BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Joint Application of Northern Crescent Solar LLC for a Solar Energy Generating System Site Permit and a Battery Energy Storage System Site Permit for the up to 150 MW Northern Crescent Solar and up to 50 MW Energy Storage System Project in Faribault County, Minnesota

MPUC Docket Nos. IP-7096/GS-22-57& IP-7135/ESS-24-238
OAH Docket No. 28-2500-40383

DIRECT TESTIMONY OF HELEN ROACH
ON BEHALF OF NORTHERN CRESCENT SOLAR LLC

February 26, 2025

I. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name, employer, and business address.

A. My name is Helen Roach. I am employed by Primergy Solar LLC, which has a business address of 1901 Harrison Street, Suite 1600, Oakland, California 94612.

Q. Please briefly describe your educational background and professional experience.

A. I received by Bachelor of Science degree from the University of St. Thomas in St. Paul, Minnesota, in 2020. Since then, I have worked as a developer in the renewable energy industry. I have worked for Primergy Solar as a Project Development Manager since October 2023.

Q. For whom are you testifying?

A. I am testifying on behalf of Northern Crescent Solar LLC (Northern Crescent or Applicant), a wholly owned indirect subsidiary of Primergy.

Q. What is your role with respect to the Project?

A. I am the Project Development Manager. I am responsible for developing utility-scale Solar and BESS projects in Midcontinent Independent System Operator (MISO) and PJM Interconnection regions from initial prospecting through construction. I lead projects through the site permitting process, including managing relationships with landowners, project stakeholders, and local communities, and coordinating with environmental engineering, and pre-construction teams to determine site design.

Q. What is relationship between Primergy Solar and Northern Crescent Solar LLC?

A. Primergy Solar LLC is the owner of Northern Crescent Solar LLC, the entity seeking the site permits for these two projects. Northern Crescent Solar LLC will construct, own and operate the two projects with technical and administrative support from Primergy Solar LLC personnel like me.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your Direct Testimony?

A. The purpose of my testimony is to provide an update on the on-going development efforts for the Northern Crescent Project (the Project). Specifically, I will provide an update on consultation with area landowners, local, state, and federal regulatory stakeholders, and tribes. I will also provide an update on potential traffic impacts on U.S. Highway 169 as well as some limited comments on the proposed draft site permits provided with the Environmental Assessment (EA) for the Project.

Q. What schedules are attached to your Direct Testimony?

A. The following schedules are attached to my Direct Testimony:

- **Attachment A**: Curriculum Vitae
- **Attachment B**: Trip Generation Analysis Memorandum (TGA)

III. PROJECT OVERVIEW

Q. Please describe the Project.

A. The Project is a proposed 150 megawatt (MW) alternating current (AC) photovoltaic solar energy generating system (Solar Facility) with an associated 50 MWac battery energy storage system (BESS) located along 170th Street and 180th Street off U.S. Highway 169 in Verona and Prescott Townships, in Faribault County, Minnesota. In addition to the solar array and BESS facilities, the Project includes an Operations and Maintenance building, a substation, an accompanying Xcel Energy switchyard, and transmission infrastructure.

The Project Area encompasses approximately 1,179 acres of predominately agricultural land, which is all under lease, easement or purchase option agreements with landowners. The Project is expected to occupy approximately 929 acres of the Project Area.

Q. How did you identify the project location?

A. We identified this Project location because of Minnesota's ambitious Renewable Energy Objectives, the proximity to existing transmission infrastructure, and willing landowners at this site.

Under Minnesota's Clean Energy Law, climate legislation establishes a carbon-free energy standard and a renewable energy standard. The Project will help meet Minnesota's 100% carbon-free energy standard by 2040 and will contribute to meeting the Minnesota Renewable Energy Objectives.

The Project location is close to existing transmission infrastructure, and an Xcel Energy Switchyard will be constructed simultaneously with the Project. Because of the proximity to existing transmission infrastructure, the length of the proposed Xcel Energy line tap connecting the Xcel Energy Switchyard to the existing Huntley-Blue Earth 161 kV transmission line will be less than 250 feet, all within the Project Area. This will minimize impacts outside the Project Area.

Finally, the Project Area had willing landowners who voluntarily granted leases, easements and purchase options to the Applicant.

Q. Did you coordinate with local landowners, local, state, and federal regulatory stakeholders, and tribes?

A. Yes. As part of pre-Application efforts, Northern Crescent Solar completed extensive engagement with local, state, and federal regulatory stakeholders to introduce the Project, request comments, and gain feedback. Northern Crescent Solar also contacted the eleven recognized Minnesota Tribal Nations for comments. Northern Crescent Solar also met with state agencies, such as the Minnesota Department of Transportation (MNDOT). Northern Crescent Solar has provided fact sheets, articles, and other resources, specifically to state and local agencies, to maximize the understanding of the Project.

Q. What did you learn from coordination with local landowners and government agencies, and how did that guide your development efforts?

A. Through consultation with Faribault County authorities, Northern Crescent learned of public drain tiles within farm fields in the Project Area. To minimize unforeseen repairs or damages to existing public drain tile lines and/or public drain tile systems, Northern Crescent Solar is committed to preserve soil drainage conditions as they currently exist. Existing drain tile lines and surrounding drainage systems will be maintained, repaired, relocated, or replaced (if damaged during construction or operation of the Project) by Northern Crescent Solar as needed. Moreover, Project solar arrays and fencing will be set back a minimum of 75-feet from each side of any public drain tile located within the Project when construction commences.

IV. TRAFFIC STUDY

Q. The Minnesota Department of Transportation (MnDOT) commented about the possibility of impacts on traffic on U.S. Highway 169. Are you familiar with those comments?

A. Yes.

Q. MnDOT noted that it had not received a Utility Early Notification Memo (ENM) from the Applicant, so it could not evaluate specifics about the Project's impacts on traffic at that time. Does the Applicant plan to provide MnDOT with the ENM as required?

A. Yes. Northern Crescent provided MnDOT with an ENM on January 17, 2025. MnDOT confirmed receipt of the ENM and noted that it would follow up with questions.

Q. Has Northern Crescent investigated the potential traffic impacts from the Project?

A. Yes. Northern Crescent had a Traffic Engineer with Westwood Professional Services complete a Trip Generation Analysis (TGA) to estimate vehicle trips per

day and peak hour volumes generated by the Project. The TGA is attached as **Attachment B.**

Q. How did the TGA estimate the effects of construction on traffic?

A. The TGA identified that current annual daily traffic along U.S. Highway 169 between 170th and 180th Street is 2,414 vehicles. The TGA then identified that the Construction Phase of the project is assumed to last 16 to 18 months. Trip generation estimates were developed based on the anticipated number of construction employees and truck deliveries. Then the TGA reviewed Northern Crescent's Haul Route Plan, which has only one route, with site trips to originate from and return to Highway 169.

Q. Did the TGA address other traffic impacts?

A. Yes. The TGA also considered trips from the operational phase and decommissioning phase of the project. In the operational phase, the site is anticipated to be operated and maintained by one employee working an 8 am to 5 pm shift. The Project would also require nominal long-term maintenance, which will require some deliveries. The decommissioning phase will last approximately 40 weeks, and will have impacts similar to the construction phase, without some concrete and water trips.

Q. What were the conclusions of the TGA?

A. The maximum peak hour traffic during the construction phase is estimated to be 11 vehicle trips, with a total of 360 trips daily. This is lower than the threshold for a Traffic Impact Study in the MnDOT Access Management Manual. Therefore, no further study or road adjustments should be necessary to accommodate construction traffic for the Project.

Q. Will any other agreements or consultation be necessary for traffic management or road development for the project?

A. Yes. Road improvements may also require permits or additional coordination with Nobles County and MnDOT. Northern Crescent will work with MnDOT, county and city road authorities to ensure that appropriate signage and traffic management are present during construction.

V. SAMPLE SITE PERMIT

Q. Have you reviewed the EA filed by the Department of Commerce Energy Environmental Review and Analysis (DOC EERA) on February 12, 2025?

A. Yes.

Q. Do you have any comments on the draft site permits that were attached to the EA?

A. Yes. The solar site permit and BESS site permit list Primergy as the Permittee. This should be updated Northern Crescent Solar LLC, consistent with the joint application for site permits. Northern Crecent Solar LLC will construct, own and operate the Project and is a distinct business entity from Primergy Solar LLC (Primergy).

Q. Do you have any comments on the mitigation measures discussed in the EA and addressed in the draft site permits?

A. Yes. The draft site permits include a special condition related to removal of a bald eagle's nest. As the EA correctly notes, the Project Area does not contain nesting habitat suitable for bald eagles. Still, the draft condition in Section 5.4 of the site permit for the solar facility and the BESS facility would require that Northern Crescent file documentation authorizing any bald eagle nest remove prior to construction. While Northern Crescent is not opposed to filing proof of authorization if a bald eagle's nest were to be identified in the Project Area, I note that the conditions do not relate to any identified project impact.

VI. CONCLUSION

Q. Does this conclude your Direct Testimony?

A. Yes.

Helen Roach

Project Development Manager

Education

Bachelor of Science in Mechanical Engineering, 2020
University of St. Thomas, St. Paul, Minnesota

Current Role

Project Development Manager, Primergy Solar
October 2023 -- Present

- Develop utility-scale Solar and BESS projects in Midcontinent Independent System Operator (MISO) and PJM Interconnection regions from initial prospecting through construction
- Lead projects through site permitting processes
- Negotiate and oversee the execution of Power Purchase Agreements, Interconnection Agreements, and Engineering, Procurement, and Construction Contracts
- Manage relationships with landowners, project stakeholders, and local communities
- Coordinate with environmental, engineering, and pre-construction teams to determine project site design
- Secure project equipment via collaboration with procurement team
- Obtain title insurance policies for land and mineral rights
- Develop project budgets for development and engineering costs
- Communicate with utilities on project timing, networks upgrades, and rights-of-way

Additional Work Experience

RWE Clean Energy
Associate Developer
February 2022 – October 2023

National Grid Renewables
Associate Developer
December 2020 – February 2022

Attachment B

5725 W. Badura Ave, Suite 100
Las Vegas, NV 89118

main (702) 284-5300

Westwood

MEMORANDUM

Date: January 24, 2025

Re: Northern Crescent Solar Project Trip Generation Analysis (TGA)
R0044069.00

To: Faribault County, Minnesota

From: Paul Villaluz, P.E., PTOE, RSP1

This memorandum has been prepared to support the permit application for the Northern Crescent Solar Project construction in Faribault County, Minnesota. This memorandum contains a Trip Generation Analysis (TGA) that is conducted by a Traffic Engineer and includes estimates of total vehicle trips per day and peak hour volumes generated by the proposed development.

Site Location

The Northern Crescent Solar Project is located along 170th St and 180th St off State Highway 169. The site location is shown on the haul route plan in **Appendix A**.

Project Description

The Northern Crescent Solar Project is projected to be a 168 MW-AC facility. A haul route plan is included in **Appendix A**. The Northern Crescent Solar Project will consist of photovoltaic (PV) panels, trackers, inverters, transformers, underground cabling, access roads, a Project substation and switchyard, security fencing, a generation tie line ("gen-tie") connecting the Project to the point of interconnection, and a battery energy storage system ("BESS"). A map showing the Project location, preliminary layout, and facilities is included in **Appendix A**.

Existing Traffic

Access to the Northern Crescent Solar Project is proposed along 170th St and 180th St off Highway 169. The Annual Daily Traffic (ADT) along Highway 169 is 2,414 vehicles between 170th and 180th St as shown in **Appendix D**. The ADT for 170th St and 180th St are not available.

Construction Phase Trip Generation

This section evaluates the Northern Crescent Solar Project traffic effects during the Construction Phase, which is forecast to generate the highest levels of project traffic over the longest duration of the project construction period. The Construction Phase is assumed to last approximately 16-18 months.

Trip generation estimates were developed based on the anticipated number of construction employees and truck deliveries. The trip generation estimates were made using the following assumptions based on the materials required as seen in **Appendix B**.

Average Number of Vehicles On-Site per Day:

- Commuters – 72
- Delivery trucks – 105

Vehicle characteristics are noted in **Appendix B.** Anticipated Trip Generation for the Construction Phase is presented in **Table 1**.

Table 1 –Project Trip Generation

Project Phase	Number of Vehicles (Daily)	Daily Trips	AM Peak Hour (7:00 – 9:00)	PM Peak Hour (4:00 – 6:00)
Phase 1: Construction Phase (16-18 months)				
Employees[a]	72	144	9	9
Construction Deliveries[b]	104	208	0	0
Miscellaneous Deliveries[c]	4	8	1	2
TOTAL	**180**	**360**	**10**	**11**

(a) Maximum number of employees per site. Daily trip estimate assumes an average vehicle occupancy of 1 employee per vehicle. 1 inbound and 1 outbound trip per employee. (ex. Phase 1 daily trips: 144 trips = (72 employees * 1 day * (1 vehicle/employee) * (2 trips/vehicle - day)). Peak hour trip estimates assume that employees arrive outside the AM peak hour and leave before or after the PM peak hour. The anticipated shift schedule is 6:00 AM to 3:00 PM with 12% of the trips expected in peak hours.

(b) Construction-related deliveries are assumed to arrive during off-peak hours

(c) Maximum number of miscellaneous deliveries per day is 4. Miscellaneous deliveries are defined as non-construction related deliveries (i.e.: packages, office equipment, mail, housekeeping, etc.). Daily miscellaneous delivery trip estimate assumes 1 inbound and 1 outbound trip per delivery. Peak hour miscellaneous delivery trip estimates assume that 6% of the daily deliveries arrive during the AM peak hour and 20% of the AM peak in the PM peak hour. Peak-hour miscellaneous delivery trip estimates also assume 50% entry and 50% exit during the peak hour.

Study Intersection Identification

Intersections with notable traffic movement were identified along the haul route as shown in **Appendix A.** The intersections are listed below:

The primary intersections along the highway are:

- Int #1 Highway 169 and 170th St
- Int #2 Highway 169 and 180th St
- On 170th St and 180th St, the construction traffic will be distributed along the site entrances.

Access Management

The Haul Route Plan in **Appendix A** shows only one route with all site trips expected to originate from and return to Highway 169. The distribution of trips to the driveways is based on the site facilities and the location of the entrances within the site area. A left turn lane is not necessary, as the Average Daily Traffic (ADT) volumes generated by the site fall below the thresholds for left turn warrants, as specified in the Mn/DOT Access Management Manual, Chapter 3, page 47, referenced in **Appendix C**. Existing right-turn lanes are already present at the intersections; therefore, a right turn lane warrants analysis was not conducted.

Operational Phase Analysis

The site is anticipated to be operated and maintained by 1 new employee working one shift (8:00 AM—5:00 PM). The Project would require only nominal long-term maintenance. **Table 2** shows the trip generation forecasts for ongoing operations. This amount of traffic is not anticipated to adversely impact the operation of nearby roadways and intersections.

Table 2 –Project Trip Generation – On-Going Operations

On-Going Operations	Number of vehicles per Day	Daily Trips	AM Peak Hour of adjacent traffic (7:00 – 9:00)	PM Peak Hour of adjacent traffic (4:00 – 6:00)
Employees[a] Day Shift (8:00 AM – 5:00 PM)	1	4	1	1
Deliveries	2	4	0	0
TOTAL	3	8	1	1

(a) Daily trip estimate assumes a vehicle occupancy of 1, 1 inbound and 1 outbound trip per employee, and that daily employee leaves for meal break. Peak hour trip estimate assumes employees arrived during the AM peak hour and departed during the PM peak hour.

Decommissioning Trips

The solar facility's decommissioning will include removing the solar panels, solar panel racking, steel foundation posts and beams, inverters, transformers, equipment pads and foundations, equipment cabinets, and ancillary equipment. The decommissioning plan will include removal of underground cables and lines and include removing and transporting all project components from the Facility site to the respective recycling and disposal facilities. It is anticipated that the decommissioning activities for the project can be completed in 40 weeks.

The trips involved will be similar to the construction phase trips without some concrete and water trips. Based on an estimate concerning construction trips, it is assumed that decommissioning trips will be 70% of the trips during the construction phase. The estimated decommissioning trips are illustrated in **Table 3**.

Table 3 –Decommissioning Trips

Project Phase	Number of Vehicle Trips (Daily)	Daily Trips PCE trips	AM Peak Hour (PCE trips) (7:00 – 9:00)	PM Peak Hour (PCE trips) (4:00 – 6:00)
Decommissioning Phase (40 weeks)				
Employees[a]	50	100	6	6
Construction Deliveries[b]	73	146	0	0
Miscellaneous Deliveries[c]	4	8	1	1
TOTAL	**127**	**254**	7	7

(a) Maximum number of employees per site. Daily trip estimate assumes an average vehicle occupancy of 1 employee per vehicle. 1 inbound and 1 outbound trip per employee. (ex. Phase 1 daily trips: 100 trips = (50 employees * 1 day * (1 vehicle/employee) * (2 trips/vehicle - day)). Peak hour trip estimates assume that employees arrive outside the AM peak hour and leave before or after the PM peak hour. The anticipated shift schedule is 6:00 AM to 3:00 PM with 12% of the trips expected in peak hours.

(b) Construction-related deliveries are assumed to arrive during off-peak hours

(c) Maximum number of miscellaneous deliveries per day is 4. Miscellaneous deliveries are defined as non-construction related deliveries (i.e.: packages, office equipment, mail, housekeeping, etc.). Daily miscellaneous delivery trip estimate assumes 1 inbound and 1 outbound trip per delivery. Peak hour miscellaneous delivery trip estimates assume that 6% of the daily deliveries arrive during the AM peak hour and 20% of the AM peak in the PM peak hour. Peak-hour miscellaneous delivery trip estimates also assume 50% entry and 50% exit during the peak hour.

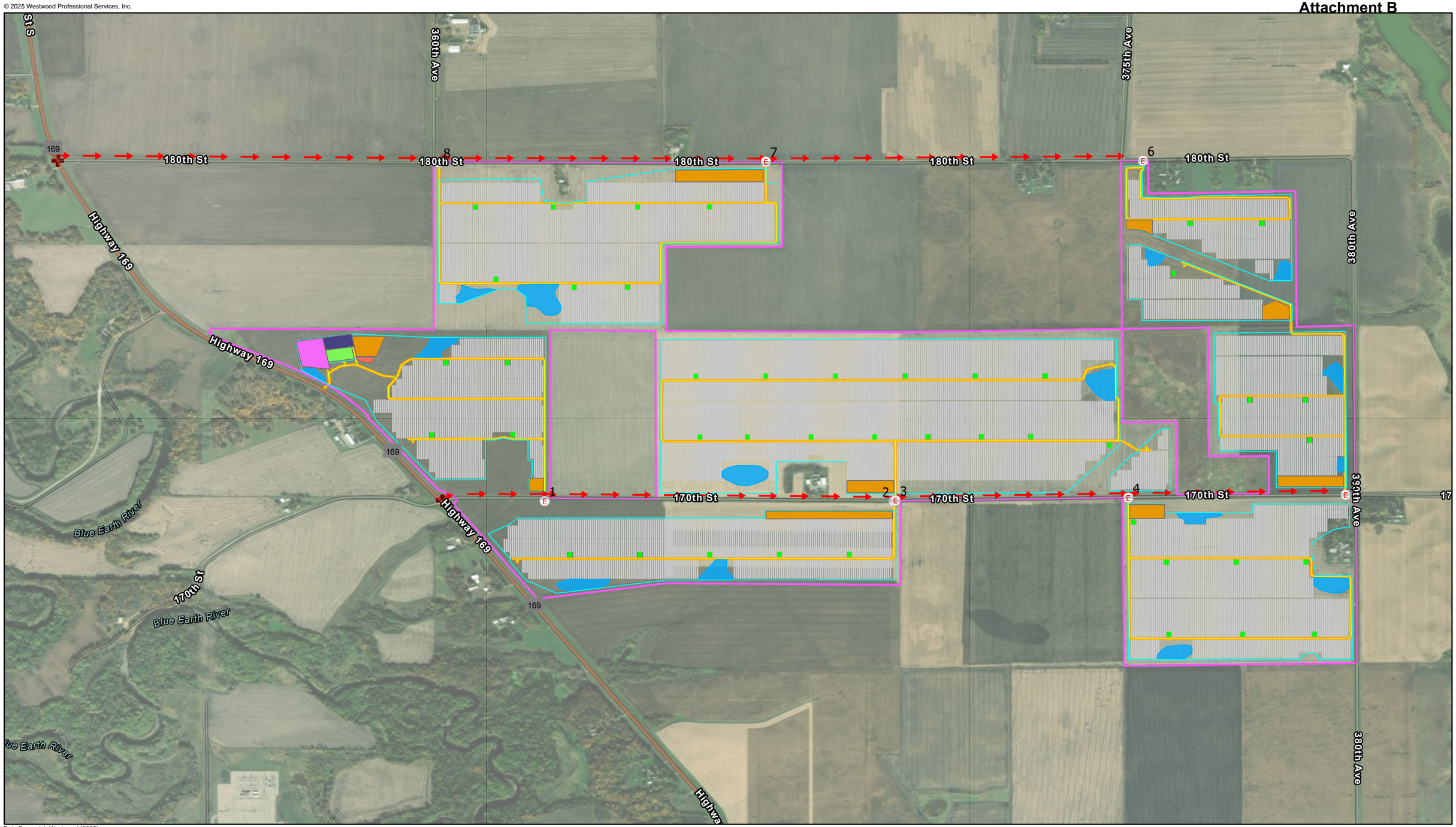
Conclusion

The maximum construction peak hour traffic is estimated at 11 vehicle trips, with a total of 360 trips daily. These figures are below the thresholds of 250 peak-hour trips and 2,500 vehicles per day, as outlined in the Mn/DOT Access Management Manual, Chapter 5, page 2, referenced in **Appendix C**. Therefore, no further traffic impact analysis is required.

APPENDIX A

Haul Route Plan

Attachment B



Data Source(s): Westwood (2025); .

Intersections
Site Entrances
Name
Laydown Yard
Proposed BESS
Proposed O&M area
Proposed Substation
Proposed Switchyard
Delivery and Haul Routes

N
0 0.13 0.25 0.5 Miles

Northern Crescent Solar

Faribault County, MN

Haul Route

January 24, 2025

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Map Document: N:\00440\69.00_GIS_ArcPro\TIA\Northern Crescent TIA\Northern Crescent TIA.aprx 1/24/2025 3:12 PM PLaholi

APPENDIX B

Trip Generation

Attachment B

Northern Crescent Solar Project
Traffic Projection
Project: 44069.00
By: PL
Date 1/23/2025

Exhibit 2- Northern Crescent Solar Project - Estimated Vehicle Trips

Vehicle Type	Number of Vehicles	Arrival Trips	Departure Trips	Total Trips	Estimated Gross Vehicle Weight (Pounds)	Load Weight (Pounds)	Notes/ Assumptions
COMMUTER TRIPS (LIGHT DUTY) VEHICLES							
Commuter Trips	25,720	25,720	25,720	51,440	7,000	500	Based on Similar Sized Project Numbers
Mid-Day Trips	2,560	2,560	2,560	5,120	7,000	500	Includes inspectors, project management staff
Total	28,280	28,280	28,280	56,560			
Average Per Working Day	72	72	72	144	**396 Working Days**		
EQUIPMENT (delivered by Lowboy Delivery Vehicle - Additional Axles)							
Bulldozer	8	8	8	16	90,000	50,000	Cat D6 - steer plus two tridems (10k + 40k+ 40k)
FE Loader	4	4	4	8	80,000	42,000	Cat 950M - steer plus two tridems (10k + 35k+ 35k)
Grader	3	3	3	6	80,000	42,000	Cat CS41B - steer plus two tridems (10k + 35k+ 35k)
Drum Compactor	4	4	4	8	80,000	41,000	Cat 12M3 - steer plus two tandems (12k + 34k+ 34k)
Rough Terrain Fork Lift/Telehandler	8	8	8	16	72,000	37,000	Manitou MHT 10120: 26,000 pound capacity - steer plus two tandems (10k + 31k+ 31k)
Skid Steer Loader	8	8	8	16	19,000	4,000	Cat 272D2 on 2 axle 10 ton trailer
Tracked Pile Driver	8	8	8	16	32,000	12,000	Vermeer PD10 on 2 axle 16 ton trailer
Trenching Equipment/Cable Plows	10	10	10	20	90,000	52,000	Wolfe 7000 - steer plus two tridems (10k + 40k+ 40k)
Back Hoe Loader	2	2	2	4	49,000	24,000	Cat 415F2 on 2 axle 25 ton trailer
Mobile Hydraulic/Truck Mounted Cranes	2	2	2	4	63,600	28,600	Shuttle Lift 15 ton crane - steer plus two tridems (10k + 26.8k+ 26.8k)
Total	57	57	57	114			
Average Per Delivery Day	6	6	6	12	**10 Delivery Days**		Delivery and removal trips concentrated at beginning and end of project
MOBILE HOME (FIELD OFFICE)							
1 Field Office Trailer (Civil) - 40' x 12'	1	1	1	2	60,000	40,000	Steer plus two tandems (10k + 25k + 25k)
3 Field Office Trailers for Subs - 12- x 36' Triple Wide	2	2	2	4	60,000	40,000	Steer plus two tandems (10k + 25k + 25k)
1 Field Office Trailer (Tracker) - 40' x 12'	2	2	2	4	60,000	40,000	Steer plus two tandems (10k + 25k + 25k)
6 Storage Trailers	5	5	5	10	60,000	40,000	Steer plus two tandems (10k + 25k + 25k)
Total	10	10	10	20			
Average Per Delivery Day	1	1	1	2	**10 Delivery Days**		Delivery and removal trips concentrated at beginning and end of project
MATERIALS							
Erosion and Sediment Control Materials	1	1	1	2	45,000	10,000	
Public Road Aggregate	186	186	186	372	80,000	40,200	
Access Road Aggregate	1,824	1,824	1,824	3,648	80,000	40,200	
Staging Area Aggregate (Laydown Yards)	3,560	3,560	3,560	7,120	80,000	40,200	
Substation Aggregate	128	128	128	256	80,000	40,200	
O&M/Field Office Aggregate	43	43	43	86	80,000	40,200	
Total	5,742	5,742	5,742	11,484			
Average Per Delivery Day	64	64	64	128	**90 Delivery Days**		
Foundation Piles	34	34	34	68	80,000	45,000	
Array Racking	881	881	881	1,762	80,000	45,000	
PV Panels	619	619	619	1,238	62,246	27,246	
Wire and Cable - Collection System	20	20	20	40	80,000	45,000	
Equipment Skids	56	56	56	112	80,000	45,000	
Inverters	43	43	43	86			
Gen-tie	1	1	1	2			
Reinforcing Steel (Rebar)	4	4	4	8	80,000	45,000	
Total	1,658	1,658	1,658	3,316			
Average Per Delivery Day	11	11	11	22	**160 Delivery Days**		
Concrete for Inverter Skids	61	61	61	122	69,000	40,000	
Concrete for Substation Foundations	2	2	2	4	69,000	40,000	
Concrete for Battery Storage System Foundations	100	100	100	200	69,000	40,000	
Concrete for O&M Building	8	8	8	16	69,000	40,000	
Total	171	171	171	342			
Average Per Delivery Day	12	12	12	24	**15 Delivery Days**		
Building Materials - O & M Building	14	14	14	28	80,000	45,000	
Structural Steel - Substation	2	2	2	4	80,000	45,000	
Electrical Equipment - Substation	20	20	20	40	80,000	45,000	
Chain Link Fence	63	63	63	126	80,000	45,000	
Miscellaneous Consumables	7	7	7	14	60,000	20,000	
Seed and Mulch	5	5	5	10	49,400	9,600	
Total	111	111	111	222			
Average Per Delivery Day	2	2	2	4	**80 Delivery Days**		
Water (Compaction) Public Roads	20	20	20	40	52,000	33,400	Based on 20 gallons/ton of aggregate " - Steer plus one tandem (18k+34k)
Water (Compaction) Access Roads	416	416	416	832	52,000	33,400	Based on 20 gallons/ton of aggregate " - Steer plus one tandem (18k+34k)
Water (Dust Control) Public Roads	86	86	86	172	52,000	1,912,647	Based on 300 gallons/acre/day of Road, staging, and field office area areas" - Steer plus one tandem (18k+34k)
Water (Dust Control) Access Roads	1,096	1,096	1,096	2,192	52,000	2,233,002	Based on 300 gallons/acre/day of Road, staging, and field office area areas" - Steer plus one tandem (18k+34k)
Water (Vegetation establishment)	6	6	6	12	52,000	24,000	Based on 3000 gallons/acre of array" - Steer plus one tandem (18k+34k)
Total	1,624	1,624	1,624	3,248			
Average Per Delivery Day	7	7	7	14	**260 Delivery Days**		
MAIL, FOOD, SANITATION, AND FUEL DELIVERIES							
Mail, Fed Ex, UPS, Etc.	450	450	450	900	12,000	60	Based on 396 days of deliveries and 3 deliveries per day" - Steer plus single (3k+9k)
Canteen Trucks	450	450	450	900	10,000	60	Based on 396 weeks and 9 deliveries per day" - Steer plus single (2k+8k)
Sanitation	240	240	240	480	10,000	60	Based on 60 weeks and 8 deliveries per week" - Steer plus single (2k+8k)
Fuel Deliveries	60	60	60	120	26,000	7,000	Based on 1500 Gallons/week of diesel on-road & off road" - Steer plus single (8k+18k)
Total	1,200	1,200	1,200	2,400			
Average Per Delivery Day	4	4	4	8	**396 Delivery Days**		
Total all Materials	38,853	38,853	38,853	77,706			
Total All Materials - Average Per Delivery Day	179	179	179	358			
OVERSIZE/OVER WEIGHT VEHICLES							
Main Power Transformer	1	1	1	2	435000 lbs	360,000	16 Axle Vehicle - 2 - Transformers - tractor with 8 dual axle platform & pusher vehicle
Total	1	1	1	2			
Average Per Delivery Day	1	1	1	2	**3 Delivery Days**		

PROJECT TOTALS

	Number of Trucks	Arrival Trips	Departure Trips	Total Trips
TOTAL	38,854	38,854	38,854	77,708
AVERAGE PER DAY	180	180	180	360

APPENDIX C

Mn/DOT Access Management Manual

Chapter 3

Figure 3.40: Warrant 9 for Left-Turn Lanes

2-Lane Highway AADT	4-Lane Highway AADT	Cross Street or Driveway ADT	Turn Lane Requirement
1500 to 2999	3000 to 5999	> 1500	Left-turn lane warranted
3000 to 3999	6000 to 7999	> 1200	Left-turn lane warranted
4000 to 4999	8000 to 9999	> 1000	Left-turn lane warranted
5000 to 6499	10,000 to 12,999	> 800	Left-turn lane warranted
≥ 6500 AADT	≥ 13,000 AADT	101 to 400 > 400	Left-turn lane or bypass lane Left-turn lane warranted

Highway AADT one year after opening
Posted speed 45 mph or greater

Chapter 5

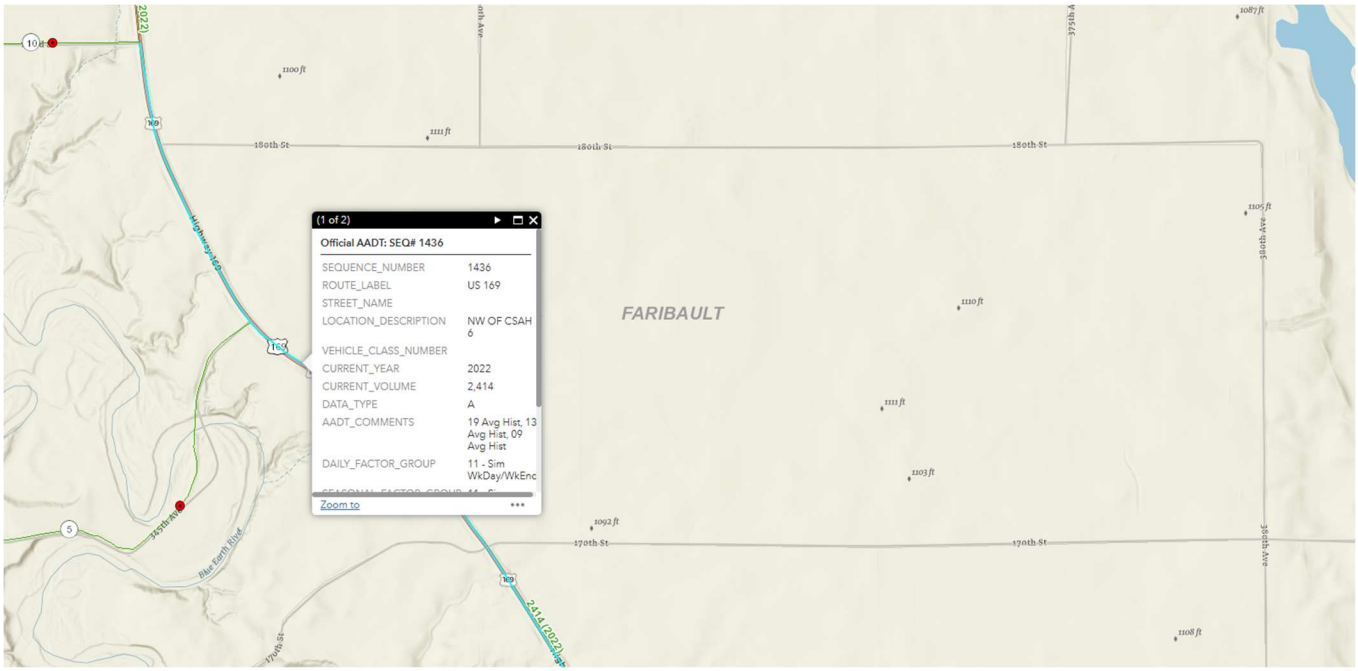
5.3 TIS Not Needed

A traffic impact study is not necessary for most individual developments.

- For developments that do not generate significant traffic volumes, a traffic impact study is neither necessary nor warranted.
  - Development proposals that are estimated to generate fewer than 250 peak-hour vehicle trips or 2,500 new daily trips generally would not warrant completion of a traffic impact study, unless there are unusual circumstances;
  - Even projects that otherwise require environmental review should generally not require a traffic impact study if projected volumes are below this threshold.
- The traffic impacts of small/modest development proposals will be evaluated sufficiently by applying other elements of the guidance in this Access Management Manual, such as that regarding development review, spacing, sight distance, and turn lanes. The guidance provides "built-in" traffic engineering measures that are sufficient to address the impacts of lower-volume developments.

APPENDIX D

Mn/DOT ADT



AADT on Highway 169 between 170th St and 180th St.