. peak hour, the intersection of CSAH 11/149th Street SE operates at a poor level of service with average delays for the eastbound approach exceeding 3 minutes. This issue is mainly caused by the poor operations of the Highway 10/CSAH 11 intersection when a train event occurs where northbound traffic queues can spill back over 2,000 feet based on the modeling results and site observations. When this queue develops, it spills past 149th Street SE, impacting operations at this location.

Based on information from BNSF and our traffic counts, approximately 2 train events occur during each peak hour. In addition to a train event, the northbound approach of CSAH 11 at Highway 10 only has one approach lane without a left-turn lane and only a short channelization for the right turn movement which also contributes to the operations and queuing issues that develop today.

Table 2. Existing Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Highway 10/CSAH 11	C	34 sec.	D	53 sec.
CSAH 11/149th Street SE ⁽¹⁾	A / C	16 sec.	F / F	202 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.

Existing Conditions with No Train Events

An additional scenario was evaluated that assumed no train events during each peak hour. This scenario was analyzed to understand the impacts that the train events had on the traffic operations at the two study intersections. The intersection results from this scenario shown in Table 3 indicate that train events have a significant impact on the traffic operations at the two study intersections during the p.m. peak hour. Without a train event, the average delay on the eastbound approach at the CSAH 11/149th Street SE intersection is reduced by over two minutes, resulting in an average delay of slightly more than one minute per vehicle. However, there are still significant queuing issues on the northbound approach at the Highway 10/CSAH 11 intersection due to the lack of capacity on the northbound approach. The northbound queue at the Highway 10/CSAH 11 intersection spills back over 1,300 feet beyond the intersection of 149th Street SE. This queue impacts traffic operations at

the CSAH 11/149th Street SE intersection even without train events. The queueing issues that remain on the northbound approach at the Highway 10/CSAH 11 intersection even without trains indicate that the lack of capacity on the northbound approach is a primary source of the operational issues.

Table 3. Existing Intersection Capacity Analysis with No Train Events

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Highway 10/CSAH 11	C	30 sec.	D	48 sec.
CSAH 11/149th Street SE ⁽¹⁾	A / C	17 sec.	C / F	65 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.

Proposed Development

The east portion of the proposed development (i.e., East Block) is generally located south of Highway 10 and between Sherburne Avenue and CSAH 11. This portion of the proposed development will occur on approximately 1,700-acre site and is scheduled to be constructed between April 2023 and October 2024. The main access point to the site will be off Sherburne Avenue near 137th Street. This location will also be the primary access point for the site during construction.

Peak Construction Conditions

Construction Traffic

Based on information provided by Xcel Energy, construction for the West Block and East Block of the solar project sites will take approximately 30 months to complete. During the peak months, approximately 400 construction workers per day will be on site between both sites. Construction traffic generated from both construction sites will drive through the Highway 10/CSAH 11 intersection on Highway 10. Due to the proximity of the study intersections and the existing northbound queues observed on CSAH 11 at the Highway 10 intersection, adding traffic to the Highway 10/CSAH 11 intersection has the potential to impact the traffic operations at both study intersections.

The primary staging area for the East Block will be located along Sherburne Avenue near 137th Street. The closest access from the staging area to Highway 10 is via Sherburne Avenue to Liberty Lane or via Sherburne Avenue to 137th Street. Therefore, it would be anticipated that most of the East Block construction traffic accessing Highway 10 will enter and exit the staging area using either Liberty Lane or 137th Street. Alternatively, some traffic may exit to the south via Sherburne Avenue and then turn south on CSAH 11. There is potential for some construction traffic to enter and exit the staging area via Sherburne Avenue to CSAH 11 to Highway 10. However, this is unlikely since this route has a further travel distance from the staging area to Highway 10 compared to the Liberty Lane and

137th Street routes, and given that there are known back-ups on northbound CSAH 11 at the Highway 10 intersection.

To understand the impact that this construction traffic will have on the study intersections, a construction peak scenario was evaluated. Peak construction conditions of 400 construction workers per day are expected from March 2023 to October 2023. The construction workers are expected to arrive on site during the a.m. peak hour and will depart during the p.m. peak hour. While some traffic may enter the site via CSAH 11 to Sherburne Avenue, the model conservatively routed all traffic via Highway 10 to understand the maximum potential impacts to the study intersections. The workers were modelled to arrive at the site from Highway 10 to Liberty Lane or 137th Street with approximately 50 percent coming from the east and 50 percent coming from the west. Construction traffic is not expected to pass through the CSAH 11/149th Street SE intersection. Construction peak traffic conditions are shown in Figure 3.

Traffic Operations

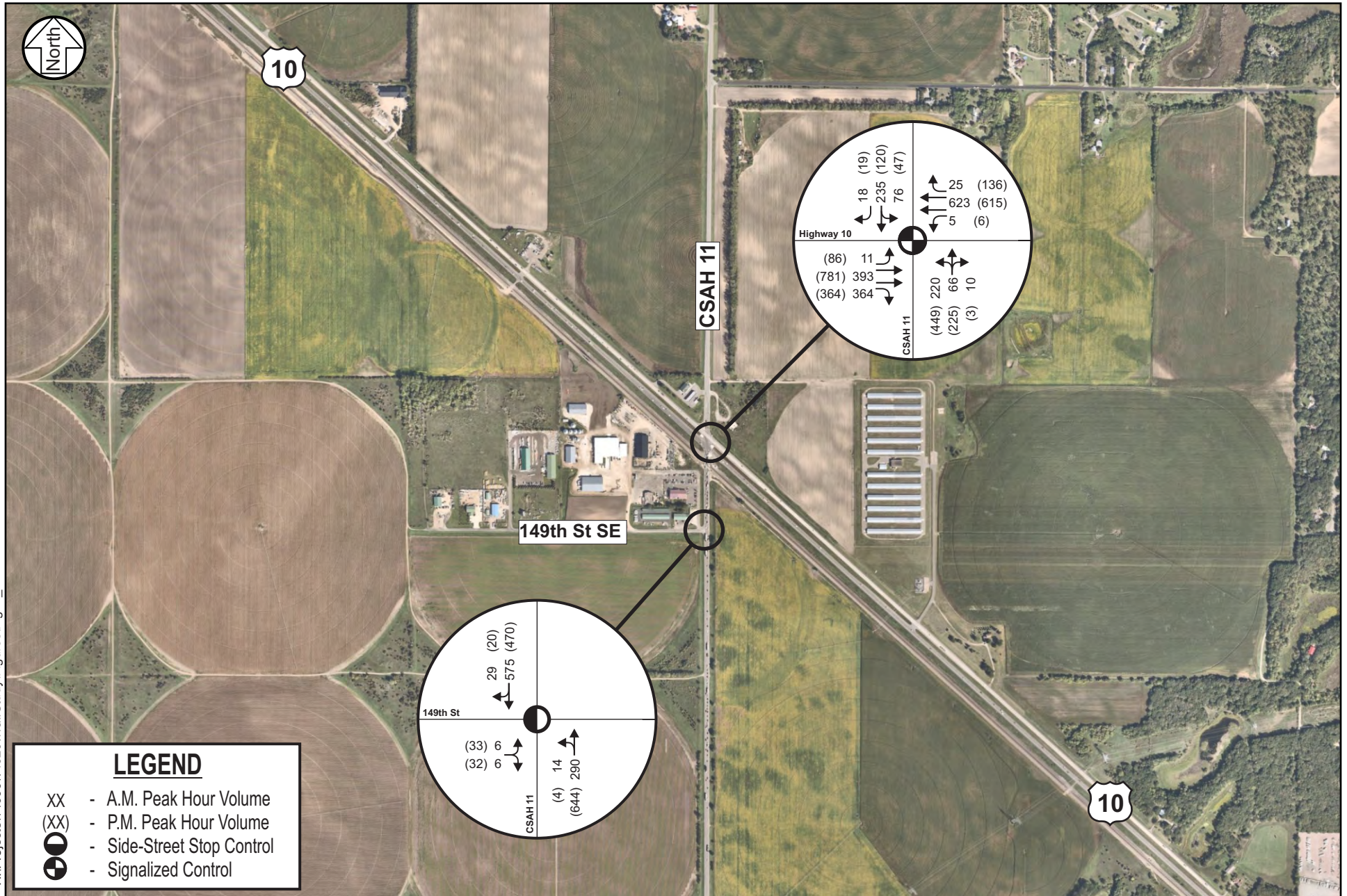
Results of the peak construction conditions intersection analysis are shown in Table 4. The results in Table 4 indicate that the traffic generated from the construction workers will not have a significant impact on the operations of the study intersections under peak construction conditions. The results from the peak construction conditions analysis reflect the results from the existing conditions analysis closely, only showing a slight increase in delay between the study intersections.

It should be noted that when conducting analysis using traffic modeling software, there is some variation and randomness that occurs during simulation. This model variation is prone to happen for movements with lower traffic volumes. The operations on the side-street approach at the CSAH 11/149th Street SE intersection is slightly better during peak construction conditions than it is under existing conditions. Since the traffic on this approach is relatively low, the discrepancy in delay can be attributed to model variation.

Table 4. Construction Peak Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Highway 10/CSAH 11	C	35 sec.	D	54 sec.
CSAH 11/149th Street SE ⁽¹⁾	A / C	20 sec.	F / F	195 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.



Peak Construction Conditions

Becker Township Business Park and Solar Development Traffic Analysis
Sherburne County

Year 2040 Baseline Conditions

Year 2040 Traffic Volumes

Year 2040 traffic volumes are consistent with those developed in the *Highway 10/CSAH 11 Intersection Study*. These forecasts were developed using Met Council's Travel Demand Model and reflect planned development for the neighboring communities of Becker, Big Lake and Monticello at the time the study was conducted.

Traffic Operations

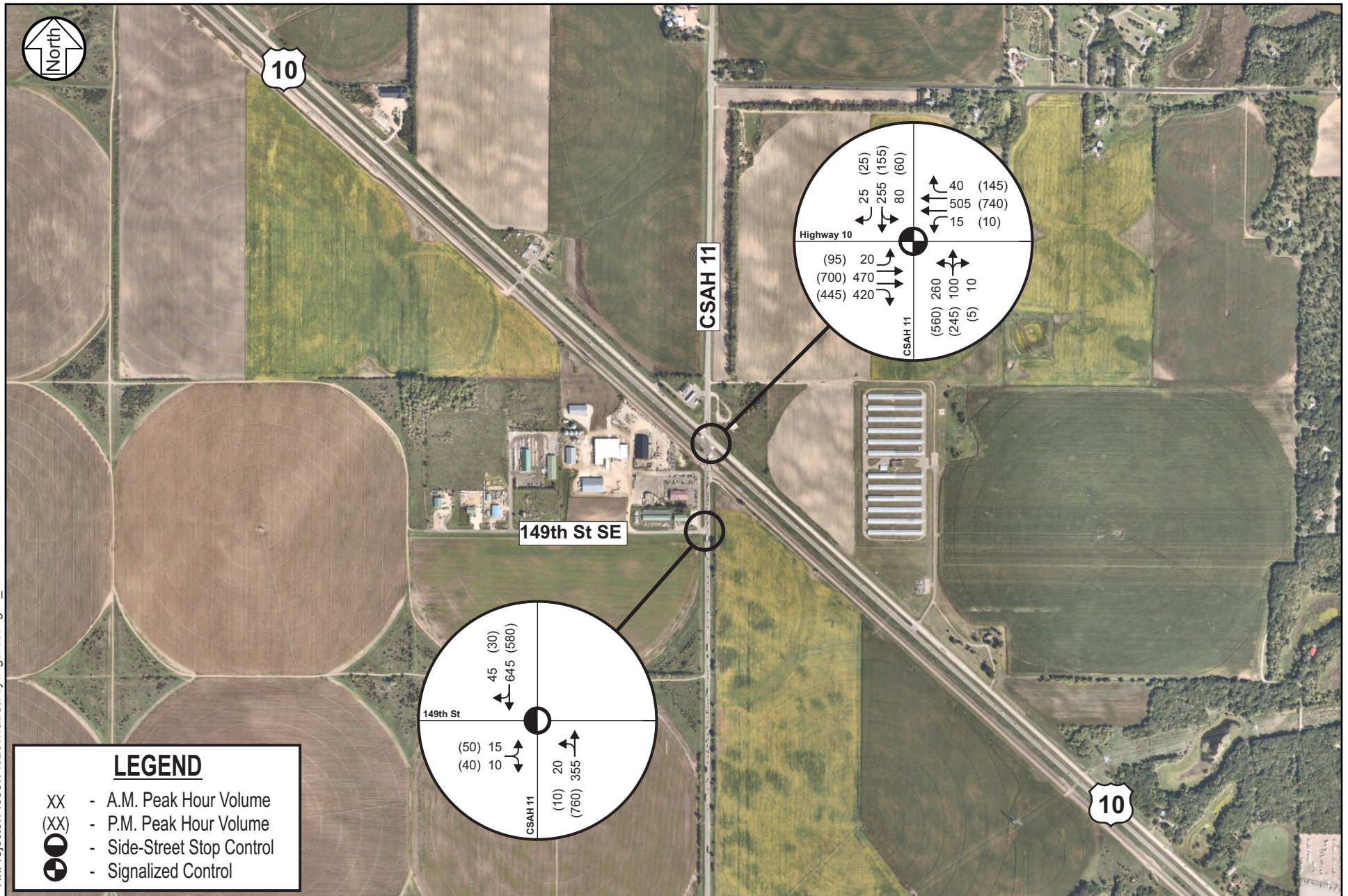
A future analysis was conducted to determine how the two study intersections would operate under future conditions if no improvements were made to the intersections and if the proposed development was not constructed. The year 2040 baseline scenario assumed the existing lane geometry at both study intersections and assumed a consistent train schedule as the existing conditions. The traffic conditions for the year 2040 baseline scenario are shown in Figure 4. The results for the year 2040 baseline scenario are shown in Table 5.

Based on these results, the operations at the study intersections worsen significantly during the afternoon peak hour. During the p.m. peak hour, the northbound queue approaching the Highway 10/CSAH 11 intersection exceeds one mile. This queue is caused by a combination of train events at the railroad crossing and the lack of capacity on the northbound approach at the Highway 10/CSAH 11 intersection. This excessive northbound queue impacts the drivers exiting the Business Park at CSAH 11/149th Street SE, causing the eastbound delay to exceed 10 minutes at that intersection. It is important to note that the traffic modeling software is not a dynamic model that would capture motorists who are not willing to accept significant delays. In reality, motorists would likely use other routes resulting in less delay and shorter queues.

Table 5. Year 2040 Baseline Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Highway 10/CSAH 11	D	42 sec.	E	62 sec.
CSAH 11/149th Street SE ⁽¹⁾	A / C	24 sec.	F / F	> 500 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.



Year 2040 Baseline Conditions

Becker Township Business Park and Solar Development Traffic Analysis
Sherburne County

Year 2040 Development Conditions

Traffic Volumes

The year 2040 development conditions scenario included the same assumptions made in the year 2040 baseline conditions scenario. However, the forecasted year 2040 traffic volumes used for this scenario accounts for the traffic generated from the proposed solar development post construction. The additional trips from the employees working on-site at the development was provided by Xcel Energy and was assumed to arrive on-site during the morning peak hour and depart from the site during the afternoon peak hour. The traffic conditions for the year 2040 development conditions scenario are shown in Figure 5.

Traffic Operations

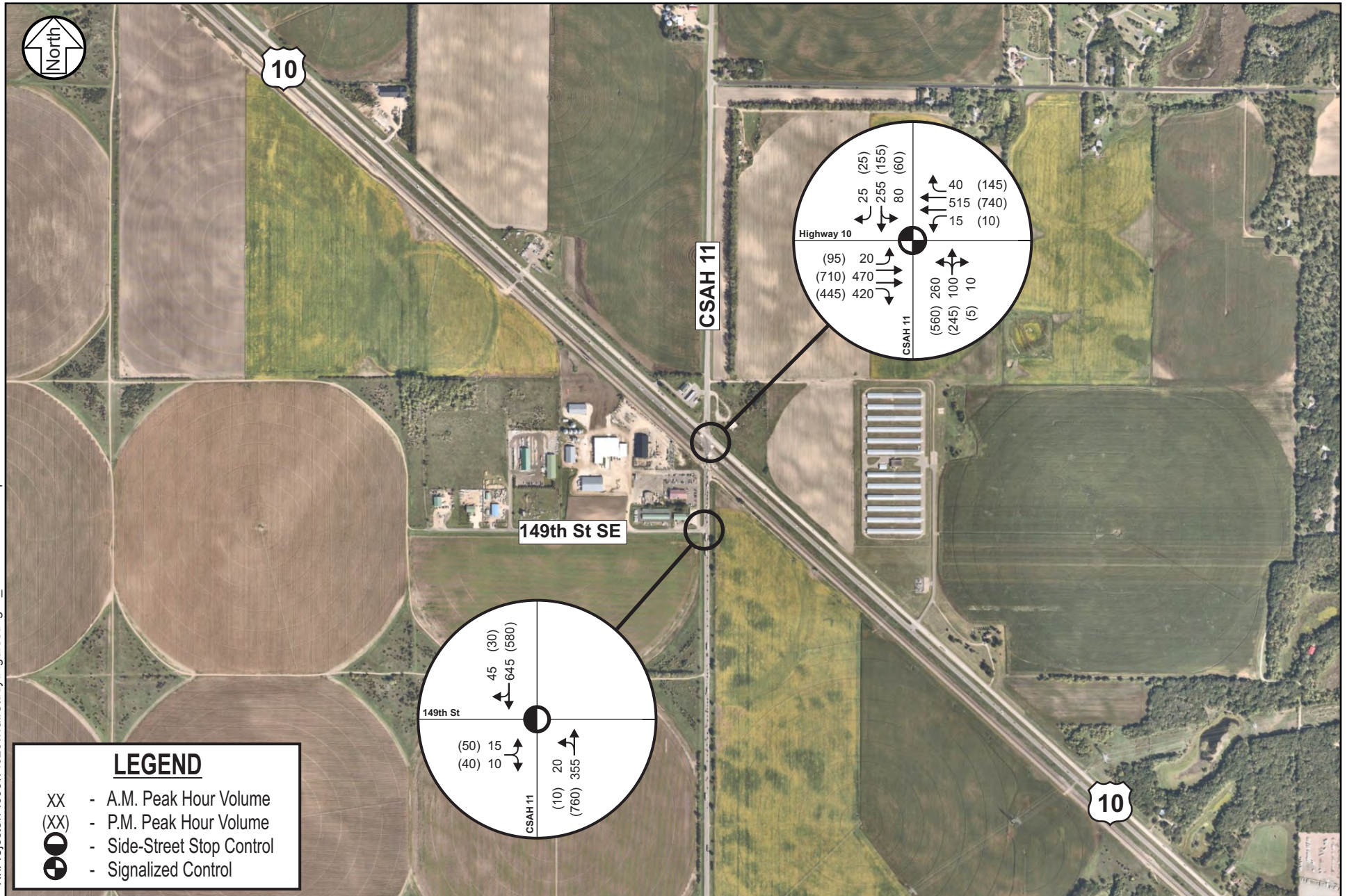
A future analysis was conducted to determine how the proposed development will impact the two study intersections and to understand how the development affects the Business Park accessibility. The results for the year 2040 development conditions scenario are shown in Table 6. Based on these results, the two study intersections show poor operations during the afternoon peak hour. The northbound queue approaching the Highway 10/CSAH 11 intersection spills back over one mile, and negatively impacts motorists exiting the Business Park.

To understand how the proposed development would impact operations at the study intersections, these results can be compared to the results from the year 2040 baseline scenario. While both scenarios show poor operations at the study intersections, the results indicate that the proposed development does not have a negative impact on traffic flow through the study intersections and does not worsen the accessibility to and from the Business Park.

Table 6. Year 2040 Development Conditions Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Highway 10/CSAH 11	D	41 sec.	E	61 sec.
CSAH 11/149th Street SE ⁽¹⁾	A / C	22 sec.	F / F	> 500 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.



Year 2040 Development Conditions

Becker Township Business Park and Solar Development Traffic Analysis
Sherburne County

Year 2040 Development Conditions with New Interchange

As part of the *Highway 10/CSAH 11 Intersection Study*, several improvement options were evaluated to improve operations and safety. These improvements ranged from adding turn lanes to a full grade separation of Highway 10 and the railroad crossing. For this study, a full grade separated interchange was assumed at Highway 10/CSAH 11 to understand the benefit this improvement would provide to the operations at the CSAH 11/149th Street SE intersection.

Traffic Volumes

The same traffic volumes that were used to evaluate the year 2040 development conditions were used for the analysis of this scenario. This year 2040 traffic volume set includes the additional traffic generated from the proposed development, as stated previously.

Traffic Operations

The year 2040 development conditions with a new interchange scenario was evaluated to understand the benefit reconfiguring the Highway 10/CSAH 11 intersection would provide to the traffic flow through the two study intersections. The traffic operations results from this scenario are shown in Table 7. In addition, the northbound queue that currently develops from the Highway 10/CSAH 11 intersection and the railroad crossing would be eliminated and would not spill back to the CSAH 11/149th Street SE intersection. Relieving this queue provides more accessibility to the Business Park.

Table 7. Year 2040 Development Conditions with a New Interchange Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Highway 10/CSAH 11 North Ramp Intersection	A	6 sec.	B	11 sec.
Highway 10/CSAH 11 South Ramp Intersection ⁽¹⁾	C / E	42 sec.	C / F	52 sec.
CSAH 11/149th Street SE ⁽¹⁾	A / C	25 sec.	A / F	117 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.

A benefit-cost analysis was completed during the previous *Highway 10/CSAH 11 Intersection Study*. Projects are considered cost-effective if the benefit-cost ratio is greater than 1.0. The larger the ratio number, the greater the benefits per unit cost. From this benefit-cost analysis, the benefit-cost ratio for the interchange concept evaluated for this project was 1.8, indicating that this project is cost-effective. While this potential interchange concept will significantly improve traffic operations at the study intersections, funding to construct this project is not secured. However, the County is currently seeking funding sources to improve operations at this location. Even with an interchange at Highway 10/CSAH 11, additional improvements may be needed at the intersection of CSAH 11/149th Street SE to reduce vehicle delay on the eastbound approach. Potential solutions could include installation of a traffic signal or construction of a roundabout. The appropriate solution

would have to be evaluated and approved by Sherburne County. These potential improvements could possibly be incorporated into the larger improvement project at Highway 10/CSAH 11 when that moves forward.

Roadway Options for Business Park

Evaluating the Becker Township Business Park accessibility off the CSAH 11/149th Street SE intersection is a primary objective in this study. As discussed in the existing conditions section, there is a northbound queue that spills back on CSAH 11 caused by a combination of the lack of capacity on the northbound approach at the Highway 10/CSAH 11 intersection and train events on the BNSF railroad. This northbound queue impacts operations at the CSAH 11/149th Street SE intersection, negatively affecting the accessibility for the Business Park. The accessibility issues have resulted in Becker Township exploring alternative options to alleviate the issues. Becker Township was preliminarily exploring three roadway options that would extend 149th Avenue to the south or west to provide an alternative exit to the business park. The three roadway build options are shown in Figure 6. Based on the distances of these roadway build options, roadway build option A provides the most direct connection to Highway 10, resulting in the greatest potential to improve the accessibility and reduce travel times to and from the Business Park. Accordingly, in the interests of modeling the roadway scenario most likely to reduce travel times, roadway build option A was used as a representative option for the analysis of potential new roadways.

It is essential to understand the amount of traffic that would use a new roadway when evaluating the benefit of building a new roadway. For the purpose of this study, it was assumed that all traffic making an eastbound left-turn out of the Business Park and a southbound right-turn in to the Business Park at CSAH 11/149th Street SE would use this new roadway. This assumption means that all traffic accessing the Business Park to and from Highway 10 are originating and destined west on Highway 10.

Travel Time Analysis

Travel times entering and exiting the Business Park are evaluated for roadway build option A with comparisons to travel times a) without a new roadway or improvements at Highway 10/CSAH 11 and to b) with improvements at Highway 10/CSAH 11. The travel time calculations consist of two metrics: free flow travel time and vehicle delay. The free flow travel time was calculated using speed limits and distances for the existing roadway and for the potential new roadway. It was assumed that the speed limit on the new roadway would be 50 mph. The vehicle delay that was considered in this travel time analysis included the delay at the intersections that would be encountered by traffic accessing the Business Park using this road option. This potential new roadway provided connection to Highway 10 at 137th Street. To capture the vehicle delay that drivers would experience under this potential new roadway scenario, the Highway 10/137th Street intersection was evaluated and is included in this analysis.



Roadway Build Options for Business Park

Becker Township Business Park and Solar Development Traffic Analysis
Sherburne County

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December 2021

Figure 6

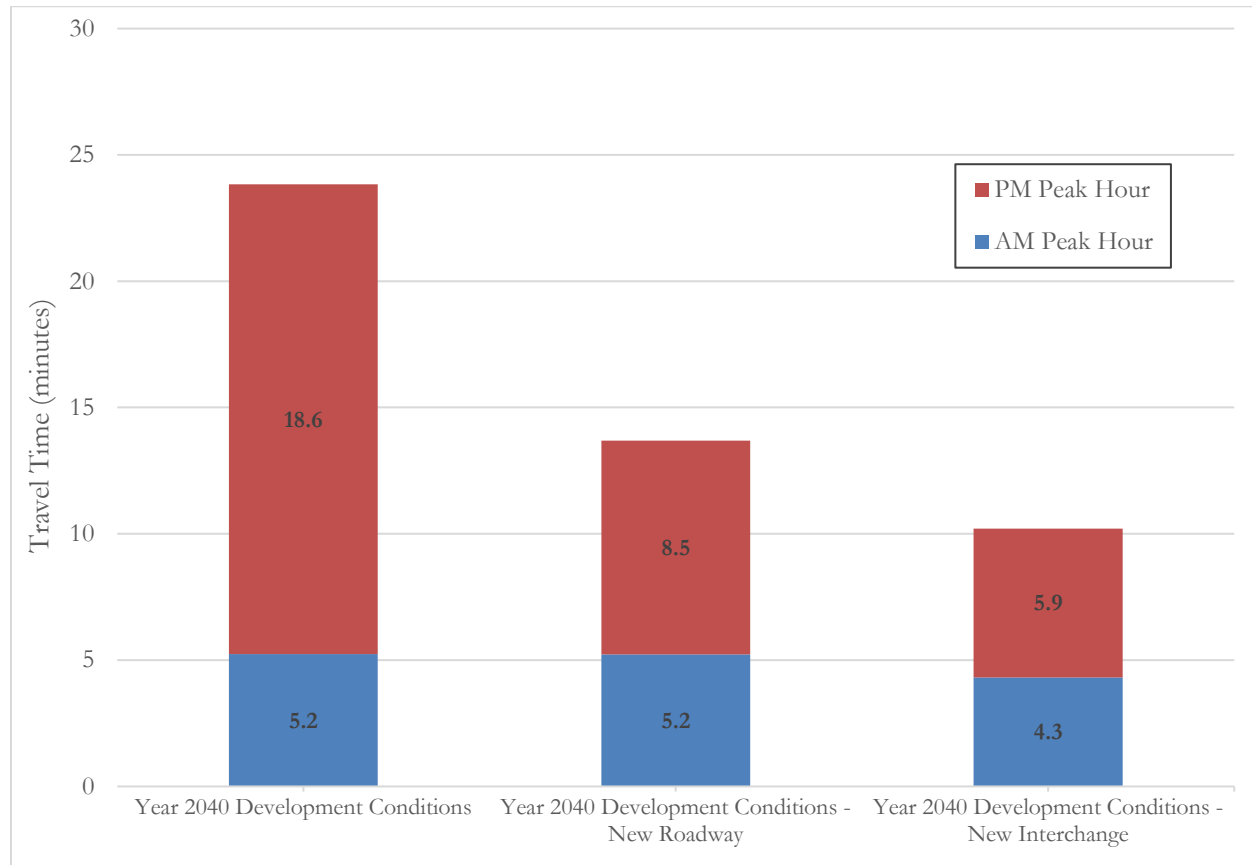
For this analysis, there were three scenarios that were evaluated, all of which included the assumption of the construction of the proposed solar development. The three scenarios that were included in this analysis were:

- Year 2040 Development Conditions
- Year 2040 Development Conditions – With Potential New Roadway
- Year 2040 Development Conditions – With Potential New Interchange

To accurately compare travel time results for each scenario, the end points of the travel time route must remain consistent. The western point of the travel time route is the Liberty Lane intersection on Highway 10, and the eastern point of the travel time route is the Business Park access at 149th Street SE. The travel time routes for these scenarios are shown in Figure 8. These three scenarios were chosen for analysis to better understand the benefits that constructing the potential new roadway will provide to Business Park traffic. The scenario with the improvements at Highway 10/CSAH 11 was included in this analysis to determine the benefit provided by the grade separation of the Highway 10/CSAH 11 intersection and railroad crossing. The results from this travel time analysis are shown in Table 8. The total travel time results listed in Table 8 are shown graphically in Figure 7. The travel time information shown below is only for Business Park traffic originating and destined west on Highway 10, since that will likely be the only traffic using the new roadway.

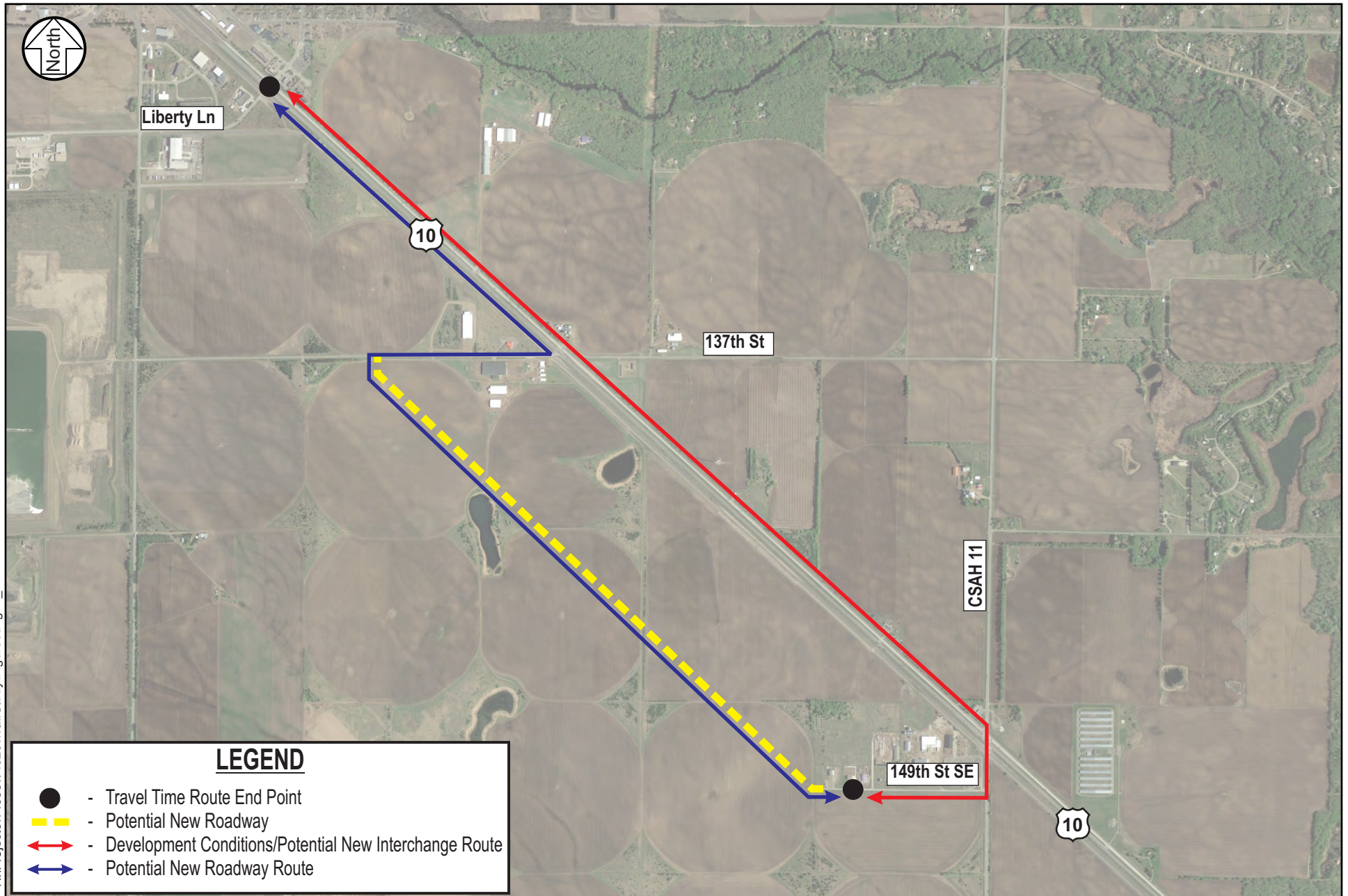
Table 8. Travel Time Analysis

Scenario	Distance (miles)	AM Peak Hour			PM Peak Hour		
		Free Flow Travel Time (min)	Delay (min)	Total Travel Time (min)	Free Flow Travel Time (min)	Delay (min)	Total Travel Time (min)
Year 2040 Development Conditions	2.95	3.8	1.4	5.2	3.8	14.8	18.6
Year 2040 Development Conditions – New Roadway	3.44	4.7	0.5	5.2	4.7	3.8	8.5
Year 2040 Development Conditions – New Interchange	2.95	3.8	0.5	4.3	3.8	2.1	5.9

Figure 7: Total Peak Hour Travel Times for Business Park Traffic

Based on these travel time results, the potential new roadway provides a significant travel time reduction compared to the development conditions scenario. This is primarily due to the Business Park traffic not having to experience the delays caused by the northbound queue that spills back from the Highway 10/CSAH 11 intersection and the BNSF railroad crossing. While the travel times with new roadway are greatly improved from the development conditions scenario, almost half of the travel time driver's experience during the afternoon peak can be attributed to vehicle delay. With the new roadway, the traffic still must cross the BNSF railroad at 137th Street, and motorists will experience a similar amount of delay at this railroad crossing as they do at the CSAH 11 railroad crossing. In addition to the delay from the BNSF railroad at 137th Street, the Highway 10/137th Street intersection is a side-street stop-controlled intersection. This intersection serves high speed traffic on Highway 10 and provides minimal gaps for side-street traffic. The minimal gaps and high speeds result in motorists feeling uncomfortable, creating potential safety issues and excessive side-street delays.

From this analysis, the Business Park accessibility is greatly improved if the lack of capacity at the Highway 10/CSAH 11 intersection is addressed in addition to the railroad crossing. Under the potential new interchange scenario, the Highway 10/CSAH 11 intersection and the railroad crossing are both grade separated, resulting in a significant travel time reduction for the Business Park traffic.



Return-on-Investment Evaluation

The return-on-investment is a measurement that is used to understand how quickly an investment will pay off. This type of evaluation can be used to compare the efficiency of different investment options. For this project, a return-on-investment evaluation was performed for the potential new roadway to determine an approximate time frame the improvement would pay off in terms of motorist travel time. The assumed capital cost for the new roadway was calculated assuming the cost of construction would be \$2.1 million per mile. This assumption of \$2.1 million per mile is based on recent design estimates for new two-lane rural roadways. It should be noted that the cost for this new roadway would likely be much more because the assumption of \$2.1 million per mile only includes the cost of grading and pavement. Additional costs will be necessary such as right of way acquisition, stormwater ponding and associated infrastructure, trails, design and engineering, etc.

To understand how the potential new roadway compares to the potential new interchange, the benefit-cost ratio from the previous *Highway 10/CSAH 11 Intersection Study* for the interchange option was used to back-calculate a return-on-investment for the new interchange option. For the purpose of this analysis and based on previous studies, it is assumed that a benefit-cost ratio of 1.0 would provide a return on investment of 20 years. This conversion is used to calculate the benefit-cost ratio of the potential new roadway and to calculate the return on investment of the potential new interchange. As stated previously in this memorandum, the benefit-cost ratio for the interchange option is 1.8. The results from the return-on-investment evaluation is shown in Table 9.

Table 9. Return on Investment Evaluation

Scenario	Return on Investment (years)	Benefit – Cost Ratio
Potential New Roadway	24.8	0.8
Potential New Interchange ⁽¹⁾	11.1	1.8

(1) Benefit-cost ratio from previous Highway 10/CSAH 11 intersection study used to calculate return on investment.

From these results, the benefit-cost ratio for the potential new roadway is less than 1.0, indicating that this is not a cost-effective solution. Additionally, the benefit-cost ratio for the potential new roadway is likely to be less than what is shown in Table 9 since the cost used to calculate the return and the benefit-cost ratio only assumed the cost of grading and pavement. The new roadway will only serve traffic accessing the Business Park, whereas the new interchange will serve all traffic traveling through the Highway 10/CSAH 11 intersection in addition to the traffic accessing the Business Park. The results from the return-on-investment evaluation indicate that it would be more cost effective to invest in a potential new interchange than a potential new roadway.

The cost estimate of the potential new interchange from the previous study is \$20,600,250 and the conservative cost estimate of the potential new roadway is \$3,700,000. While the cost of the new

interchange is greater than the conservative cost of the new roadway, the new interchange provides a better return-on-investment compared to the new roadway; 11 years compared to 25 years. This indicates the investment made to construct the new interchange will pay off at a quicker rate than the investment made to construct a new roadway. From the previous study, the new interchange provides a safety benefit with the grade separation of Highway 10 and the railroad crossing in addition to the travel time and delay reduction benefit. These safety benefits are not applicable to the new roadway since traffic still must cross the railroad and access Highway 10 at-grade on 137th Street. Additionally, the new interchange is eligible for funding sources that would not apply to the new roadway due to the grade separation between the railroad crossing and CSAH 11.

Summary and Recommendations

The following summary and recommendations are offered for consideration:

- 1) Currently, the intersection of Highway 10 and CSAH 11 experiences 2,000-foot long northbound traffic queues during the weekday p.m. peak hour. This queue spills past the intersection of CSAH 11 and 149th Street SE resulting in delays exceeding 3 minutes on 149th Street SE. These issues are mainly caused by lack of turn lanes on the northbound approach at Highway 10 and the at grade BNSF railroad crossing of CSAH 11.
 - a. Removing train events from the traffic model reduced the northbound queue during the p.m. peak period by almost half and improved overall delay between the two study intersections. However, the northbound queue was still over 1,300 feet long, indicating that the lack of capacity on the northbound approach at Highway 10 is still a concern.
- 2) The east portion of the proposed development will consist of a 1,700-acre solar field generally located south of Highway 10 between Sherburne Avenue and CSAH 11. The site will be constructed over a 20-month season starting in April 2023 and finishing in October 2024. The main access point to the site will be off Sherburne Avenue near 137th Street.
- 3) There are two different construction site locations: Sherco Solar West Block and Sherco Solar East Block. During peak months, approximately 400 construction workers per day will be on site between both sites. There will be approximately 8 months between March 2023 and October 2023 that will operate at this level.
- 4) Based on the analysis, the addition of construction traffic will not have a significant impact on traffic operations at the two study intersections. The construction traffic added to the Highway 10 mainline will be traveling in off-peak directions during each peak hour.
- 5) Year 2040 Analysis Findings
 - a. The solar development will have minimal impact to the operations of the regional traffic system once construction is complete. However, the existing issues that currently develop at the Highway 10/CSAH 11 intersection are expected to worsen as traffic volumes increase over time due to other factors not related to the solar project.

- b. During the p.m. peak hour and under the year 2040 baseline conditions and the year 2040 development conditions, the vehicle delay for drivers exiting the Business Park at the CSAH 11/149th Street SE intersection are modeled to exceed 10 minutes. This excessive delay is caused by an unmitigated northbound queue at Highway 10 and the BNSF railroad.
 - c. Future improvements at the Highway 10/CSAH 11 intersection will be necessary to improve operations at the CSAH 11/149th Street SE intersection regardless of the project's minimal impacts on the regional traffic system. In year 2040 with an interchange at Highway 10/CSAH 11, delays at 149th Street SE will be almost half of what they are today during the p.m. peak hour. The solar project minimally impacts 2040 modelling results.
 - d. Future improvements at Highway 10 and CSAH 11 are not currently funded. However, Sherburne County is actively looking for funding sources to implement future improvements.
- 6) Business Park Travel Time Analysis Findings
- a. The accessibility of the Business Park will remain poor if no improvements are made to the study intersections with travel times exiting the Business Park to Liberty Lane west on Highway 10 exceeds 18 minutes, regardless of whether the project is built or not.
 - b. A new roadway from the Business Park to 137th Street reduces the travel times for the Business Park traffic by over half compared to the baseline development conditions scenario. However, the Business Park traffic will still experience significant delays from the 137th Street railroad crossing and the Highway 10/137th Street intersection. Almost half of the travel time experienced by Business Park traffic during the p.m. peak hour will be vehicle delay at the railroad and Highway 10/137th Street intersection.
 - c. The grade separation of the Highway 10/CSAH 11 intersection and the BNSF railroad on CSAH 11 greatly improves the Business Park accessibility. This grade separation eliminates the northbound queue and provides motorists a travel time with minimal delay.
- 7) Constructing a new roadway does not address the operational issues in the study area. With the new roadway, there will still be long northbound queues on CSAH 11 in front of the 149th Street SE access to the Business Park.
- 8) The new roadway will likely only serve traffic originating and destined west on Highway 10. This traffic accounts for 50 vehicles or less during each peak hour under existing conditions. Constructing a new roadway that only serves a relatively low traffic volume is not a cost-effective solution.

- 9) From the return-on-investment evaluation and benefit-cost analysis, the new interchange provides a return on investment of 11 years and a benefit-cost ratio of 1.8, while the new roadway provides a return on investment of 25 years and a benefit-cost ratio of 0.8.
- 10) Constructing a grade separated interchange at Highway 10 and CSAH 11 and at the railroad crossing is more cost-effective than the local roadway option. The grade separation of Highway 10 and CSAH 11 also fits within the long-term vision for the Highway 10 corridor as there is currently another grade separated interchange being designed on the west side of Becker at Highway 10 and Highway 25 to address similar accessibility and delay issues at that intersection.

CERTIFICATE OF SERVICE

I, Crystal Syvertsen, hereby certify that I have this day served copies of the foregoing document on the attached lists of persons.

xx by depositing a true and correct copy thereof, properly enveloped
with postage paid in the United States mail at Minneapolis, Minnesota;

or

xx by electronic filing.

Docket No. E002/M-20-891

Docket No. E002/TL-21-189

Docket No. E002/TL-21-190

Docket No. E002/GS-21-191

Dated this 21st day of April 2022

/s/

Crystal Syvertsen
Regulatory Administrator

[illegible]

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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Aaron	Brixius	Aaron.P.Brixius@xcelenergy.com	Xcel Energy	414 Nicollet Mall Minneapolis, MN 55401	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Jordan	Burmeister	jordan@nationalgridrenewables.com	National Grid Renewables Development, LLC	8400 Normandale Boulevard Suite 1200 Bloomington, MN 55437	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC	445 Minnesota Street Suite 1400 St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_21-190_Official CC Service List
Jeremy	Duehr	jduehr@fredlaw.com	Fredrikson & Byron, P.A.	200 South Sixth Street Suite 4000 Minneapolis, Minnesota 55402-1125	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce	85 7th Place E Ste 280 Saint Paul, MN 551012198	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Lucas	Franco	lfranco@liunagroce.com	LIUNA	81 Little Canada Rd E Little Canada, MN 55117	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Gary	Gray	cltwppchair@hotmail.com	Clear Lake Township	PO Box 305 Clear Lake, MN 55319	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Matthew B	Harris	matt.b.harris@xcelenergy.com	XCEL ENERGY	401 Nicollet Mall FL 8 Minneapolis, MN 55401	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Ellen	Heine	ellen.l.heine@xcelenergy.com	Xcel Energy	414 Nicollet Mall, MP-8 Minneapolis, MN 55401	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Breann	Jurek	bjurek@fredlaw.com	Fredrikson & Byron PA	200 South Sixth St Ste 400 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_21-190_Official CC Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Ryan	Long	ryan.j.long@xcelenergy.com	Xcel Energy	414 Nicollet Mall 401 8th Floor Minneapolis, MN 55401	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Judge Kimberly	Middendorf	kimberly.middendorf@state.mn.us	Office of Administrative Hearings	PO Box 64620 Saint Paul, MN 55164-0620	Electronic Service	Yes	OFF_SL_21-190_Official CC Service List
Marie	Pflipsen	mpflipsen@ci.becker.mn.us	City of Becker	12060 Sherburne Avenue PO BOX 250 Becker, Minnesota 55308	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Greg	Pruszinske	gpruszinske@ci.becker.mn.us	City of Becker	PO Box 250 12060 Sherburne Ave Becker, MN 55308	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Generic Notice	Residential Utilities Division	residential.utilities@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012131	Electronic Service	Yes	OFF_SL_21-190_Official CC Service List
William	Risse	wrisse@nationalgridrenewables.com	National Grid Renewables Development, LLC	8400 Normandale Blvd Ste 1200 Bloomington, MN 55437	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Melissa	Schmit	melissa@nationalgridrenewables.com	National Grid Renewables	8400 Normandale Lake Blvd Ste 1200 Bloomington, MN 55437	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Will	Seuffert	Will.Seuffert@state.mn.us	Public Utilities Commission	121 7th Pl E Ste 350 Saint Paul, MN 55101	Electronic Service	Yes	OFF_SL_21-190_Official CC Service List
Janet	Shaddix Elling	jshaddix@janetshaddix.com	Shaddix And Associates	7400 Lyndale Ave S Ste 190 Richfield, MN 55423	Electronic Service	Yes	OFF_SL_21-190_Official CC Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
William	Storm	bill.storm@state.mn.us	Department of Commerce	Room 500 85 7th Place East St. Paul, MN 551012198	Electronic Service	No	OFF_SL_21-190_Official CC Service List
Lynnette	Sweet	Regulatory.records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	Yes	OFF_SL_21-190_Official CC Service List
Haley	Waller Pitts	hwallerpitts@fredlaw.com	Fredrikson & Byron, P.A.	200 S 6th St Ste 4000 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_21-190_Official CC Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Aaron	Brixius	Aaron.P.Brixius@xcelenergy.com	Xcel Energy	414 Nicollet Mall Minneapolis, MN 55401	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Jordan	Burmeister	jordan@nationalgridrenewables.com	National Grid Renewables Development, LLC	8400 Normandale Boulevard Suite 1200 Bloomington, MN 55437	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC	445 Minnesota Street Suite 1400 St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_21-191_Official CC Service List
Jeremy	Duehr	jduehr@fredlaw.com	Fredrikson & Byron, P.A.	200 South Sixth Street Suite 4000 Minneapolis, Minnesota 55402-1125	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Scott	Ek	scott.ek@state.mn.us	Public Utilities Commission	121 7th Place East Suite 350 St. Paul, MN 55101	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce	85 7th Place E Ste 280 Saint Paul, MN 551012198	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Lucas	Franco	lfranco@liunagroc.com	LIUNA	81 Little Canada Rd E Little Canada, MN 55117	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Gary	Gray	cltwpchair@hotmail.com	Clear Lake Township	PO Box 305 Clear Lake, MN 55319	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Matthew B	Harris	matt.b.harris@xcelenergy.com	XCEL ENERGY	401 Nicollet Mall FL 8 Minneapolis, MN 55401	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Ellen	Heine	ellen.l.heine@xcelenergy.com	Xcel Energy	414 Nicollet Mall, MP-8 Minneapolis, MN 55401	Electronic Service	No	OFF_SL_21-191_Official CC Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Breann	Jurek	bjurek@fredlaw.com	Fredrikson & Byron PA	200 South Sixth St Ste 400 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Brian	Kolbinger	brian@beckertownship.org	Becker Township Board	PO Box 248 12165 Hancock St Becker, MN 55308	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Gretel	Lee	gllee@flaherty-hood.com	Flaherty & Hood, P.A.	525 Park Street Suite 470 SAINT PAUL, MN 55103	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Ryan	Long	ryan.j.long@xcelenergy.com	Xcel Energy	414 Nicollet Mall 401 8th Floor Minneapolis, MN 55401	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Judge Kimberly	Middendorf	kimberly.middendorf@state.mn.us	Office of Administrative Hearings	PO Box 64620 Saint Paul, MN 55164-0620	Electronic Service	Yes	OFF_SL_21-191_Official CC Service List
Marie	Pflipsen	mpflipsen@ci.becker.mn.us	City of Becker	12060 Sherburne Avenue PO BOX 250 Becker, Minnesota 55308	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Kevin	Pranis	kpranis@liunagroc.com	Laborers' District Council of MN and ND	81 E Little Canada Road St. Paul, Minnesota 55117	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Greg	Pruszinske	gpruszinske@ci.becker.mn.us	City of Becker	PO Box 250 12060 Sherburne Ave Becker, MN 55308	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Generic Notice	Residential Utilities Division	residential.utilities@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012131	Electronic Service	Yes	OFF_SL_21-191_Official CC Service List
William	Risse	wrisse@nationalgridrenewables.com	National Grid Renewables Development, LLC	8400 Normandale Blvd Ste 1200 Bloomington, MN 55437	Electronic Service	No	OFF_SL_21-191_Official CC Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Melissa	Schmit	melissa@nationalgridrenewables.com	National Grid Renewables	8400 Normandale Lake Blvd Ste 1200 Bloomington, MN 55437	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Will	Seuffert	Will.Seuffert@state.mn.us	Public Utilities Commission	121 7th PI E Ste 350 Saint Paul, MN 55101	Electronic Service	Yes	OFF_SL_21-191_Official CC Service List
Janet	Shaddix Elling	jshaddix@janetshaddix.com	Shaddix And Associates	7400 Lyndale Ave S Ste 190 Richfield, MN 55423	Electronic Service	Yes	OFF_SL_21-191_Official CC Service List
William	Storm	bill.storm@state.mn.us	Department of Commerce	Room 500 85 7th Place East St. Paul, MN 551012198	Electronic Service	No	OFF_SL_21-191_Official CC Service List
Lynnette	Sweet	Regulatory.records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	Yes	OFF_SL_21-191_Official CC Service List
Haley	Waller Pitts	hwallerpitts@fredlaw.com	Fredrikson & Byron, P.A.	200 S 6th St Ste 4000 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_21-191_Official CC Service List