STATE OF MINNESOTA
BEFORE THE
PUBLIC UTILITIES COMMISSION

Katie Sieben	Chair
Joseph K. Sullivan	Vice-Chair
Audrey Partridge	Commissioner
Hwikwon Ham	Commissioner
John Tuma	Commissioner

In the Matter of the Application for a Certificate of Need for the Gopher to Badger Link 765 kV High Voltage Transmission Line Project (LRTP 26)	Docket No. ET3, E002/CN-25-121

APPLICANTS' SUBMISSION OF SUPPLEMENTAL INFORMATION REQUIRED BY COMPLETENESS ORDER

INTRODUCTION & BACKGROUND

Dairyland Power Cooperative and Northern States Power Company, doing business as Xcel Energy (together, Applicants) have submitted a Joint Certificate of Need Application (Application) for the Gopher to Badger Link Project (Project). On April 29, 2026, the Minnesota Public Utilities Commission (Commission) issued an order that accepted the Application as complete and, among other things, required the Applicants to submit certain additional filings (Order). In this filing, the Applicants provide the additional information required in paragraph 6 of the Order.

SUPPLEMENTAL INFORMATION

I. Electrical Standards for 765 kV and Wind / Solar Facilities.

Order point 6(a) requires the Applicants to provide responses to the following questions:

> What are the electrical engineering limitations and safe distances that a 765/161kV double circuit transmission line can be constructed from an existing wind turbine or solar facility? Are there any North American Electric Reliability Corporation (NERC) or other electrical standards that establish appropriate distances from wind

> turbines and solar facilities for a 765kV double circuit transmission line?

There are no NERC standards specifying the distance between a 765 kV transmission line and wind or solar facilities. Likewise, the Applicants have not identified any relevant transmission line-specific documentation from the American Society of Civil Engineers or the Institute of Electrical and Electronics Engineers. The National Electric Safety Code (NESC) also does not include any specific provisions regarding distances between 765 kV transmission lines and wind turbines and solar panels. However, the NESC establishes vertical and horizontal clearance requirements for existing obstacles. NESC Rule 234.C is the classification that would apply to existing wind and solar facilities. The minimum vertical clearance (assuming 2,000 foot elevation) is 23.5 feet and the minimum horizontal clearance is 23 feet. In addition to these minimum clearances, the Applicants have developed Project-specific routing criteria, as discussed further in Section II, below, and the Project's right-of-way is designed to meet all applicable standards (regardless of obstacle), in addition to Minnesota's state noise requirements.

II. General Criteria for Routing 765 kV near Existing Wind / Solar Facilities.

Order point 6(b) requires the Applicants to answer the following question:

> Relating to the type of structures described in (d) below, what general criteria would be applied when running a 765/161kV double circuit transmission line through or next to existing wind farms or solar facilities?

The Applicants are aware that there are existing and proposed wind farms and solar facilities in the Project Area and, thus, understood that it would be important to develop criteria to apply when routing the Project near these facilities. These criteria are summarized below.

For existing wind farms, the Applicants are using a 1.1 times turbine tip height[1] setback from the route centerline, which can be adjusted based on site-specific conditions. This setback is being applied to minimize the risk of impact to the transmission line if an extreme weather event causes damage to a wind turbine. This buffer applies to individual wind turbines – not wind farm project boundaries. The Applicants are not applying a buffer to wind farm project boundaries or treating the project boundaries as avoidance areas.

For existing solar facilities, the Applicants' initial criteria is that the 765 kV transmission line conductors should not cross or span the arrays (solar panels).[2] However, the Applicants have initially assumed that the edge of the transmission line right-of-way could abut or overlap the fenceline boundary of the solar facility.

The Applicants are engaging with developers and operators of wind farms and solar facilities in Minnesota as part of outreach efforts and will continue to do so throughout the planning and permitting process. Likewise, the Applicants are reviewing publicly available data and engaging with developers, landowners, and local governments to understand plans for proposed future wind and solar facilities and are seeking to coordinate with developers to avoid conflicts while minimizing land use impacts.

III. Visual Simulations

Order point 6(c) requires the Applicants to:

> Provide several proof of concept examples in Segment 1 (between the North Rochester Substation and a point near Marion, Minnesota) of three 765 kV transmission line structures (the proposed lattice structure, tubular steel monopole under 200 feet and tubular steel H-

[1] "Tip height" is equal to the 'total height' attribute for each structure obtained from the U.S. Wind Turbine Database, Minnesota and National. Available online at: https://gisdata.mn.gov/dataset/util-uswtdb.

[2] The Applicants are aware of at least two instances on other projects where a solar array is crossed by a transmission line. However, doing so poses risks for maintenance of the transmission line and operational issues for the solar array.

> frame – see Table 7.6-1 of the Application) moving through an area covering four sections of land (a section being approximately 640 acres in a typical township division) a rural mostly agricultural cross-section. This filing should show (1) the 765 kV transmission line routing practices the Applicants will use for each particular structure as the line moves through that landscape, and (2) what the viewshed would look like at distances of a quarter mile, a half mile, and a mile from the structures. The purpose is to identify how each of the proposed structures would comparatively mitigate impacts on agricultural and on human residences and structures across these representative landscapes.

Similarly, Order point 6(d) requires:

> Likewise provide a similar analysis for Segment 2 (between Marion, Minnesota, to the Minnesota/Wisconsin state line) of three double circuited 765/161 kV transmission line structures (steel tubular H-frame structures – see Figure 7.6-3 of the Application). For this segment it should include a minimum of two proofs of concept - one depicting areas of flatter agricultural landscapes on the western part of the segment and one depicting an area more in the Bluff Country on the eastern portion of the segment. Additionally for this segment provide visual comparisons to the 161kV line being replaced.

The visual simulations required by Order points 6(c) and (d) are included as **Attachment A** to this filing. The visual simulations were prepared with industry standard methodology. The visual simulations were prepared using three locations in the Project area — one in Segment 1 of the Project area (in response to Order point 6(c)), one in a flat agricultural area of Segment 2 (Order point 6(d)), and one in the Driftless Area of Segment 2 (Order point 6(d)). Structure locations, size, configuration, and spacing shown in the visual simulations are also reflective of preliminary design included in the accompanying Route Permit Application.

The selected locations are described in further detail below:

- **Segment 1**: The location included in the visual simulation for Segment 1 is at the Project crossing of US Highway 14 between Chester, Minnesota, and Eyota, Minnesota. This location is representative of Segment 1's typical landscape with agricultural land use and gently rolling hills.

- **Segment 2 (Agricultural)**: This visual simulation location is at the Project's proposed crossing of 295th Avenue approximately 2.5 miles west

of Harmony, Minnesota. The location is representative of Segment 2's typical landscape with agricultural land use and gently rolling hills.

- **Segment 2 (Driftless)**: This visual simulation location is at the Project's crossing of County Road 5, approximately 5.5 miles south southeast of Caledonia, Minnesota, in the Winnebago Creek valley. The location is representative of Segment 2 Driftless landscape with steep, tree covered valley walls and agricultural land use on valley floors.

Each location includes an image of existing conditions and visual simulations from approximately one-quarter mile, one-half mile, and one mile from the identified location showing a four-legged lattice structure like that proposed for the Project, a monopole structure, and an H-frame structure. The Segment 2 (Driftless) locations vary slightly in distance due to accessibility in rugged terrain with limited road options. Each attachment also includes an inset map showing the location of the simulation.

The camera sensor and focal length of the lens used to photograph the view determines its horizontal angle of view. These photos were taken using a focal length of 50 millimeters (mm) on a 35 mm film. If printed, the simulations should be printed so that the image is 16 inches wide. The appropriate viewing distance for photographs printed in landscape mode on tabloid (16 inch wide) sheets is approximately 22 inches (arm's length). This will represent Project elements in their appropriate scale as they would be if seen at the viewpoint.

IV. Agricultural Practices

Order point 6(e) requires the Applicants to:

> Provide the best technical literature on the best ways to modify agricultural practices around the proposed lattice structure, tubular steel monopole under 200 feet, tubular steel H-frame and guyed lattice structures for the 765 kV and 765/161 kV transmission line structures.

The Applicants conducted a literature search using JSTOR, Google, and MS Copilot to identify peer-reviewed articles, article summaries, government guidance, utility industry

publications, and agricultural extension resources. Applicants then searched directly within potentially relevant publications. Example search terms include:

- "agriculture practices transmission line right-of-way"
- "autosteer and obstacle detection agricultural machinery"
- "integrated vegetation management ROW agriculture"

Sources were screened based on relevance to agricultural practices adjacent to transmission line structures. Search results were not limited to geographical location or publication date to allow for a comprehensive review. **Attachment B** is the resulting bibliography. Applicants note that most of the potentially relevant publications regarding lattice-specific research are from the 1970s-1980s, after which time it appears this research lessened. Additionally, Applicants included articles that describe the current technology available for obstacle avoidance by autonomous agricultural machinery, the suitability of automated systems to detect utility poles, and the adoption of precision agricultural technologies, such as fully automated guidance systems.

By providing this bibliography, Applicants are not representing the validity of these resources and note that further record development will occur in this docket and related routing proceedings regarding agricultural practices and the Project.

V. Removal of Existing 161 kV Facilities

Order point 6(f) requires the Applicants to:

> Provide a thorough discussion of what will happen to existing structure foundations from the line being replaced particularly as it relates to agricultural fields.

Dairyland's existing 161 kV line, which will be rebuilt as part of the Project, was largely constructed with direct-embed structures, meaning that most of the structures do not have concrete foundations. Where existing transmission structures are to be removed, it is common practice to remove the structure to a depth of at least 4 feet below grade. However, in some cases, such as in

wetland features, the structure may be cut off at grade. The determination will be site specific and will be based on the type of structure, land use at the site, and construction vehicle access constraints. The Applicants will coordinate with affected landowners and appropriate permitting authorities, as necessary, regarding removal practices.

VI. Conceptual Agricultural Impacts

Order point 6(g) requires:

> For each of the proof of concept examples in (c and d), estimate the number of agricultural acres per mile that would be lost to production when best management practices are used around the three types of identified structures, and describe the methodology used to determine the estimates.

As an initial matter, Section 7.6.2 of the Certificate of Need Application describes the Applicants' analysis regarding alternative structure design for both Segment 1 and Segment 2 of the Project. The Applicants did evaluate tubular steel H-frame and tubular steel monopole structures and rejected both structures in favor of the self-supporting lattice structure due to, as applicable, cost, constructability, technical considerations, and the ability to withstand extreme weather events. The Applicants continue to conclude that neither structure is reasonable for the Project. Likewise, the Applicants are not aware of any existing 765 kV facilities in the United States constructed with monopoles, or other 765 kV facilities proposed to be constructed using monopole structures.

Nonetheless, consistent with the Completeness Order, the Applicants conducted an analysis to estimate the number of agricultural acres per mile that would be lost to production when best management practices are used around three structure types for both Segment 1 and Segment 2: the self-supporting lattice structure (as proposed by the Applicants); tubular steel monopole under 200 feet; and tubular steel H-frame. This section also describes the Applicants' methodology.

For all structures, to allow for an apples-to-apples comparison, the calculations below assume that the structure would be placed in the center of an agricultural field. The calculations further assume that the one-mile segment evaluated is a straight line (i.e., no dead-end structures). The Applicants note that, even with tubular H-frame or tubular monopole tangent structures, lattice structures may be required for dead-end structure locations. Further, actual impacts will be highly dependent on structure placement and alignment.

The Applicants used standard assumptions for the footprint dimensions of each structure type as outlined in **Table 1**, below. The Applicants then applied a two-foot-wide "halo" around each structure. This halo represents the area around each structure which the Applicants assume would not be farmed, as equipment operators typically leave a small area around each structure to ensure proper clearance between the structure and farm equipment operation. The Applicants' use of a two-foot-wide halo is based on observed practices at structures in agricultural settings. This increased the dimensions of each footprint as shown in **Table 1. Table 1** also reflects the average span distances between structures, which further equates to an average number of structures per mile, as shown in **Table 1**.

Table 1
Agricultural Impacts Analysis by Structure Type

Structure Type	Structure Footprint	Structure Footprint Plus Halo	Average Span Distance Between Structures	Average Number of Structures Per Mile	Acres Per Structure	Acres Per Mile
Segment 1						
Self-Supporting Lattice	52 feet x 52 feet[3]	56 feet by 56 feet	1,300 feet[4]	5.06	0.072	0.364
Tubular Steel Monopole under 200 feet	8-foot diameter	12-foot diameter	800 feet	7.60	0.0026	0.0198
Tubular Steel H-Frame	60 feet x 10 feet	64 feet x 14 feet	1,200 feet	5.40	0.0206	0.1112
Segment 2						
Self-Supporting Lattice	52 feet x 52 feet	56 feet by 56 feet	1,350 feet	4.91	0.072	0.354
Tubular Steel Monopole under 200 feet	8-foot diameter	12-foot diameter	550	9.60	0.0026	0.0249
Tubular Steel H-Frame	60 feet x 8 feet	64 feet x 12 feet	1300	4.06	0.0176	0.0716

CONCLUSION

The Applicants are submitting this filing concurrently with the submission of the Route Permit Application for the Project and look forward to further record development on these topics as the joint proceedings progress.

[3] The structure footprint for both Segment 1 and 2 was from a minimum of 45 feet x 45 feet to 60 feet x 60 feet. 52 feet x 52 feet was used as the average structure footprint.

[4] The average span distance for the lattice structure for Segment 1 is 1,200 to 1,400 feet. The average span distance for Segment 2 is 1,200 to 1,500 feet.

Dated: November 5, 2026

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Attorneys for Dairyland Power Cooperative

Attachment A







Location: 43.9993033, -92.2792815
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1265 ft
Photography: 12:08 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 65.08
Solar Azimuth: 173.58

Structure: NA

Gopher to Badger Link
Visual Simulation - Existing Conditions at 1/4 mile
Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993033, -92.2792815
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1265 ft
Photography: 12:08 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 65.08
Solar Azimuth: 173.58

Structure: 175' Tubular Steel H-Frame, 1,300' structure spacing

Gopher to Badger Link
Visual Simulation - H-Frame at 1/4 mile

Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link







Location: 43.9993033, -92.2792815
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1265 ft
Photography: 12:08 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 65.08
Solar Azimuth: 173.58

Structure: 175' Lattice, 1,300' structure spacing

Gopher to Badger Link
Visual Simulation - Lattice at 1/4 mile

Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993033, -92.2792815
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1265 ft
Photography: 12:08 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 65.08
Solar Azimuth: 173.58

Structure: 195' Monopole, 800' structure spacing

Gopher to Badger Link
Visual Simulation - Monopole at 1/4 mile

Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993033, -92.2792815
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1265 ft
Photography: 12:01 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 64.87
Solar Azimuth: 169.17

Structure: NA

Gopher to Badger Link
Visual Simulation - Existing Conditions at 1/2 mile
Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993033, -92.2792815
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1265 ft
Photography: 12:01 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 64.87
Solar Azimuth: 169.17

Structure: 175' Tubular Steel H-Frame, 1,300' structure spacing

Gopher to Badger Link
Visual Simulation - H-Frame at 1/2 mile

Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993033, -92.2792815
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1265 ft
Photography: 12:01 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 64.87
Solar Azimuth: 169.17

Structure: 175' Lattice, 1,300' structure spacing

Gopher to Badger Link
Visual Simulation - Lattice at 1/2 mile

Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993033, -92.2792815
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1265 ft
Photography: 12:01 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 64.87
Solar Azimuth: 169.17

Structure: 195' Monopole, 800' structure spacing

Gopher to Badger Link
Visual Simulation - Monopole at 1/2 mile

Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993424, -92.2691049
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1270 ft
Photography: 12:26 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 65.17
Solar Azimuth: 183.07

Structure: NA

Gopher to Badger Link
Visual Simulation - Existing Conditions
at 1 mile
Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993424, -92.2691049
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1270 ft
Photography: 12:26 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 65.17
Solar Azimuth: 183.07

Structure: 175' Tubular Steel H-Frame, 1,300' structure spacing

Gopher to Badger Link
Visual Simulation - H-Frame at 1 mile

Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993424, -92.2691049
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1270 ft
Photography: 12:26 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 65.17
Solar Azimuth: 183.07

Structure: 175' Lattice, 1,300' structure spacing

Gopher to Badger Link
Visual Simulation - Lattice at 1 mile

Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993424, -92.2691049
Looking west on Highway 14 SE between Chester and Eyota.
Elevation: 1270 ft
Photography: 12:26 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Mostly cloudy
Solar Elevation: 65.17
Solar Azimuth: 183.07

Structure: 195' Monopole, 800' structure spacing

Gopher to Badger Link
Visual Simulation - Monopole at 1 mile

Segment 1 (between North Rochester Substation and near Marion, MN)

Gopher to Badger Link

Attachment A







Location: 43.9993424, -92.2691049
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1350 ft
Photography: 12:23 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.59
Solar Azimuth: 186.75

Structure: NA

Gopher to Badger Link
Visual Simulation - Existing Conditions at 1/4 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.551254, -92.059777
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1350 ft
Photography: 12:23 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.59
Solar Azimuth: 186.75

Structure: 175'-195' Tubular Steel H-Frame, 1,200'-1,400' structure spacing

Gopher to Badger Link
Visual Simulation - H-Frame at 1/4 mile

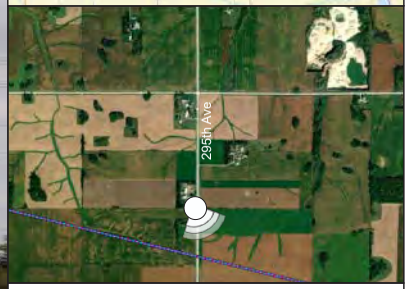
Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.551254, -92.059777
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1350 ft
Photography: 12:23 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.59
Solar Azimuth: 186.75

Structure: 175'-195' Lattice, 1,200'-1,400' structure spacing

Gopher to Badger Link
Visual Simulation - Lattice at 1/4 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.551254, -92.059777
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1350 ft
Photography: 12:23 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.59
Solar Azimuth: 186.75

Structure: 195' Monopole, 525' structure spacing

Gopher to Badger Link
Visual Simulation - Monopole at 1/4 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.556232, -92.059768
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1350 ft
Photography: 12:20 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.65
Solar Azimuth: 185.24

Structure: NA

Gopher to Badger Link
Visual Simulation - Existing Conditions at 1/2 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.556232, -92.059768
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1350 ft
Photography: 12:20 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.65
Solar Azimuth: 185.24

Structure: 175'-195' Tubular Steel H-Frame, 1,200'-1,400' structure spacing

Gopher to Badger Link
Visual Simulation - H-Frame at 1/2 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.556232, -92.059768
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1350 ft
Photography: 12:20 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.65
Solar Azimuth: 185.24

Structure: 175'-195' Lattice, 1,200'-1,400' structure spacing

Gopher to Badger Link
Visual Simulation - Lattice at 1/2 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.556232, -92.059768
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1350 ft
Photography: 12:20 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.65
Solar Azimuth: 185.24

Structure: 195' Monopole, 525' structure spacing

Gopher to Badger Link
Visual Simulation - Monopole at 1/2 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.562085, -92.059810
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1300 ft
Photography: 12:28 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.47
Solar Azimuth: 189.24

Structure: NA

Gopher to Badger Link
Visual Simulation - Existing Conditions at 1 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.562085, -92.059810
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1300 ft
Photography: 12:28 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.47
Solar Azimuth: 189.24

Structure: 175'-195' Tubular Steel H-Frame, 1,200'-1,400' structure spacing

Gopher to Badger Link
Visual Simulation - H-Frame at 1 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.562085, -92.059810
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1300 ft
Photography: 12:28 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.47
Solar Azimuth: 189.24

Structure: 175'-195' Lattice, 1,200'-1,400' structure spacing

Gopher to Badger Link
Visual Simulation - Lattice at 1 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.562085, -92.059810
Looking south on 295th Ave west of Harmony, MN.
Elevation: 1300 ft
Photography: 12:28 PM, 5/06/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Cloudy
Solar Elevation: 61.47
Solar Azimuth: 189.24

Structure: 195' Monopole, 525' structure spacing

Gopher to Badger Link
Visual Simulation - Monopole at 1 mile

Segment 2 (Agricultural)

Gopher to Badger Link

Attachment A







Location: 43.557252, -91.459703
Looking south on County Road 5 south of Caledonia, MN.
Elevation: 820 ft
Photography: 12:41 PM, 5/07/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 61.24
Solar Azimuth: 195.78

Structure: NA

Gopher to Badger Link
Visual Simulation - Existing Conditions at 1/4 mile

Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.557252, -91.459703
Looking south on County Road 5 south of Caledonia, MN.
Elevation: 820 ft
Photography: 12:41 PM, 5/07/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 61.24
Solar Azimuth: 195.78

Structure: 195' Tubular Steel H-Frame, 750'-1,900' structure spacing

Gopher to Badger Link
Visual Simulation - H-Frame at 1/4 mile

Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.557252, -91.459703
Looking south on County Road 5 south of Caledonia, MN.
Elevation: 820 ft
Photography: 12:41 PM, 5/07/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 61.24
Solar Azimuth: 195.78

Structure: 175' Lattice, 750'-1,900' structure spacing

Gopher to Badger Link
Visual Simulation - Lattice at 1/4 mile

Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.557252, -91.459703
Looking south on County Road 5 south of Caledonia, MN.
Elevation: 820 ft
Photography: 12:41 PM, 5/07/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 61.24
Solar Azimuth: 195.78

Structure: 195' Monopole, 300'-750' structure spacing

Gopher to Badger Link
Visual Simulation - Monopole at 1/4 mile

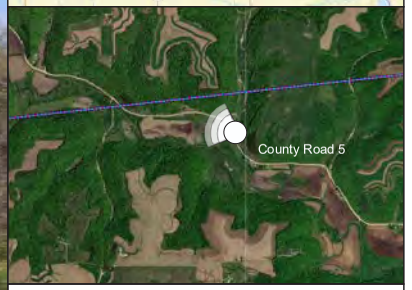
Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.551799, -91.437143
Looking west on County Road 5 south of Caledonia, MN.
Elevation: 760 ft
Photography: 12:59 PM, 5/07/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 60.16
Solar Azimuth: 204.29

Structure: NA

Gopher to Badger Link
Visual Simulation - Existing Conditions at 1/2 mile

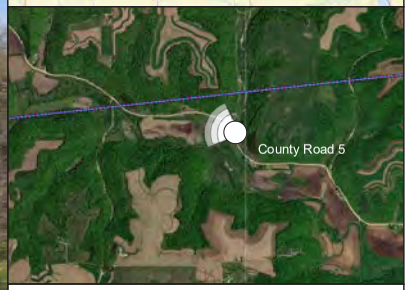
Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.551799, -91.437143
Looking west on County Road 5 south of Caledonia, MN.
Elevation: 760 ft
Photography: 12:59 PM, 5/07/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 60.16
Solar Azimuth: 204.29

Structure: 195' Tubular Steel H-Frame, 750'-1,900' structure spacing

Gopher to Badger Link
Visual Simulation - H-Frame at 1/2 mile

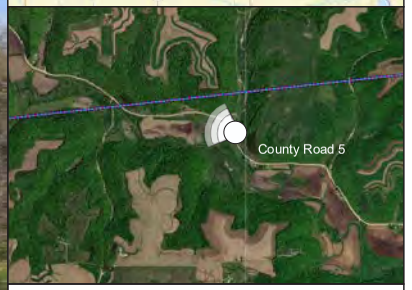
Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.551799, -91.437143
Looking west on County Road 5 south of Caledonia, MN.
Elevation: 760 ft
Photography: 12:59 PM, 5/07/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 60.16
Solar Azimuth: 204.29

Structure: 175' Lattice, 750'-1,900' structure spacing

Gopher to Badger Link
Visual Simulation - Lattice at 1/2 mile

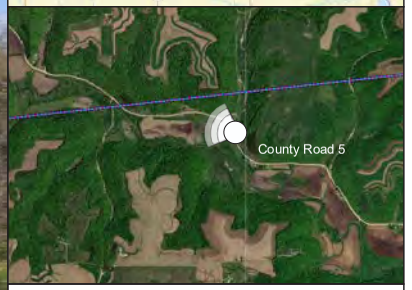
Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.551799, -91.437143
Looking west on County Road 5 south of Caledonia, MN.
Elevation: 760 ft
Photography: 12:59 PM, 5/07/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 60.16
Solar Azimuth: 204.29

Structure: 195' Monopole, 300'-750' structure spacing

Gopher to Badger Link
Visual Simulation - Monopole at 1/2 mile

Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.544557, -91.422297
Looking northwest on County Road 5 south of Caledonia, MN.
Elevation: 745 ft
Photography: 2:55 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 49.51
Solar Azimuth: 245.13

Structure: NA

Gopher to Badger Link
Visual Simulation - Existing Conditions at 1-1/4 mile

Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.544557, -91.422297
Looking northwest on County Road 5 south of Caledonia, MN.
Elevation: 745 ft
Photography: 2:55 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 49.51
Solar Azimuth: 245.13

Structure: 195' Tubular Steel H-Frame, 750'-1,900' structure spacing

Gopher to Badger Link
Visual Simulation - H-Frame at 1-1/4 mile

Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.544557, -91.422297
Looking northwest on County Road 5 south of Caledonia, MN.
Elevation: 745 ft
Photography: 2:55 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 49.51
Solar Azimuth: 245.13

Structure: 175' Lattice, 750'-1,900' structure spacing

Gopher to Badger Link
Visual Simulation - Lattice at 1-1/4 mile

Segment 2 (Driftless)

Gopher to Badger Link

Attachment A







Location: 43.544557, -91.422297
Looking northwest on County Road 5 south of Caledonia, MN.
Elevation: 745 ft
Photography: 2:55 PM, 7/22/2026
Canon EOS R5, RF24-105mm
Focal Length: 50mm

Conditions: Partly Cloudy
Solar Elevation: 49.51
Solar Azimuth: 245.13

Structure: 195' Monopole, 300'-750' structure spacing

Gopher to Badger Link
Visual Simulation - Monopole at 1-1/4 mile

Segment 2 (Driftless)

Gopher to Badger Link

Attachment B
Literature Related to Agricultural Practices and Transmission Structures[1]

1. Chen, Z., Yin, J., Farhan, S., Liu, L., Zhang, D., Zhou, M., Cheng, J. (2026) *A comprehensive review of obstacle avoidance for autonomous agricultural machinery in multi-operational environment.* Artificial Intelligence in Agriculture, 16(1), 139-163. Available at: https://doi.org/10.1016/j.aiia.2025.10.001.

2. EPRI (2008) *Assessment of Environmental Effects of Current Underground and Overhead Transmission Line Construction and Maintenance in the United States*. EPRI, Palo Alto, CA: 2008. 1015597.

3. Fortin, J.-M., & Vigneault, C. (1982). *Time and land losses with electric towers in agricultural fields*. Canadian Agricultural Engineering, 24(2), 103–108.

4. Gustafson, R. J., Grumstrup, P. D., Hendrickson, E. R., & Meyer, M. P. (1980). *Land lost from production under and around electrical transmission line structures.* Transactions of the ASAE, 23*(1), 180–184.*

5. McFadden, J., Njuki, E. & Griffin, T. (2023) *Precision Agriculture in the Digital Era: Recent Adoption on U.S. Farms*. U.S. Department of Agriculture, Economic Research Service. EIB-248. Available at: https://ers.usda.gov/sites/default/files/_laserfiche/ publications/105894/EIB-248.pdf

6. Parsch, Reneau & Norman (1987). *Effects of overhead electric transmission lines on crop production costs.* Arkansas Agricultural Experiment Station, Bulletin 896. Available for download at: https://digitalcollections.uark.edu/digital/collection/ArkBulletins/id/960/ rec/1

7. Parsch & Norman. *(1988) Impacts of Powerlines on Cost of Crop Production.* Available at: https://eweb.irwaonline.org/eweb/upload/web_0488_Impact_of_Powerlines.pdf.

8. Ontario Hydro (1977) *Effects of Hydro Transmission Towers on Farm Operations.* Ontario, Hydro, Toronto. (Unavailable)

9. Ross, P., English, A., Ball, D., Upcroft, B., Corke, P. (2015) *Online novelty-based visual obstacle detection for field robotics.* 2015 IEEE International Conference on Robotics and Automation (ICRA). Available for purchase at: https://www.ieee.org/

10. Wisconsin Public Service Commission. (2012) *Environmental Impacts of Transmission Lines*. Available at: https://www.nrc.gov/docs/ML1209/ML12090A853.pdf

[1] Applicants do not represent the validity or accuracy of these resources. Further record development will occur in this proceeding and in forthcoming routing proceedings, and the Applicants reserve the right to supplement, refine, respond to, or object to these resources, as applicable.