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# 1 Introduction

This environmental assessment (EA) has been prepared for the Sherco Solar Project (Project), which includes a solar farm and two high voltage transmission lines (HVTLs) proposed by Xcel Energy (Xcel Energy) and developed jointly with National Grid Renewables Development, LLC (NG Renewables). This EA evaluates the potential human and environmental impacts of the proposed project and possible mitigation measures including siting alternatives and modifications.

This EA is not a decision-making document, but rather serves as a guide for decision makers. The EA is intended to facilitate informed decisions by state agencies.

On April 20, 2021, Xcel Energy submitted a site permit application and two high voltage transmission line route permit applications (combined referred to as the Project) to the Minnesota Public Utilities Commission (Commission) under the alternative review process (Minnesota Statute 216E.04; Minnesota Rule 7850.2800-3900) for the Project.[1]

## 1.1 Project

Xcel Energy proposes to construct a solar energy conversion facility (solar farm) with an up to 460-MW alternating current (AC) nameplate capacity, in Sherburne County, Minnesota (**Figure 1**). The solar farm is located within agricultural fields between U.S. Highway 10 and the Mississippi River, and on the east and west sides of the existing Sherco Generating Plant (SGP). The Solar Project will connect to the transmission grid via two 345 kV transmission lines, the West HVTL Project and the East HVTL Project.

The Project is proposed due to ceasing operations of Unit 2 of the SGP which will occur by the end of 2023. The Commission previously approved ceasing operations of Unit 2 and upon cessation, the existing interconnection capacity must be repowered or retired by Xcel Energy under the Midcontinent Independent System Operator (MISO) generating facility replacement process.

The Applicants states that the Project will replace a portion of the nearly 700 MW of energy generated by Unit 2 of the SGP. The Applicant states that this plan represents a key milestone step in Xcel Energy's clean energy transition, which targets 100 percent carbon free electricity by 2050 and 80 percent less carbon by 2030. The addition of this resource will increase the solar energy produced on Xcel Energy's system by more than 40 percent from current levels and increase the system to a total of approximately 40 percent renewable energy.

[1] Xcel Energy, *Application to the Minnesota Public Utilities Commission for a Site Permit and Two Route Permits*, April 20, 2021, eDocket ID: 20214-173139-#, 20214-173140-#, 20214-173141-#, 20214-173142-# [hereinafter Site Permit Application or SPA].

Xcel Energy has indicated that they decided to accelerate plans to add solar generation capacity at the SGP in response to the Commission's Inquiry into Utility Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic (Docket No. 20-492).

According to the filing, NG Renewables and Xcel Energy (Applicants) were each developing solar generation facilities adjacent to the SGP to service the issuance of the request for proposal (RFP).[2] NG Renewables was developing a project to the west of the SGP and had secured purchase options and leases through its subsidiary, Sherco Solar, LLC sufficient to site up to 230 MW of solar generating capacity. Xcel Energy was developing a project to the east of the SGP and had secured land leases sufficient to site up to 230 MW of solar generating capacity. NG Renewables and Xcel Energy elected to combine the two developments into one Project, the Project, with the stated goal of providing up to 460 MW of solar energy capacity being requested by Xcel Energy in the RFP in a timely manner to maximize job creation during the COVID-19 pandemic.

Xcel Energy anticipates that project will have an in-service for the entire project by the fourth quarter of 2024.[3]

## 1.2 State of Minnesota's Role

In order to build the Project, Xcel Energy must obtain three approvals from the Public Utilities Commission (Commission)—a Large Electric Power Generating Plant (LEPGP) Site Permit for the solar farm, and two High Voltage Transmission Line (HVTL) Route Permits for the two 345 kV transmission lines.[4] In addition to these approvals from the Commission, the Project also requires approvals (permits, licenses) from other state agencies and federal agencies with permitting authority for specific resources. Commission site and route permits supersede and preempt all zoning, building, and land-use regulations promulgated by local units of government.[5]

To help the Commission with its decision-making and to ensure a fair and robust airing of the issues, the state of Minnesota has set out a process for the Commission to follow in making its decisions. This process requires[6]:

- the development of an environmental review document, and
- public hearings before an administrative law judge (ALJ).

[2] Xcel Energy launches RFP for 500 MW of fresh solar. Xcel Energy launches RFP for 500 MW of fresh solar (renewablesnow.com).
[3] SPA, p. 6.
[4] Minnesota Rules 7850.
[5] Minnesota Statutes 216E.10
[6] Minnesota Statutes 216B and 216E

The goal of the EA is to describe the potential human and environmental impacts of the project ("the facts"); the goal of the hearings is to advocate, question, and debate what the Commission should decide about the Project ("what the facts mean"). The entire record developed in this process—the EA and the report from the ALJ, including all public input and testimony—is considered by the Commission when it makes its decisions on the Applicants' site, and route permit applications.

## 1.3 Organization of Environmental Impact Statement

This EA is based on Xcel Energy's site permit and route permit applications, public comments received during the scoping comment period for this EA, and input from the Commission. This EA addresses the matters identified in the *Scoping Decision* for this project (**Appendix A**) and is organized as outlined as follows:

| | | |
|---|---|---|
| Chapter 1 | Introduction | Provides an overview of the Project, the state of Minnesota's role, and the organization of the document. |
| Chapter 2 | Regulatory Framework | Describes the regulatory framework associated with the project, including the state of Minnesota's certificate of need and site and route permitting processes, the environmental review process, and the permits and approvals that would be required for the project. |
| Chapter 3 | Proposed Solar Farm and System Alternatives | Describes the engineering, design, and construction of the proposed solar farm. Chapter 3 also discusses the two alternatives to the proposed solar farm. |
| Chapter 4 | Proposed Transmission Projects | Describes the engineering, design, and construction of the two proposed transmission line projects. |
| Chapter 5 | Affected Environment, Potential Impacts, and Mitigation Measures | Discusses the resources in the Project area and the potential human and environmental impacts of the project and identifies measures that could be implemented to avoid or mitigate potential adverse impacts. |
| Chapter 6 | Application of Siting Factors (Factors Considered) | Discusses the proposed Project (including Alternative 1 and Alternative 2) and their merits relative to the *Factors Considered*. |

## 1.4 Describing Potential Impacts and Mitigation

This EA analyzes potential impacts of both the solar farm and the transmission lines on various resources. The discussion of the duration, size, intensity, and location of the impacts provides context. This context is used to determine an overall resource impact level. Impact levels are described using qualitative descriptors. These descriptors are not intended as value judgments, but rather as a means to both ensure a common understanding among readers and compare resource impacts between alternatives.

- **Negligible** - Negligible means the impacts are so small or unimportant as to be not worth considering; insignificant.
- **Minimal** - Minimal impacts do not considerably alter an existing resource condition or function. Depending upon the resource and the location, minimal impacts may be noticeable to an average observer. These impacts generally affect common resources over the short-term.
- **Moderate** - Moderate impacts alter an existing resource condition or function and are generally noticeable or predictable for the average observer. Effects may be spread out over a large area making them difficult to observe but can be estimated by modeling or other means. Moderate impacts may be long-term or permanent to common resources but are generally short- to long-term for rare and unique resources.
- **Significant** - Significant impacts alter an existing resource condition or function to the extent that the resource is severely impaired or cannot function. Significant impacts are likely noticeable or predictable for the average observer. Effects may be spread out over a large area making them difficult to observe but can be estimated by modeling. Significant impacts can be of any duration and may affect common and rare and unique resources.

This EA also discusses ways to avoid, minimize, or mitigate specific impacts. These actions are collectively referred to as mitigation.

- **Avoid** - Avoiding an impact means the impact is eliminated altogether by moving or not undertaking parts or all of a project.
- **Minimize** - Minimizing an impact means to limit its intensity by reducing project size or moving a portion of the project from a given location.
- **Mitigate** - Impacts that cannot be avoided or minimized could be mitigated. Impacts can be mitigated by repairing, rehabilitating, or restoring the affected environment, or compensating for it by replacing or providing a substitute resource elsewhere.

## 1.5 Sources of Information

The primary sources of information for this EA are the applications for the site permit, and route permits submitted by Applicants. Additional sources of information are identified in the footnotes throughout the document. New and additional data has been included from the Applicants and from state agencies. Information was also gathered by visits to the project area.

A number of spatial data sources, which describe the resources in the project area, were used in preparing this EA. Spatial data from these sources can be imported into geographic information system (GIS) software, where the data can be analyzed and potential impacts of the project quantified, (acres of wetland within the anticipated right-of-way).

# 2 Regulatory Framework

The Project requires three approvals from the Commission – a site permit for the solar farm, and two route permits for the transmission project. The Project will also require approvals from other state and federal agencies with permitting authority for actions related to the project.

## 2.1 Certificate of Need

Typically, a Certificate of Need (CN) is required for all "large energy facilities,"[7] unless the facility falls within a statutory exemption from the CN requirements. Through the CN proceedings the applicant must demonstrate using several factors prescribed in the rules that the proposed facility is in the best interest of the state's citizens. An applicant must also demonstrate there is not a more prudent and reasonable way than the proposed project to provide the stated goals.

The Project includes a generating plant (solar farm) larger than 50 MW and the west transmission line, and the east transmission line are HVTLs, each meet the definition of a large energy facility and would, without an exemption, require a CN prior to issuance of a Site Permit and Route Permits.

In a separate but related docket (E002/M-20-891), Xcel Energy has filed for Commission approval to develop, own, and operate the proposed Project. In that docket, Xcel Energy has taken the position that the Project, including the solar farm, West and East HVTLs are all exempt from CN.

On July 6, 2021, the Commission issued an Order granting the proposed Project an exemption from a certificate of need pursuant to Minn. Stat. § 216B.2422, subdivision 5 (b).[8]

## 2.2 Site and Route Permits

The Project requires both site and route permits from the Commission.[9] Because the Project is powered by solar energy it qualifies for the alternative permitting process.[10] The two HVTLs qualify for review under the alternative permitting process because the length of each of the 345 kV lines is less than five miles.[11] Applicants must provide the commission with written notice of their intent to file an application under the alternative permitting process,[12] which was provided on March 22, 2021.[13]

[7] Minn. Stat. 216B.243, subd. 2; Minn. Stat. 216B.2421, subd. 2(1 and 2).
[8] Commission Order Granting the proposed Sherco Solar project an Exempt from a Certificate of Need, July 6, 2021. eDocket No. 20217-175855-01.
[9] Minn. Stat. 216E.03, subd. 1 and 2.
[10] Minn. Stat. 216E.04, subd. 2(8).
[11] Minn. Stat. § 216E.04, subd. 2(4) and Minn. R. 7850.2800, subp. 1(D).
[12] Minn. R. 7850.2800, subp. 2.
[13] Sherco Solar, Notice of Intent to File Site and Route Permits Under the Alternative Process, March 22, 2021. eDocket No. 20213-172092-03.

Site and Route permit applications must provide specific information.[14] This includes, but is not limited to, information about the applicant, descriptions of the project and site, and discussion of potential human and environmental impacts and possible mitigation measures.[15] Under the alternative permitting process an applicant is not required to propose alternative sites or routes; however, if alternatives were evaluated and rejected, the application must describe these and the reasons for rejecting them.[16]

Upon receiving a site and/or route permit application, the Commission may accept it as complete, reject it and advise the applicant of its deficiencies, or accept it as complete but require the applicant submit additional information.[17]

At the time of application acceptance, the Commission may designate a public advisor;[18] appoint an advisory task force to aid in the environmental review scoping process;[19] and request the ALJ provide either a summary of the hearing (summary report) or request the ALJ provide a full report with findings of fact, conclusions of law, and recommendations regarding the permit applications (summary proceeding).

On August 11, 2021, the Commission issued an Order accepting the combined Site and Route Permit Applications as substantially complete, took no action on an advisory task force, and requested that an ALJ from the Office of Administrative Hearings preside over the public hearing and provide the Commission with a Summary Proceeding.[20]

The Commission is required to make a permit decision within six months from the date an application is accepted.[21] This time limit may be extended up to three months for just cause or upon agreement of the applicant.[22]

### 2.2.1 Environmental Review

Applications for site and/or route permits are subject to environmental review conducted by the Department of Commerce (Department) Energy Environmental Review and Analysis (EERA) staff per Minnesota Rule 7850.3700. Projects proceeding under the alternative permitting process require the preparation of an EA.

[14] Minn. Stat. 216E.04, subd. 3; Minn. R. 7850.3100.
[15] Ibid.
[16] Ibid.
[17] Minn. R. 7850.3200.
[18] Minn. R. 7850.3400.
[19] Minn. Stat. 216E.08, subd. 1; Minn. R. 7850.3600, subp. 1.
[20] Commission Order on Application Acceptance dated August 11, 2021, eDocket No. 20218-177014-01.
[21] Minn. R. 7850.3900, subp. 1.
[22] Ibid.

An EA is a document which describes the potential human and environmental impacts of the proposed project and potential mitigative measures. This is the only state environmental review document required for the Project (Minnesota Statute 216E.04, subdivision 5). Staff provides notice and conducts a public scoping meeting to solicit comments on the scope of the EA.

The Department Commissioner determines the scope of the EA. The Department may include alternative sites or routes suggested by the public in the scope of the EA if such alternatives will aid in the Commission's decision on the site or route permit application.

Under Minn. R. 7850.3700, subpart 3, the scope of the environmental assessment must be determined by the Department within ten days after the closing of the public comment period. Minn. Stat. § 216E.04, subdivision 5 anticipates, however, that the Commission will have the opportunity to identify other routes for consideration prior to environmental review of a project. The statute states that the environmental assessment must contain information on the proposed project, as well as on other sites or routes identified by the Commission. The rule's ten-day timeline for determining the scope of the environmental assessment after the close of the public comment period constrains the Commission's ability to evaluate public input and identify other possible routes prior to environmental review and is typically set-aside.

The EA will be completed and made available prior to the public hearing for the Project.

Under Minnesota Rule, 7850.3700, subpart 4, the Environmental Assessment must include the following:

A. A general description of the proposed project.
B. A list of any alternative sites or routes that are addressed.
C. A discussion of the potential impacts of the proposed project and each alternative site or route on the human and natural environment.
D. A discussion of mitigative measures that could reasonably be implemented to eliminate or minimize any adverse impacts identified for the proposed project and each alternative.
E. An analysis of the feasibility of each alternative site or route considered.
F. A list of permits required for the project; and
G. A discussion of other matters identified in the scoping process.

Scoping is the first step in the development of the EA for the project. The scoping process has two primary purposes:

- gather public input as to the impacts, mitigation measures, and alternatives to study in the EA.
- focus the EA on those impacts, mitigation measures, and alternatives that will aid in the

Commission's decisions on the certificate of need and route permit applications.[23]

On August 31, 2021, Commission staff and EERA staff conducted an in-person public information and environmental assessment scoping meeting near the proposed project area in Becker, Minnesota. A remote-access public information and environmental assessment scoping meeting was held on September 1, 2021. A comment period was open through September 15, 2021, to receive comments on issues to be considered in the environmental assessment scoping decision.

At the meeting, 17 members of the public provided comments on or asked question about the proposed project. By the close of the written comment period, comments were received from the Minnesota Department of Natural Resources, Minnesota Department of Transportation, Becker Township, City of Becker, Clear Lake Township, Sherburne County, International Brotherhood of Electrical Workers Local Union 292, International Union of Operating Engineers Local 49, Laborers' International Union of North America Minnesota and North Dakota, CJ Gray Farms LLC, Hayes Landing LLC, R.D. Offutt Farms, L. Alfords, B. Armstrong, O. Armstrong, J. Carx, B. Collier, W. Herkenhoff, R. Imholte, A. Person, and R. Seeley.

The comments and questions received from participants included a broad range of topics including whether there are hazardous materials contained in solar panels and the potential impacts to soil and groundwater; the recyclability of solar panels; solar panel country of origin; impacts associated with solar panel manufacturing process; aerial crop-dusting impacts on solar panels; the efficiency, reliability, and cost effectiveness of the solar farm compared to a natural gas power plant or other electrical generating technologies; visual impacts of the project; the project's effect on property values; project fencing design and wildlife movement issues; effect on the microclimate; general zoning issues; site selection criteria; amount of land needed for a solar farm; the loss of agricultural land; impacts to future development in the immediate area of the project by local municipalities, and the lack of local government input in the state permit review process.

There was also general support for the project and the positives including the use of local workers, general community economic benefits, pollinator and native vegetation plantings, and the discontinued need for agricultural irrigation and fertilization.

The process for individuals to request that specific alternative sites/routes, and/or modifications to the project, be included in the scope of the environmental review document was discussed at the public meeting.

[23] "The scoping process must be used to reduce the scope and bulk of an environmental impact statement by identifying the potentially significant issues and alternatives requiring analysis and establishing the detail into which the issues will be analyzed." (Minnesota Rule 7850.2500, subpart. 4)

The City of Becker requested that the scope of the Environmental Assessment contain alternative siting options for the Project that would allow for the removal of the five identified parcels (East Site: PID 05-005-2400 and 05-005-3000; West Site: PID 20-134-1100, 20-134-1400, 20-134-4100). The City's concern with the proposed location for the Project centers on the fact that the solar farm footprint abuts the City's boundaries and encompasses areas of interest for future business growth and development.

A summary of the EA scoping process is contained in **Appendix A**, along with the signed *Scoping Decision*.

### 2.2.2 Public Hearing

The alternative permitting process requires a public hearing be held in the project area upon completion of the EA[24] in accordance with the procedures outlined in Minnesota Rule 7850.3800, subpart 3.

On August 11, 2021, the Commission issued an Order on application completeness that among other procedural items: (1) accepted Xcel's application as substantially complete; and (2) referred the matter to the Office of Administrative Hearings for a Summary Proceeding and preparation of findings of fact, conclusions of law, and a recommendation.

### 2.2.3 Public Hearing

The Commission is required to make a permit decision within six months from the date an application is accepted.[25] This time limit may be extended up to three months for just cause or upon agreement of the applicant.[26]

## 2.3 Other Permits and Approvals

A site permit for the solar farm from the Commission is the only state permit required for the siting of the solar farm. Likewise, a route permit from the Commission is the only state permit required for the routing of the transmission project (the Commission's route permit determines where the line will be located). Commission-issued site and route permits supersede local planning and zoning and bind state agencies;[27] thus, state agencies are required to participate in the Commission's permitting

[24] Minn. R. 7850.3800, subp. 1.
[25] Minn. R. 7850.3900, subp. 1.
[26] Ibid.
[27] Minnesota Statutes, sections 216F.07 and 216E.10.

process to aid the Commission's decision-making and to indicate site and routes that are not permittable.

However, various federal, tribal, state, and local approvals may be required for activities related to the construction and operation of the project. All permits subsequent to the Commission's issuance of a site and route permit and necessary for the project (commonly referred to as "downstream permits") must be obtained by a permittee. The information in this EA may be used by downstream permitting agencies in their evaluation of impacts to resources. **Table 1** lists permits and approvals that could be required for the Project, depending on the final design.

### 2.3.1 Federal Approvals

The United States Army Corps of Engineers (USACE) regulates potential impacts to waters of the United States. Dredged or fill material, including material that moves from construction sites into these waters, could impact the quality of the waters. The USACE requires permits for projects that may cause such impacts. The USACE is also charged with coordinating with Native American tribes regarding potential impacts to traditional cultural properties.

The U.S. Fish and Wildlife Service (USFWS) requires permits for the taking of threatened or endangered species. The USFWS encourages consultation with project proposers to ascertain a project's potential to impact these species and to identify general mitigation measures for the project.

The Federal Aviation Administration (FAA) regulates civil aviation, including the airspace used for aviation. The FAA requires permits for tall structures, such as transmission line structures, which could adversely impact aviation.

### 2.3.2 State of Minnesota Approvals

The Minnesota Department of Natural Resources (DNR) regulates potential impacts to Minnesota's public lands and waters. The DNR requires a license to cross public lands and waters; licenses may require mitigation measures. Additionally, a water use permit from the DNR is required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. Similar to the USFWS, the DNR encourages consultation with project proposers to ascertain a project's potential to impact state-listed threatened and endangered species and possible mitigation measures.

A general national pollutant discharge elimination system/sanitary disposal system (NPDES/ SDS) construction stormwater permit from the Minnesota Pollution Control Agency (MPCA) is required for stormwater discharges from construction sites. A permit is required if a project disturbs 1 acre or more

| Table 1. Potential Permits and Approvals Required for the Sherco Solar Project | | |
|---|---|---|
| **Unit of Government** | **Type of Permit, Approval, Consultation** | **Purpose** |
| **FEDERAL** | | |
| U.S. Army Corps of Engineers – St. Paul District (USACE) | Section 404 Clean Water Act – Dredge and Fill | Protects water quality through authorized discharges of dredged and fill material into waters of the United States. |
| | Section 10 – Rivers and Harbor Act | Protects water quality through authorized crossings of navigable waters. |
| U.S. Fish and Wildlife Service (USFWS) | Section 7 Endangered Species Act Consultation | Establishes conservation measures for endangered species. |
| | Special Use Permit | Authorization to cross USFWS-owned land or easements. |
| Federal Aviation Administration (FAA) | Part 7460 Review | Review to prevent airspace hazards due to structures taller than 200 feet. |
| Native American Tribes | National Historic Preservation Act (NHPA), coordination in support of USACE Section 106 to determine impacts on traditional cultural properties | Coordination to prevent impacts to traditional cultural properties. |
| **STATE** | | |
| Minnesota Department of Natural Resources (DNR) | License to Cross Public Waters | License to prevent impacts associated with crossing public waters. |
| | License to Cross Public Lands | License to prevent impacts associated with crossing public lands. |
| | State Threatened and Endangered Species Consultation | Consultation to avoid, minimize, and mitigate impacts to state-listed species. |
| | Water Appropriations Permit | A water use permit from the DNR is required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. |
| Minnesota Pollution Control Agency (MPCA) | National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit | Minimizes impacts to waters due to construction of the project. |
| | Section 401 Clean Water Act – Water Quality Certification | Ensures project will comply with state water quality standards. |
| Minnesota State Historic Preservation Office (SHPO) | National Historic Preservation Act Section 106 Consultation | Ensures adequate consideration of impacts on significant cultural resources. |
| Minnesota Department of Health | Well Construction Permit<br>Sealing Unused Wells | Required for installation of a well. Unused/abandoned well can be a conduit for contaminants that reach a drinking water source |
| Minnesota Department of Agriculture (MDA) | Agriculture Impact Mitigation Plan (AIMP) | Establishes measures for protection of agricultural resources. |
| | Utility Permit | Authorizes accommodation of utilities along highway rights-of-way |

| Table 1. Potential Permits and Approvals Required for the Sherco Solar Project | | |
|---|---|---|
| **Unit of Government** | **Type of Permit, Approval, Consultation** | **Purpose** |
| Minnesota Department of Transportation (DOT) | Driveway Access | Authorizes access to driveways along highways. |
| | Oversize/Overweight Permit | Authorizes the use of roads for oversize or overweight vehicles. |
| Minnesota Board of Water and Soil Resources (BWSR) | Wetland Conservation Act | Coordination with BWSR and local governments to ensure conservation of wetlands. |
| Minnesota Department of Labor and Industry | Request for Electrical Inspection | Comply with the state electrical code. |
| **Local/County** | | |
| Sherburne County | •The Sherburne County Zoning Ordinance, Section 16.2, Interim Use Permits, Subd 5 (21) does not allow solar farms within 1,000 ft of a lake. A portion of the proposed location of the solar farm (west) is located with the 1,000 ft area (lakes 71-143, 71-137 & 71-138).<br>•The Sherburne County Zoning Ordinance, Section 16.2, Interim Use Permits, Subd 5 (21) A7 does not allow solar farms in the Mississippi Recreational River District. The southern portion of the solar farm area (west) includes property located in the Mississippi Recreational River District.<br>•The Sherburne County Zoning Ordinance, Section 16.2, Interim Use Permits, Subd 5 (21) C9 requires that six (6) foot tall coniferous trees be planted about the entire perimeter of the solar farm.<br>•A wetland delineation submitted to Sherburne County for the Wetland Conservation Act, Technical Evaluation Plan. | Protection of County water resources. Aesthetic preservation. |
| County, Township, City | Right-of-way/utility permits<br>Overwidth/overweight loads permits<br>Road crossing permits<br>Driveway/access permits | Road safety. |

of land. To ensure that state water quality standards are not compromised, the general NPDES/SDS permit requires:

- use of best management practices,
- a stormwater pollution prevention plan, and
- adequate stormwater treatment capacity once the project is constructed.

Estimating stormwater retained for a photovoltaic solar farm project can be challenging because the panels are impervious, but the area beneath the panels is often pervious. Since the standard calculation for the water quality volume (1 inch times the impervious surface) required by the NPDES construction stormwater permit doesn't recognize the vegetated surface left in place under the panels (**Diagram 1**), the calculation may be done using the disconnected impervious credit described in the MPCA's methodology and guidelines.[28] For solar installations, the remaining water quality volume after applying the credit will still need to be treated using more traditional stormwater management practices.

The Minnesota State Historic Preservation Office (SHPO) is charged with preserving and protecting the state's historic resources. SHPO consults with project proposers and state agencies to identify historic resources (through surveys) and to avoid and minimize impacts to these resources.

The Minnesota Department of Agriculture (MDA) ensures the integrity of Minnesota's food supply while protecting the health of its environment and the resources required for food production. MDA assists in the development of *Agricultural Impact Mitigation Plans* (AIMP) to avoid and mitigate impacts to agricultural lands.

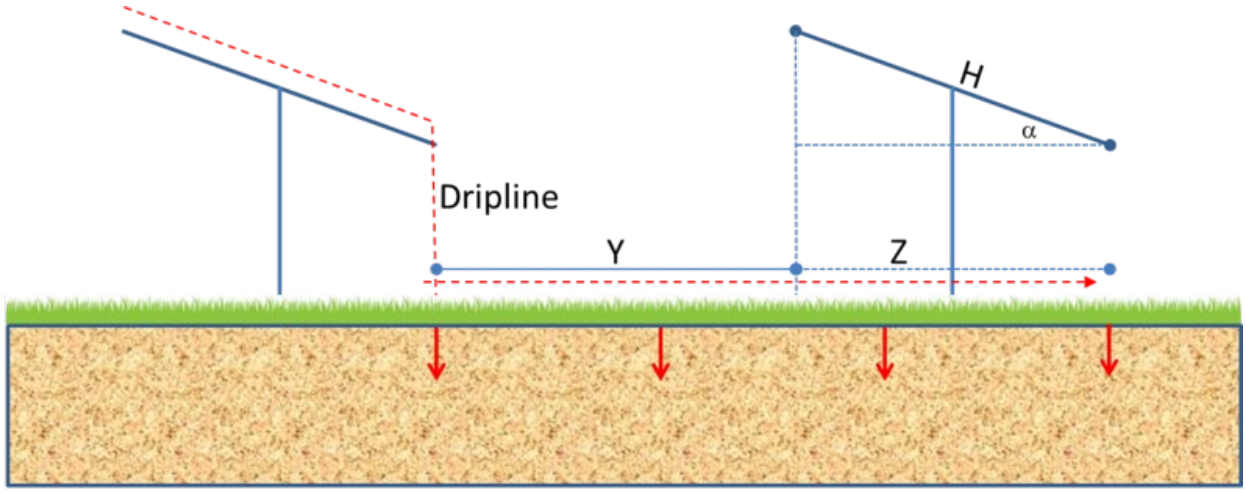
A permit from the Minnesota Department of Transportation (MnDOT) is required for transmission lines that are adjacent to or cross over Minnesota trunk highway rights-of-way (ROW). MnDOT's utility accommodation policy generally allows utilities to occupy portions of highway ROW where such occupation does not put the safety of the traveling public or highway workers at risk or unduly impair the public's investment in the transportation system.

The Minnesota Board of Water and Soil Resources (BWSR) oversees implementation of Minnesota's Wetland Conservation Act (WCA). The WCA is implemented by local units of government (LGUs). For linear projects that cross multiple LGUs, BWSR typically coordinates the review of potential wetland impacts among the affected LGUs. The WCA requires anyone proposing to impact a wetland to:

- try to avoid the impact,
- try to minimize any unavoidable impacts, and
- replace any lost wetland functions.

[28] https://stormwater.pca.state.mn.us/index.php?title=File:Solar_panels_1.png.

**Diagram 1. MPCA Stormwater Management PV Solar Facilities[29]**




Water flow path

Y = Pervious length between panels in adjacent rows

Z = Average horizontal distance below panel

H = Length of panel

α = angle of solar panel from horizontal

### 2.3.1 Local Approvals

Commission LEPGP site permits and HVTL route permits preempt local zoning, building, and land use rules, regulations, or ordinances promulgated by regional, county, local, and special purpose government; however, coordination with local governments may be required for the issues listed below:

- Access/Driveway. Coordination may be required to construct access roads or driveways from county or township roads.
- Public Lands. Coordination would be required to occupy county or township lands such as forest lands, park lands, watershed districts, and other properties owned by these entities.
- Overwidth Load. Coordination may be required to move over-width or heavy loads on county or township roads.
- Road Crossing and Right-of-Way. Coordination may be required to cross or occupy county or township road rights-of-way.

[29] https://stormwater.pca.state.mn.us/images/5/52/Solar_panels_1.png.

### 2.3.2 Conservation Programs

Conservation easements involve the acquisition of limited rights in land for conservation purposes. Landowners who offer the state a conservation easement receive a payment to stop cropping and/or grazing the land, and in turn the landowners establish conservation practices such as native grass and forbs, trees or wetland restorations. The easement is recorded on the land title with the county recorder and transfers with the land when the parcel is sold.[30] There may be lands within a proposed solar farm site that are part of various conservation programs including Reinvest in Minnesota (RIM) and the Conservation Reserve Enhancement Program (CREP).

The CREP is an offshoot of the Conservation Reserve Program (CRP) which is a land conservation program established by the U.S. Department of Agriculture and administered by the Farm Service Agency that pays farmers a yearly rental fee for agreeing to take environmentally sensitive land out of agricultural production in an effort to improve environmental health and quality. Minnesota implemented the CREP to target state-identified, high-priority conservation resources by offering payments to farmers and agricultural landowners to retire environmentally sensitive land using the Reinvest in Minnesota (RIM) Reserve Program.[31]

The Board of Water and Soil Resources (BWSR) may alter, release, or terminate a conservation easement after consultation with the commissioners of agriculture and natural resources. BWSR may alter, release, or terminate an easement only if they determine that the public interests and general welfare are better served by the alteration, release, or termination.

### 2.3.3 National Electric Safety and Reliability Code

The Project, both the solar farm and the transmission project, must meet the requirements of the National Electrical Safety Code (NESC). Permittees must comply with the most recent edition of the NESC, as published by the Institute of Electrical and Electronics Engineers, Inc., and approved by the American National Standards Institute, when constructing new facilities or upgrading existing facilities.[32]

The NESC is designed to protect human health and the environment. It also ensures that the collection system, the transmission lines and all associated structures are built from high-quality materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided that routine maintenance is performed.

[30] Board of Water and Soil Resources, http://bwsr.state.mn.us/what-are-conservation-easements.
[31] Ibid.
[32] Minnesota Statute 326B.35.

Permittees must also comply with North American Electric Reliability Corporation (NERC) standards. NERC standards define the reliability requirements for planning and operating the electrical transmission grid in North America.

# 3 Proposed Solar Farm and Alternatives

On April 20, 2021, Xcel Energy submitted a combined site permit and two high voltage transmission line route permit applications to the Commission under the alternative review process (Minnesota Statute 16E.04; Minnesota Rule 7850.2800-3900) for the Project.

During the EA scoping process, the City of Becker requested that the Environmental Assessment contain alternative siting options for the Project that would allow for the removal of the five identified parcels (East Site: PID 05-005-2400 and 05-005-3000; West Site: PID 20-134-1100, 20-134-1400, 20-134-4100). The City's concern with the proposed location for the Project centers on the fact that the solar farm footprint abuts the City's boundaries and encompasses areas of interest for future business growth and development.

Based on the City's comments and EERA staff recommendation, the *Scoping Decision* contained the following two siting alternatives:

1. Alternative 1: Modification of the site layout to remove the problematic parcels. This would involve studying the proposed project's economic viability minus the capacity (megawatt) inherent in the missing parcels (**Figure 2**).
2. Alternative 2: Modification of the site layout to remove the problematic parcels, with the addition of a portion of the 900-acre Clear Lake site (originally proposed in Sherco Solar's January 15, 2021, letter[33]) to off-set the missing capacity (**Figure 3**).

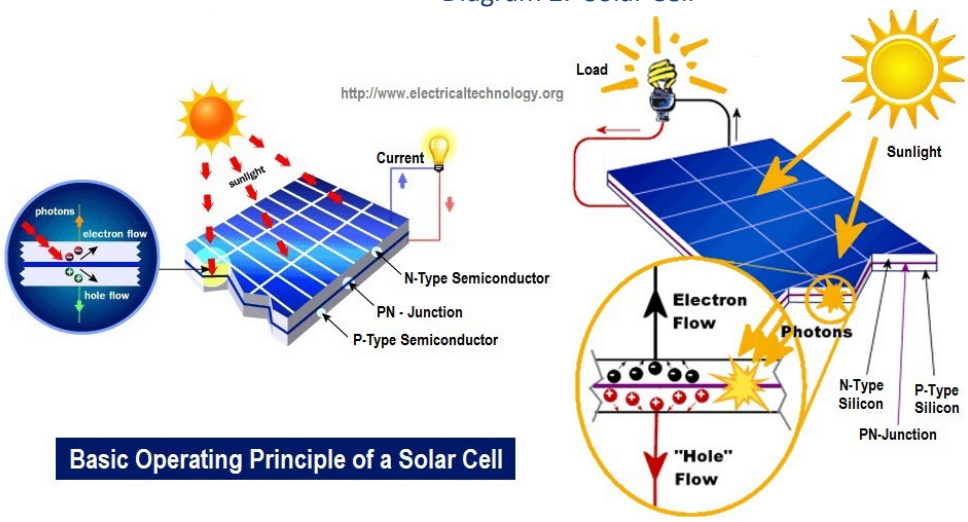
These alternative siting options are described in Sections 3.3 and 3.4.

## 3.1 PV Solar Systems

PV solar systems convert both direct and indirect solar energy (direct and scattered sunlight) to electrical energy by capitalizing on nature's inherent desire to keep electrical charges in balance (**Diagram 2**). At the most basic level, electrical current is the flow of electrons through a conductor. When solar radiation strikes a PV cell some of it is absorbed, exciting electrons within the cell. Some of these electrons move freely between layers from negative to positive. In the process, electrons from the positive layer are disrupted and "flow" back to the negative layer through the external load creating a continuous flow of electrons, or a continuous flow of electric current.

[33] NGR Letter to City of Becker (Jan. 15, 2021), eDocket No. 20219-177995-07.

Diagram 2. Solar Cell [34]




PV Solar farms can be configured as a fixed or tracking system. Permanently mounted in a stationary position, fixed systems are aligned to gather the greatest level of solar radiation over the course of the year. Tracking systems increase efficiencies by orientating the PV panels towards the sun. There are both single axis and dual axis tracking systems. Single axis systems track the sun from east to west throughout the day. Dual axis systems track the sun both east to west throughout the day and north to south throughout the year.

PV cells generate direct current (DC) electricity, which must be converted to alternating current (AC) electricity before reaching the electrical grid. Solar panels are arranged into electrically connected blocks and connected to inverters. An inverter converts DC electricity to AC electricity. Transformers then step up the electrical voltage before the electrical power is collected through a collection system. Collection systems combine the electricity from across the array and deliver it to one location.

## 3.2 Sherco Solar Project

The Project is proposed due to ceasing operations of Unit 2 of the SGP which will cease operations by the end of 2023. The Commission previously approved ceasing operations of Unit 2 and upon cessation, the existing interconnection capacity must be repowered or retired by Xcel Energy under the Midcontinent Independent System Operator (MISO) generating facility replacement process.

The Applicants states that the Project will replace a portion of the nearly 700 MW of energy generated by Unit 2 of the SGP. The Applicants states that this plan represents a key milestone step in Xcel Energy's clean energy transition, which targets 100 percent carbon free electricity by 2050 and 80

[34] Source: https://www.electricaltechnology.org/2015/06/how-to-make-a-solar-cell-photovoltaic-cell.html.

percent less carbon by 2030. The addition of this resource will increase the solar energy produced on Xcel Energy's system by more than 40 percent from currently expected levels and increase the system to a total of approximately 40 percent renewable energy.[35]

Xcel Energy has indicated that they decided to accelerate its plans to add solar generation capacity at the SGP in response to the Commission's Inquiry into Utility Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic.[36]

According to the Applicants, NG Renewables and Xcel Energy were each developing solar generation facilities adjacent to the SGP prior to issuance of the RFP. NG Renewables was developing a project to the west of the SGP and had secured purchase options and leases through its subsidiary, Sherco Solar, LLC (Sherco Solar) sufficient to site up to 230 MW of solar generating capacity. Xcel Energy was developing a project to the east of the SGP and had secured land leases through an affiliate sufficient to site up to 230 MW of solar generating capacity. NG Renewables and Xcel Energy elected to combine the two developments into one project, the Project, with the goal of providing up to 460 MW of solar energy capacity being requested by Xcel Energy in the RFP in a timely manner to maximize job creation during the COVID-19 pandemic.[37]

### 3.2.1 Project Description

The solar farm consists of an up to 460 MW solar photovoltaic (PV) facility located in southwestern Sherburne County, Minnesota. The Project would interconnect into the Sherburne County Substation, which is adjacent to the solar farm. Xcel Energy and NG Renewables selected this location based on a number of factors, but a key consideration in the selection process was the site's proximity to existing electrical and transportation infrastructure, including the SGP, existing transmission lines, and the Sherburne County Substation, which will soon have capacity as a result of ceasing operation of Unit 2 of the SGP. Additionally, the agricultural areas surrounding the SGP provide abundant opportunity for solar generation on relatively flat landscapes, with few sensitive resources, that have been previously disturbed by agricultural activities with few sensitive resources. Existing infrastructure in the immediate vicinity of the site, together with Xcel Energy owned property, allows the Applicants to minimize the need to construct ancillary facilities on private land not owned by Xcel Energy.

NG Renewables will develop the Project and secure a site and two route permits on behalf of Xcel Energy for the solar project site and the West and East HVTL routes prior to construction. Xcel Energy will construct, own, and operate the Sherco Solar Project (LEPGP and HVTLs). The Project will partially

[35] SPA, Section 1.1.
[36] Ibid.
[37] Ibid.

replace the energy generation of the SGP's Unit 2 coal generating facility, which will cease operations by the end of 2023.

Xcel Energy plans to construct the Project on a schedule that facilitates an in-service date by the end of 2024.

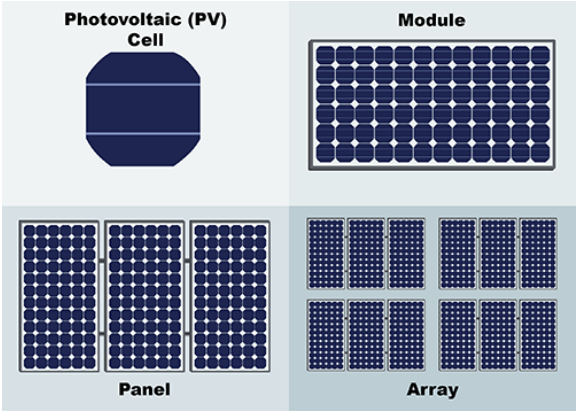
The Project's primary solar components include PV panels affixed to linear ground-mounted single-axis tracking systems, inverters and transformers housed in electrical cabinets, electrical collection system, project substation, and SCADA systems and metering equipment. It also requires fencing, access roads, laydown areas, and weather stations.

Sets of panels will be electrically connected in series and terminated at an inverter. The inverters will convert the DC power (approximately 1,500 volts) from the panels to AC power (650-950 volts depending on the inverter specifications). Next, a transformer will step up the AC voltage of generated electricity from the inverter output voltage to 34.5 kV. From the transformers, electrical cable will be buried below-ground for routing to the collector substations where the electricity will be stepped up from 34.5 kV to 345 kV to interconnect to the existing transmission infrastructure.

### PV Array

The most visible component of the solar farm will be the PV arrays. To limit reflection, solar PV panels are constructed of dark, light-absorbing materials. Multiple PV cells are combined into modules to generate greater quantities of electricity. Modules are encased in glass and sealed within an aluminum frame; modules are further combined into panels that are arranged in electrically connected blocks throughout the solar farm. Taken together, the panels are referred to as a solar array (**Diagram 3**).

Diagram 3. Photovoltaic cells, modules, panels, and arrays[38]




[38] http://www.fsec.ucf.edu/en/consumer/solar_electricity/basics/cells_modules_arrays.htm.

The solar farm will utilize photovoltaic (PV) panels with tempered glass; the size of the panels will vary from approximately 4 to 6.5 feet long by 2 to 3.5 feet wide, and 1 to 2 inches thick. The panels will be installed on a tracking rack system that utilizes galvanized steel and aluminum for the foundations and frame with a motor that allows the racking to rotate from east to west throughout the day (**Diagram 4**).

Diagram 4. Arrays Mounted onto Tracking Rack System[39]

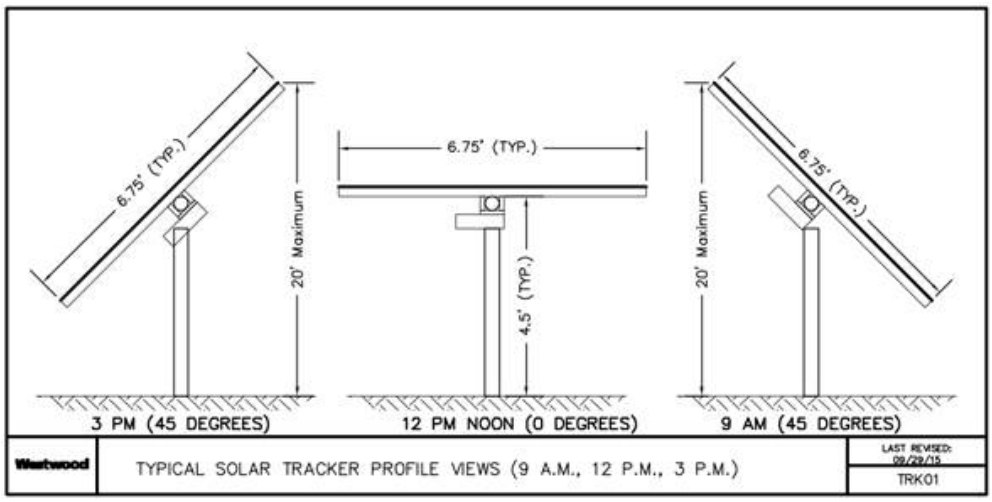
The Applicants anticipate the use of bifacial solar modules, those that produce solar power from both sides of the panel. Bifacial modules are increasingly becoming the industry standard, and some manufacturers estimate a 30 percent increase in production from the additional power generated by the rear side of the panel.[40] While bifacial panels can result in higher panel costs when compared to traditional, back-sheeted, mono-facial modules, the increased panel output is expected to offset any additional costs and results in a more cost-effective Project.

Each tracking rack will contain multiple panels. On the tracking rack system, panels will be approximately 15 feet in height from the ground to the top of the panels when at a 45-degree angle (**Diagram 5**). Height may vary due to manufacturer, topography and vegetation constraints and could reach a height of approximately 20 feet from the ground. Depending on the technology selected, the PV panels may have an aluminum frame, silicon, and weatherized plastic backing or a side-mount or

[39] http://www.esolarfirst.com/goodsolarmounting/169.html.
[40] Solar Power World, *What are bifacial solar modules?*, April 2, 2018.

under-mount aluminum frame, heat strengthened front glass, and laminate material encapsulation for weather protection.

Diagram 5. Tracking Rack System Dimensions[41]




The tracking rack system is mounted on top of steel piers that are typically driven or augured into the ground, without a need for excavation or concrete to install the piers. The solar array will occupy most of the development area of the solar farm site.

The linear axis tracking rack system allows the PV panels to track the solar resource throughout the day. The panels and tracking rack system are generally aligned in rows north and south with the PV panels facing east toward the rising sun in the morning, parallel to the ground during mid-day, and then west toward the setting sun in the afternoon. The panels are rotated by a small motor connected to the tracking rack system to slowly track with the sun throughout the day. The tracking rack system allows the solar farm to optimize the angle of the panels in relation to the sun throughout the day, thereby maximizing production of electricity (capacity factor).

The tracking rack system is mounted on top of steel piers that are typically driven into the ground, without a need for excavation or concrete to install the piers (**Diagram 6**).

### Inverters, Transformers, and SCADA Systems

Inverter skids centralized within PV panel blocks will house inverters, transformers, and *Supervisory Control and Data Acquisition* (SCADA) equipment. These metal skids will be approximately 10 feet wide by 25 feet long and 12 feet in height. From a distance, they will appear similar to a small semi-

[41] SPA, p. 17, Image 4.

Diagram 6. Standard Steel Pier Foundations[42]

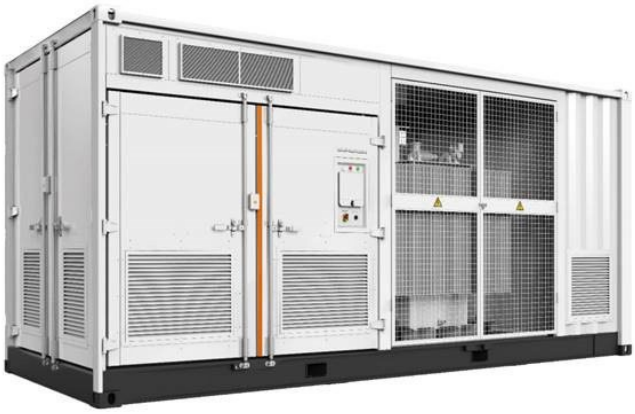
trailer box (**Diagram 7**); as an example, full length semi-trailers are usually 48 to 53 feet long, eight feet wide, and eight feet tall. The skids will be placed on concrete or pier foundations along access roads. The Applicants states that one inverter will be required for every two to three MW of electricity. Therefore, based on this estimate, up to 110 skids (55 inverters in the West Block and 55 inverters in the East Block) might be needed.[43]

### Electrical Collection System

An electrical collection system will collect DC electricity generated by the solar panels and funnel it to the inverter skid where it will be converted to AC electricity. The system then directs the AC electricity to the project substation. This happens within individual panel blocks across the array. The Applicants

[42] SPA, at p. 18, Image 2.2-4.
[43] SPA, p. 20.

Diagram 7. Typical Inverter and Transformer Station[44]



indicates the electrical collection system may be installed in either a below-ground, an above-ground, or a hybrid (combination of both) collection system.[45]

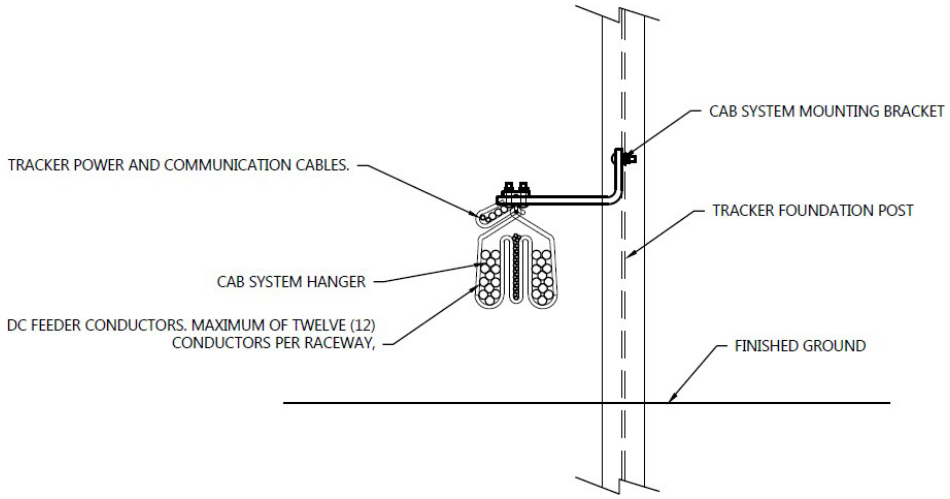
Above-ground System: DC collection cables will be located underneath each panel row on steel arms attached to the foundation posts (**Diagram 8**). Hanging brackets would connect panel blocks to a common collection point where the cables would be routed below-ground to an inverter skid. The AC power will be routed below-ground to a distribution-type pole. The electrical cables will be strung on poles to the project substation. These poles would be made of wood, approximately 18 inches in diameter, up to 30 feet tall, and spaced approximately 200 feet apart.[46]

Below-ground System: For each panel block, DC collection cables will be routed below-ground (approximately four feet deep and one to two feet wide) to an inverter skid. The AC power will then be routed below-ground to the project substation. During all trench excavations the topsoil and subsoil will be removed and stockpiled separately in accordance with the AIMP. Once the cables are laid in the trench, the area will be backfilled with subsoil followed by topsoil.[47]

Hybrid System: Similar to the above-ground system, DC collection cables will be located underneath each panel row on steel arms attached to the foundation posts and supported by a steel cable. Hanging brackets would connect panel blocks to a common collection point where the cables will be routed below-ground to an inverter skid. The AC power will then be routed below-ground to the project substation.

[44] SPA, at p. 20, Image 2.2-6.
[45] SPA, at p. 19.
[46] SPA, at pp. 19-20.
[47] Ibid, at pp. 18-19.

Diagram 8. Typical Above-Ground Collection Hanging Bracket[48]




## Associated facilities

The following facilities will be permitted as part of the Project.

Project Substation: The solar farm will require two collector substations: the West Collector Substation, which will collect power from the West Block of the solar farm and the East Collector Substation, which will collect power from the East Block of the solar farm. The West Collector Substation is located on the eastern edge of the West Block; its location was selected to minimize the length of the associated transmission line (**Figure 4**) and to accommodate potential future development and transmission expansion. The East Collector Substation is located on the western edge of the East Block and was selected to minimize the length of the associated transmission line (**Figure 5**), avoid impacts to residences and agricultural buildings along 137th Street, and to accommodate potential future development and transmission expansion. The locations were chosen to allow for potential future interconnections into the substations as peripheral substations to the Sherburne County Substation. Allowing future interconnections to the West and East Collector Substations will limit the transmission infrastructure needed for future development or transmission projects to interconnect to the Sherburne County Substation in an area that is currently significantly developed with existing transmission infrastructure.

Both the West and East Collector Substations will be 34.5/345 kV step-up substations with metering and switching gear required to connect to the transmission grid at the Sherburne County Substation. The area within the substation will be graveled to minimize vegetation growth in the area and reduce fire risk. The substations will be fenced with a 7-foot chain-link fence, topped with one foot of barbed wire for security and safety purposes (8-foot total height). The West and East Collector Substation

[48] SPA, at p. 20, Image 7.

areas will be approximately 300 feet by 850 feet once construction is complete. The substations proposed for this Project are designed not only for the collection needs associated with the solar Project, but the area in which they will be located was sized to accommodate additional substation infrastructure for potential future generation.

Access Roads: Approximately 33.8 miles of 16-foot wide (wider along curves at internal road intersections, approximately 45 feet) graveled access roads will be constructed and will lead to the inverters and project substation to provide access for maintenance activities. Access roads will also be constructed around the project perimeter to reduce the chance of fire reaching the solar array.

Upgrades to public roads may be required, which could include general improvements, additional aggregate, and driveway changes. If granted permit approvals by the Commission, the former Applicants (then Permittee) would be responsible to pay for these upgrades and to coordinate with the LUGs.

Construction crews will use the space between panel rows to access the project once foundations posts are driven. These temporary access corridors will not be improved or augmented with additional materials but will be easily identified as a function of the construction process as foundation posts would be installed first.

Security: The entire solar farm area will be fenced to prevent the public from gaining access to the electrical equipment, which could cause injury. The solar array will be enclosed by an agricultural style woven fence. The fence will be six feet tall and topped with three to four strands of smooth wire angled at 45 degrees. In total, the fence will be about 7 feet tall. The project substation will be enclosed in a chain-link fence topped with barbed wire (to comply with the National Electric Code). The project will also have security cameras and down lit lighting at select locations.

The solar farm will also have security cameras and security lighting at the entrances that will be down-lit to minimize light pollution. The typical pole height will be ten feet and manually operated by switch as well as motion activated if an intrusion is detected. There will be lights at each inverter that will be downlit and switch controlled for repair purposes.

Weather Stations: Up to 12 weather stations may be constructed. These stations will be mounted on 20-foot wood poles and be located within the developed area of the solar farm (**Diagram 9**).

Diagram 9. Weather Station[49]

Operation and Maintenance Building: The solar farm will not have a dedicated operations and maintenance (O&M) building; instead, O&M will be based out of the SGP, which is central to the Project. There is available parking, storage for extra materials, and office space within the SGP site.

Temporary Facilities: The Project contractors will utilize five temporary laydown areas: four laydown areas covering six acres in the West Block and one laydown area covering one-half acre in the East Block. These five laydown areas will all be located within the fence line of the Solar Project (**Figures 4 and 5**).

Two additional laydown areas outside the fence line and on Xcel Energy property may be used during construction. One 10.0-acre laydown area is located on the eastern edge of the West Block in cultivated cropland and the second 10.1-acre laydown area is located on the western edge of the East Block within the SGP fence line (**Figures 4 and 5**). These areas are anticipated to be graveled during construction and serve both as a parking area for construction personnel and staging areas for Project components during construction. These laydown areas have been sited to avoid any tree clearing. After construction, the laydown areas within the solar farm fence line will be seeded as described in

[49] SPA, at p. 23, Image 2.2-7.

the Vegetative Management Plan (VMP); the laydown area outside the solar farm fence line in agricultural land is anticipated to return to agricultural use and the laydown area at the SGP will return to its passive use.

Transmission System: The solar farm will interconnect into the existing Sherburne County Substation via two 345 kV overhead gen-tie transmission lines (**Figure 6**). The West HVTL will connect the West Collector Substation to the Sherburne County Substation via a 3.2-mile transmission line. The East HVTL will connect the East Collector Substation to the Sherburne County Substation via a 1.7-mile transmission line. A description of these HVTLs is presented in **Section 4.0** of this document.

Stormwater Drainage Basins: Preliminarily designs contain 11 stormwater drainage basins located throughout the project footprint and range in size from 0.2 to 4.8-acres. These basins are located in existing low areas that also contain hydric soils; these areas will be vegetated with a wet seed mix to help stabilize soils and minimize soil erosion after rain events.

### 3.2.2 Project Purpose

The Project is proposed due to ceasing operations of Unit 2 of the SGP which will cease operations by the end of 2023. The Commission previously approved ceasing operations of Unit 2 and upon cessation, existing interconnection capacity must be repowered or retired by Xcel Energy under the Midcontinent Independent System Operator (MISO) generating facility replacement process. The plan to add solar adjacent to the SGP is consistent with the Order approving Xcel Energy's 2016-2030 Resource Plan[50] and its 2020-2034 Upper Midwest Integrated Resource Plan currently before the Commission. The Project will replace a portion of the nearly 700 MW of energy generated by Unit 2 of the SGP.[51]

### 3.2.3 Project Location

The proposed site for the Project is in Clear Lake Township and Becker Township in Sherburne County, Minnesota (**Figure 1**). The solar portion of the Project is proposed in two distinct blocks, which collectively create the solar farm. The solar farm covers 3,479.4 acres and is comprised of the West Block (1,653.7 acres), which is located on the west side of the SGP and the East Block (1,825.7 acres), which is located on the east side of the SGP. **Table 2** provides the township, range, and section for the solar farm. The total nameplate capacity for the proposed solar facilities is up to 460 MW AC.

[50] Commission Order Approving Plan with Modifications and Establishing Requirements for Future Resource Plan Filings (January 11, 2017) at Order Point 4a, Docket No. E002/RP-15-21.
[51] SPA, Section 1.1.

Table 2. Township, Range, and Section – Sherco Solar Project[52]

| Facility | Acres | Township Name | Township | Range | Section(s) |
|---|---|---|---|---|---|
| West Block | 1,653.7 | Clear Lake | 34 N | 29 W | 22, 26-28, 34 |
| East Block | 1,825.7 | Becker | 33 N | 28 W | 5, 7-8, 16-17 |
| | | Becker (city) | 33 N | 28 W | 7 |

The Applicants selected this specific site based on the need to replace a portion of the energy production being lost by ceasing operation of Unit 2 of the SGP, significant landowner interest, transmission and interconnection suitability and availability, adequate solar resource, and minimal impact on environmental resources. The area within the existing SGP site was not optimal due to plans to continue coal generation operations at the existing site through 2030. Additionally, the land in the City of Becker and Becker Township, between the SGP and the Project, is being reserved for commercial and industrial development expansion. Xcel Energy has designated approximately 1,300 acres of land within and surrounding the existing SGP for future economic development. The available acreage is being actively marketed by both Xcel Energy and the City of Becker and is either located within the City boundary or is under an orderly annexation agreement between the City and Becker Township.[53]

The Applicants have a combination of lease agreements and purchase options with the landowners for the Project. Prior to construction, lease agreements and purchase options will be assigned to Xcel Energy. The Project will be constructed, owned, and operated by Xcel Energy.

### 3.2.4 Project Layout

The solar farms' ultimate layout (**Appendix B**) depends on several factors designed to optimize the generation, while avoiding and mitigating potential impacts to the natural and built environments. The Applicants have stated the Project facilities will be sited to comply with Sherburne County and Becker Township setback requirements.[54] After the Application was filed, one of the non-participating landowners in the southwestern corner of the West Block elected to sign a lease for two portions of its land totaling approximately 4.1 acres on the east and west sides of the landowner's home (**Appendix B, Plate W-4**). The Applicants have not designed Project infrastructure for this land but believes the eastern portion of the land could be utilized for an access road and the western portion could be utilized for solar panels, temporary laydown areas or construction parking.

The setback regulations for solar energy systems in Sherburne County and Becker Township are provided in **Table 3**.

[52] SPA, at p. 9, Table 2.1-1.
[53] SPA, Section 2.1.2.
[54] SPA, Section 2.2.2.

Sets of panels will be electrically connected in series and terminated at an inverter. The inverters will convert the DC power (1,500 volts) from the panels to AC power (650-950 volts). Next, a transformer will step up the AC voltage of generated electricity to 34.5 kV. From the transformers, electrical cable

Table 3. Solar Project Setback Requirements[55]

| Feature | Setback Requirement (feet) to solar array | Project Design (at closest) |
|---|---|---|
| Neighboring Property Lines (property lines of participating landowners within project boundaryare exempt) | 50’ | 52’ |
| Township Road | 67’ | 94’ |
| County Road | 50’ | 89’ |
| County State Aid Highway | 70’ | 102’ |
| Highways 24 or 25 | 80’ | NA |
| U.S. Highway 10 | 100’ | 288’ |
| Side or rear, accessory structures (applied on property lines on the outside edges of the Projectboundary) | Up to 50’ | 52’ |
| County Ditch | 50’ | NA |
| Structure Setback in Shoreland Overlay District[1] | 150’ | 153’ |
| Expanded Right-of-Way along County Road 53 [2] | 65’ | 88’ |

[1] Xcel Energy has applied the structure setback of 150’ in this overlay district.

[2] Based on coordination with the City of Becker, Xcel Energy used a larger setback to accommodate anexpanded water and sewer easement.

Sources: Sherburne County, 2018; Becker Township, 2019.

will be buried below-ground, or pole mounted above-ground for routing to the solar farm substations where the electricity will be stepped up to 345 kV to interconnect to the existing transmission infrastructure.

Acreage required for the solar farms’ various components is described in **Table 4**.

### 3.2.5 Project Schedule and Cost

The anticipated schedule for the solar farm is provided in **Table 5**, the major milestones for the solar farm include: Land acquisition, Site Permit, “Downstream” Permits, Equipment Acquisition, Construction, Commercial Testing, Commercial Operation. The Project is being developed to facilitate an in-service date by the fourth quarter 2024. Xcel Energy states that commercial operation for

[55] SPA, at p. 25, Table 2.2-1.

portions of the Project may be phased in beginning in 2023 to accommodate an in-service date for the entire Project by Q4 of 2024. The expected service life of the Project is 25 to 40 years, and the Applicants estimate that the Project will result in up to 24 full-time permanent positions to operate and maintain the facilities.[56]

Table 4. Estimated Project Facility Acreages within Solar Farm Footprint[57]

| Project Facilities | Acres |
|---|---|
| Access Roads | 66.4 |
| Inverters | 0.2 |
| West Collector Substation | 5.9 |
| East Collector Substation | 5.9 |
| Laydown Areas (within fence) | 6.6 |
| Laydown Areas (outside fence – for construction only) [1] | 20.1 |
| Solar Panels | 2,901.0[2] |
| Stormwater Basins | 18.1 |
| **Project Total** | **3,024.2** |

[1] The laydown areas are temporary impacts to be used only during construction.
[2] The impacts associated with solar panels include the open grass area between every row of panels

Table 5. Estimated Solar Farm Schedule[58]

| Project | Activity | Estimated Activity Dates |
|---|---|---|
| Solar Project | Land Acquisition | Complete |
| | Site Permit Approval/Issuance | Q1 2022 |
| | Other Federal, State, and Local Permits Issued (see Table 7.0-1) | Q2 2022 |
| | Final Commercial Operation | Q4 2024 |
| West HVTL Project | Land Acquisition | Complete |
| | Survey and Transmission Line Design Begins | Q4 2020 |
| | Route Permit Approval/Issuance | Q1 2022 |
| | Other Federal, State, and Local Permits Issued | Q2 2022 |
| | West HVTL Project In-Service | Q4 2023 |
| East HVTL Project | Land Acquisition | Complete |
| | Survey and Transmission Line Design Begins | Q4 2020 |
| | Route Permit Approval/Issuance | Q1 2022 |
| | Other Federal, State, and Local Permits Issued | Q2 2022 |
| | East HVTL Project In-Service | Q4 2024 |

[56] SPA, at p. 94.
[57] SPA, at p. 25, Table 2.2-2.
[58] SPA, Appendix B, Table 1.3-1.

Applicants' total estimated costs for the Sherco Solar Project is $621 million (**Table 6**). The total installed capital costs for the solar portion will depend on variables including, but not limited to, construction costs, taxes, tariffs, and panel selection, along with associated electrical and communication systems, and access roads. The total estimated cost of the West HVTL Project along the proposed West Route is approximately $6.9 million. The total estimated cost of the East HVTL Project along the proposed East Route is approximately $3.7 million. These estimates are engineering estimates and expected to reflect actual Project costs within 20 percent. Final Project costs are dependent on a variety of factors, including the approved route, timing of construction, cost of materials, and labor.

Table 6. Estimated Project Cost[59]

| Category | Total |
|---|---|
| **Capital** | *$570,546,595* |
| **Transmission** | *$10,548,800* |
| **POI Substation** | *$4,981,000* |
| **AFUDC** | *$35,956,822* |
| **Total** | ***$ 621,943,217*** |

### 3.2.6 Project Construction

Construction cannot not begin until the Applicants obtain the necessary approvals. All activities must comply with the LEPGP Site Permit conditions and requirements of any "downstream" permits.

The Applicants anticipate nearly 900 workers (laborers, supervisory personnel, support personnel, and construction management personnel) at the project site during construction and approximately 24 long-term employees for operation and maintenance.[60] The Applicants plan for construction activities to occur between 7 a.m. and 5 p.m., Monday through Saturday. In some cases, construction activities may occur outside of these times. In situations where activities such as testing or commissioning need to be performed outside of daylight, temporary lighting for these activities will be provided.

Construction equipment such as scrapers, dozers, dump trucks, watering trucks, motor graders, vibratory compactors and pile drivers, pickup trucks, skid steer loaders, medium duty cranes, all-terrain forklifts, concrete truck and boom truck, high reach bucket truck, auger or drill rigs, and backhoes will be used during construction.

[59] Communication Xcel Energy, March 14, 2022.
[60] SPA, p. 94.

A Project-specific safety plan will be developed and implemented. The plan will outline safety rules and procedures required on-site. All personnel will be required to complete a safety orientation and training. Weekly safety meetings will occur. At the start of work each day, crews will perform a field level hazard assessment to review hazards associated with work to be completed that day.

The preliminary list of activities necessary to develop the Project include:

- Pre-construction
  - Geotechnical analysis.
  - Design substation and electrical collection system.
  - Design solar array, access roads, and O&M building.
  - Underground utility discovery; and
  - Procure all necessary facility components (solar panels, tracking system, and transformers).
- Construction
  - Site preparation, grubbing, and grading.
  - Construct laydown areas and set up temporary job site trailers.
  - Construct fencing.
  - Civil construction of access roads.
  - Install PV mounting posts.
  - Install below-ground or above-ground collection system.
  - Install electrical enclosure/inverter.
  - Tracker installation.
  - PV panel installation; and
  - Construct gen-tie line.
- Post-construction
  - Restore disturbed areas not intended for permanent above-ground facilities. Permanent above-ground facilities include the substation, inverter skids and electrical cabinets, and access roads.
  - Implementation of the approved VMP and AIMP.
  - Test facility; and
  - Commence commercial operation.

### 3.2.7 Project Decommissioning

If granted a LEPGP site permit from the Commission, the Permittee would be required to submit a formal *Decommissioning Plan* with updates every five years in accordance with the LEPGP Site Permit

(**Appendix C**).[61] Information in this section is adapted from the draft Decommissioning Plan contained within Appendix H of the Sherco Solar Project application for a site permit.[62]

The anticipated service life of the project is 35 years.[63] At the end of the Project's useful life, Xcel Energy will either take the necessary steps to continue operation of the Project (re-permitting and retrofitting) or will decommission the Project.

At the time of decommissioning the Permittee will be responsible for removing the solar facilities and restoring the site to prior conditions.

The overhead electrical lines associated with the Project substation and electrical collection system (poles, conductors, switches, and lines) will be removed and hauled off-site to a recycling facility or disposal site. Underground infrastructure such as pole foundations will be removed down to four feet below grade (unless a landowner requests the Permittee otherwise). Pole foundation holes will be filled with a suitable clean compactable material. Topsoil will be applied and the areas re-vegetated to pre-construction conditions.

Pad mounted inverters and transformers will be disconnected and removed from the site. The concrete pads will be crushed and hauled offsite.

Unless a landowner requests the Permittee otherwise, access roads, will be removed and the land will be restored to pre-construction conditions.

Underground collection lines buried above four feet below the surface will be removed. Underground collection buried greater than four feet below the surface will be abandoned in place unless otherwise requested by the landowner. In certain cases, landowners may wish to abandon underground collector lines in place when located above four feet below the surface to minimize impacts to the environment. Site permits issued by the Commission require that any agreement between landowners and Permittee to leave underground cables in place at a lesser depth or no removal must be recorded with the county and show the location of all remaining infrastructure. If the cables are to be removed, a trench will be opened the cables pulled out, cut into manageable lengths, and removed from the site.

All unsalvageable materials will be disposed of at authorized sites in accordance with applicable regulations.

[61] PUC staff Briefing Papers Application Acceptance, Sample Permit Item 9, June 29, 2021. eDocket No. 20216-175526-03.
[62] SPA, at pp. 33-35, Appendix H.
[63] Ibid, p. 33.

After dismantling the Project, the Permittee would remove components having salvage value. Generally, functioning panels, transformers, electrical components, steel pier foundations, and transmission poles are refurbished and resold or are recycled for scrap. Unless expressly requested by the landowner, non-salvageable material will be broken down for transport, removed from the site, and disposed at an authorized site in accordance with applicable regulations.

Xcel Energy estimates the decommissioning costs for the solar farm to be approximately $13 million out of a net total cost of approximately $48 million (salvage value for the solar farm is estimated at $35 million).[64]

## 3.3 Solar Farm Alternative 1

The Solar Farm Alternative 1 (Alternative 1) would consist of the removal of portions of the Project's East Block and West Block areas (**Figure 2**) which under the existing proposal would contain solar modules, tracking and racking systems, inverters, underground collection lines, access roads, and associated infrastructure capable of producing 27.8 MW AC of nameplate capacity; based on the preliminary design, this alternative would result in a nameplate capacity of 432.2 MW.[65] No replacement/substitution parcels for solar development are considered under this alternative.

Alternative 1 was developed through the EA scoping process to address concerns raised by the City of Becker. The City of Becker believes that harm to the city (and its residents, businesses, and the broader community) would occur through the loss of the future development potential (and the associated benefits in jobs and revenue) from the five identified parcels.[66]

Alternative 1 would remove 3 parcels from the Project's West Block totaling approximately 120.3 acres. Two additional parcels totaling approximately 126.4 acres would be removed from the East Block. In total, Alternative 1 would reduce the Project area from 3,483.6 acres to 3,237.0 acres.

The parcels are identified as 20-134-1100, 20-134-1400, 20-134-4100, 05-005-2400, and 05-005-3000 (**Figure 2**).

No changes to the proposed transmission routes (West or East HVTL projects) are necessary to accommodate Alternative 1.

## 3.4 Solar Farm Alternative 2

[64] SPA, at Appendix H, p. 18.
[65] Xcel Energy Memorandum Communication, December 22, 2021.
[66] City of Becker White Paper, February 7, 2022. eDocket No. 20222-182514-03, 06, 09, 12, 15, and 18.

The Solar Farm Alternative 2 (Alternative 2) would consist of the removal of the same parcels and solar farm components, as identified for Alternative 1; however, Alternative 2 provides replacement/substitution parcels for solar development taken from the previously considered Clear Lake site (originally proposed in Sherco Solar's January 15, 2021, letter) and added to the proposed Project (**Figure 3**).[67] This would replace the reduction in lands considered in Site Alternative 1 to maintain the nameplate capacity of the Project at 460MW under the assumptions contemplated in the preliminary design submitted with the Site Permit Application.

Alternative 2 would add an additional 246.8 acres of Project area to accommodate the solar array footprint, and an additional 37.4 acres of Project area to accommodate a 1.9-mile corridor of underground collection cable to transport the energy produced at the new site (Clear Lake) to the revised West Block boundary.[68]

The total Project Area from the reduced West Block, reduced East Block, and additional lands considered in Alternative 2 (Clear Lake and collection cable corridor) would be approximately 3,521.3 acres, an increase of 37.7 acres from the initially proposed 3,483.6 Project. A preliminary site layout of Alternative 2 is provided in **Appendix D**.

The energy produced by this Alternative would be transported via medium voltage 34.5 kV underground collection lines to the West Block substation, and existing collector easement agreements with the landowners for the corridor dictate that the medium voltage corridor be installed underground either by cable plowing, or alternatively open trenching, depending on engineering considerations encountered along the route. Additionally, one public waterbody crossing and 2 road crossings along the corridor would be crossed via horizontal direction drilling (HDD) methods.

No changes to the proposed HVTL routes (West or East) would be necessary to accommodate Alternative 2.

[67] NGR Letter to City of Becker (Jan. 15, 2021), eDocket No. 20219-177995-07.

[68] Xcel Energy Memorandum Communication, December 22, 2021.

# 4 Proposed Transmission Project

The Applicants propose to connect the Sherco Solar Project to the electrical grid through two new 345 kV transmission lines, one servicing the west solar block (West HVTL Project) and one servicing the east solar block (East HVTL Project). The West HVTL Project and the East HVTL Project qualifies for review under the Alternative Permitting Process because the length of each of the 345 kV lines is less than five miles.

## 4.1 West HVTL Project

The West HVTL route begins at the proposed Project's west collector substation to be constructed on the east side of the West Solar Block (**Figure 6 and 7**) along 115th Avenue SE (County Road 53) and approximately one-quarter mile north of River Road SE (CSAH 8). The west route will then generally travel south and east for approximately three miles to the existing Sherburne County Substation.

From the West Collector Substation, the west route runs south on the west side of 115th Avenue SE (County Road 53) within the solar farm for three-quarters of a mile before crossing to the east side of 115th Avenue SE (County Road 53) to avoid a residence, continuing south to the intersection of 115th Avenue SE (County Road 53) and River Road SE (CSAH 8). The route then turns east on the north side of River Road SE (CSAH 8) for one mile before turning south on the west side of 125th Avenue SE (County Road 52). At the intersection of River Road SE (CSAH 8) and 125th Avenue SE (County Road 52), the route enters the fenced area of the SGP. The route follows the east side of 125th Avenue SE (County Road 52) for one mile to avoid the existing ash storage associated with the coal plant on the west side of 125th Avenue SE (County Road 52). The route then courses around the west side of the SGP by turning west for 0.2 mile then south for 0.5 mile and then east for 0.3 mile into the Sherburne County Substation (**Figure 6 and 7**).

There are no substation improvements at the Sherburne County Substation required outside the existing footprint; this point of interconnection has capacity for the necessary equipment within its existing footprint.

The West HVTL will be constructed, owned, and operated by Xcel Energy.

### 4.1.1 Route Width, Right-of-Way, and Anticipated Alignment

When the Commission issues a route permit, it approves a route, a route width, and an anticipated alignment within that route width.

- **Route**: The path the transmission line will follow between the solar farm's Collector Substation to the grid interconnect substation (Sherburne County Substation). Under Minnesota Statute 216E,

subd. 8, the route may have a variable width of up to 1.25 miles.

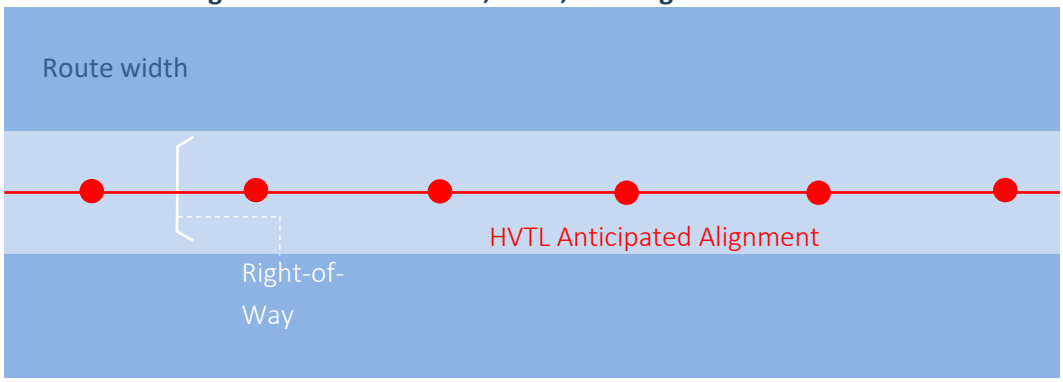
- **Right-of-Way (ROW)**: The ROW is the physical land area within a route that is needed to construct and operate an energy facility; usually represented as the required easement.
- **Route Width**: The area along the route within which the actual ROW will be placed. The route width is typically larger than the ROW to provide flexibility to address engineering, human (landowner preferences) and environmental concerns that arise after the permit has been issued.
- **Anticipated Alignment**: A representation of the location of the poles and conductors within the ROW. In many cases, the poles would be placed in the center of the ROW, but in some areas, such as along certain roads, developers will propose to place the structures within, but near the edge of existing road ROW, outside of the travel lanes.

The Commission may include conditions in a route permit (see sample route permit in **Appendix C**). These conditions address the route width and anticipated alignment in a specific area of the project, for example, requiring the alignment of a specific portion of the route to be north rather than south of a road, or requiring that the route width be narrower than initially requested in certain areas.

### Route Width

The route width is typically larger than the actual ROW needed for the transmission line (**Diagram 10**). This additional width provides flexibility in constructing the line yet is not of such extent that the placement of the line is undetermined. The route width allows permittees to work with landowners to address their concerns and to address engineering issues that may arise after a permit is issued. The route width, in combination with the anticipated alignment, is intended to balance flexibility and predictability.

**Diagram 10. Route Width, ROW, and Alignment Illustration**




When the Commission issues a HVTL route permit, a specific route and anticipated alignment are designated, and construction and maintenance conditions are specified. The HVTL route permit anticipates that the right-of-way will generally conform to the anticipated alignment as identified within the route permit unless changes are requested by individual landowners or unforeseen conditions are encountered. Any right-of-way modifications within the designated route shall be located so as to have comparable overall impacts relative to the factors in Minn. R. 7850.4100, as the

alignment identified in the permit, and shall be specifically described and documented in and approved as part of the plan and profile post-permit compliance deliverable. Should such modification in the alignment require deviation outside of the designated route, the permittee shall follow the requirements of Minnesota Rule 7850.4900 (Amendment of Permit Conditions) to seek approval.

The Applicants propose a route width of approximately 1,200 feet around the West Collector Substation to allow for flexibility in routing around this facility. The Applicants are proposing a route width of approximately 600 feet between the West Collector Substation and the intersection of River Road SE (CSAH 8) and 125th Avenue SE (County Road 52), where the West Route enters the existing fence line of the SGP. Inside this fence line, the Applicants are proposing a varying route width of approximately 700 to 1,800 feet to provide flexibility in routing around and near existing transmission lines and the SGP and associated facilities.[69] The widest route width, approximately 1,800 feet, is proposed around the Sherburne County Substation (**Figure 6 and 7**).

### Right-of-Way

The right-of-way (ROW) is that specific area required for the safe construction and operation of the transmission line, where such safety is defined by the National Electric Safety Code (NESC) and the North American Electric Reliability Corporation (NERC) reliability standards. The ROW must be within the designated route and is the area for which the applicant obtains rights (easements) from private landowners to construct and operate the line.

Once a route permit is issued by the Commission, the Permittee will conduct detailed survey and engineering work, including, for example, soil borings. The Permittee would also contact landowners to gather information about their property and their concerns and discuss how the transmission line ROW might best proceed across their property. Use of a ROW for a transmission line across private property is typically obtained by an easement agreement between the permittee and landowner.

The Applicants anticipates constructing the new single-circuit 345-kV transmission line and structures using a design and span lengths that require a 150-foot-wide ROW. When paralleling existing road rights-of-way, the Applicants propose to place poles on adjacent private property, within approximately 10 feet of the existing road right-of-way (**Diagram 11**). These pole placements allow the transmission line ROW to share existing road rights-of-way to the greatest extent feasible and will reduce the overall size of the easement required from the private landowner along roads.

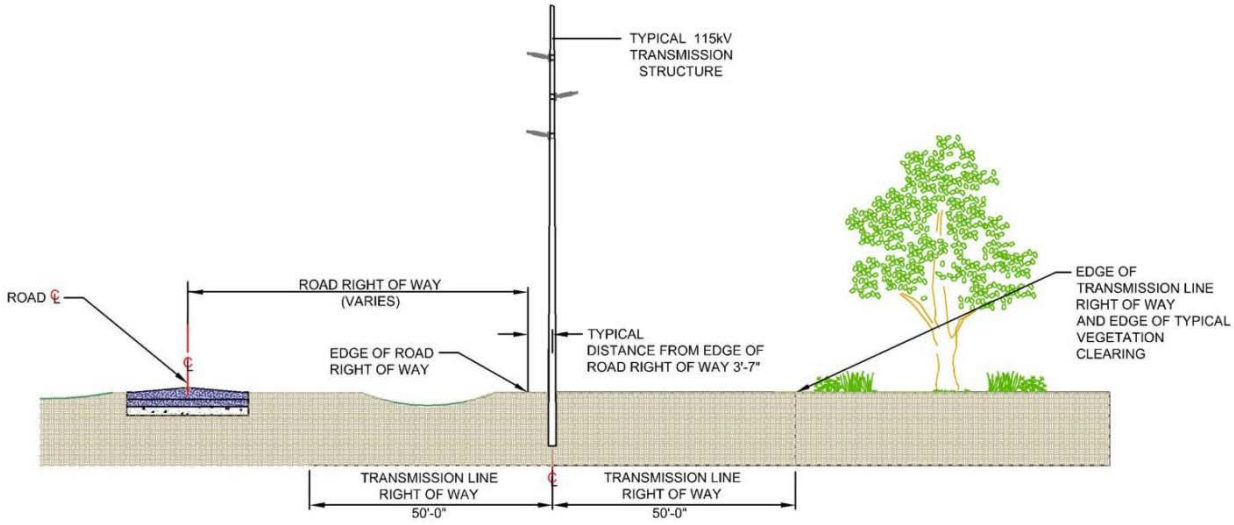
### Anticipated Alignment

The anticipated alignment is the anticipated placement of the transmission line within the route and ROW, where the transmission line is anticipated to be built; usually represented as the “centerline”.

[69] SPA, at p. 37.

After coordinating with landowners and completing detailed engineering plans, the permittee will establish the final alignment for the project and designate pole placements. These final plans, known as "plans and profiles," must be provided to the Commission so that the Commission can confirm that the Permittee's plans are consistent with the record the Commission has based its decision, the route permit, and all permit conditions prior to construction of the project.

**Diagram 11. Alignment Sharing Road ROW**[70]




### 4.1.2 Transmission Structure and Conductor Design

Transmission structures are one of the most visible elements of the electric transmission system. They support the conductors used to transport electric power from generation sources to customer load. Transmission lines carry electricity over long distances at high voltages, typically between 115 kV and 765 kV. There are various types of conductors which are used transmission line. The most common conductors used in HVTLs are Aluminum Alloy Conductors. The most common conductor in use for transmission today is aluminum conductor steel reinforced (ACSR). Aluminum is used because it has about half the weight and lower cost of a comparable resistance copper cable.

#### Transmission Structures

The proposed transmission structures are custom steel single-pole (monopole) structures of three types: tangent, angle, and dead end. These structures are typically used in the following situations:

- Tangent – structures that support straight or nearly straight runs of conductor
- Angle – structures that turn the conductor approximately 2 to 60 degrees

[70] RPA, at p. 47.

• Dead End – structures that turn the conductor approximately 60 to 90 degrees or take the full tension of the line in one direction

The proposed structures will range in height from approximately 135 feet to 165 feet tall (**Diagram 12 and Table 7**). The typical spans between structures will be between 900 and 1,100 feet. Because the structures will be built to support an additional circuit in the future, all three structure types will have concrete foundations between 12 and 58 feet deep, depending on soil conditions, geotechnical analysis, and the structures' function (i.e., angle and dead-end structures typically require deeper foundations).

**Diagram 12. Example: Single-Circuit Monopole 345 kV Structure**[71]

[71] SPA, at p. 39, Image 3.2-1.

**Table 7. 345 kV Structure Design Summary[72]**

| Structure Type | Structure Material | Typical Right-of-way Width (feet) | Structure Height (feet) | Structure Base Diameter (inches) | Foundation Diameter (feet) | Average Span Between Structures (feet) |
|---|---|---|---|---|---|---|
| Tangent | Steel | 150 | 135 to 145 | 66 to 78 | 7.5 to 8.5 | 900 to 1,100 |
| Angle | Steel | 150 | 135 to 145 | 72 to 84 | 8 to 9 | 900 to 1,100 |
| Dead End | Steel | 150 | 150 to 165 | 102 to 120 | 10.5 to 12 | 900 to 1,100 |

### Conductor Design

The conductors for the 345-kV transmission line will consist of 2-bundle Dover T-2 aluminum conductor steel-reinforced (ACSR) conductor in a vertical configuration with 18" spacing. The conductors will have a capacity of 370 megavolt amperes (MVA) loading.[73]

The proposed transmission line will be designed to meet or surpass relevant local and state codes including the NESC standards. Applicable standards will be met for construction and installation, and applicable safety procedures will be followed during design, construction, and after installation.

## 4.1.3 ROW Acquisition, Construction, Restoration, and Maintenance

Following the issuing of a HVTL Route Permit to the Applicants for the West HVTL Project, the permittee will perform a physical evaluation of each parcel along the permitted route. This work would include mobilization of various survey crews to conduct preliminary assessments (soil characterization, foundation design, wetland/biological reviews, property surveys, etc.). A geotechnical company will take soil borings to assess the soil characteristics and determine appropriate foundation design specifications; other consulting engineers will perform surveys to minimize potential impacts of the project and identify right-of-way corridors, natural features, man-made features, and associated ground elevations that will be considered in the detailed engineering necessary to construct the West HVTL Project.[74]

### ROW Acquisition

The Applicants have secured all the necessary easements for the West HVTL Project from willing landowners. The Applicants prioritized siting of the solar farm as close to the SGP as practicable to minimize the length of the transmission line and the number of affected landowners. The West Route begins at the West Collector Substation within the solar farm footprint, the leases for which allow for transmission lines associated with the Project. The remaining 3.2 miles of the West Route are on Xcel

[72] SPA, at p. 39, Table 3.2-1.
[73] SPA, at p. 39.
[74] SPA, at pp. 43-45.

Energy-owned land and/or within the SGP. As such, there are no landowners along the West Route that require standalone transmission easement agreements.[75]

### Construction

Construction of the transmission line will not begin until all necessary federal, state, and local approvals have been obtained, easements have been finalized for rights-of-way, and final plans and profiles have been approved by the Commission. The precise timing and order of ROW clearing and construction will depend on the receipt of all necessary approvals, various requirements that may be in place due to permit conditions, system loading issues, weather, and available workforce and materials.

Construction activities will require the use of many different types of equipment, including, but not limited to, tree removal equipment, mowers, cranes, backhoes, line trucks, drill rigs, dump trucks, front-end loaders, bulldozers, flatbed trucks, concrete trucks, helicopters, cranes, and various trailers for hauling equipment. Excavation equipment is often set on wheel or track-driven vehicles.[76]

Staging areas for the transmission project were selected for their proximity to the route, ease of access, security, ability to store supplies efficiently and safely, and sites that require minimal grading or excavation. To the extent practicable, staging areas would be located on previously disturbed sites and would be used as receiving locations for delivery and storage of construction materials and equipment until they are needed for the project.[77]

Construction in areas where approvals are not needed or where already obtained could proceed while approvals for other areas are in progress. Construction progresses, generally, as follows:

- Survey marking of the ROW, pole locations, and environmental constraints (e.g., wetlands).
- Establishment of laydown and staging areas.
- ROW clearing and access preparation.
- Grading or filling as necessary.
- Excavation of holes for structures, and Installation of culverts and concrete foundations for select structures.
- Installation of poles, insulators, and hardware.
- Conductor stringing.
- Installation of any markers required by state or federal permits on conductors or shield wires.

Given the transmission project's setting in a largely agricultural area, tree clearing, and extensive route excavation is expected to be minimal. In areas of difficult terrain (>10 percent grade), more extensive

[75] SPA, at pp. 43-45.
[76] Ibid.
[77] Ibid.

leveling using bulldozer or front-end loaders may be required to provide a level location for equipment operation. Structure foundations will be installed after the structure pads are stabilized. The Applicants anticipate that only minimal grading will be needed because the proposed West Route has minimal elevation change.[78]

Access to the ROW is typically made directly from existing roads or paths that run parallel or perpendicular to the route. However, in some locations improvements to existing access (temporary culverts) or construction of new access could be required to accommodate construction equipment. The permittee will evaluate construction access opportunities by identifying existing transmission line easements, roads, or trails adjacent to the permitted route.[79]

Where feasible, the Applicants indicate they will limit access and construction activities to the ROW acquired for the transmission line to minimize impacts to landowner and adjacent properties. In some situations, however, private field roads, trails, or farm fields may be used to gain access to construction areas. Where no current access is available, where existing access is inadequate, or when access requires incorporation of areas outside the ROW, permission from landowners will be obtained prior to using any of these areas to access the HVTL ROW for construction.[80]

After ROW clearing and access preparation have been completed, pole and foundation installation can begin. The Applicants anticipate the predominant foundation type for the West Route will be concrete drilled pier foundations for all three structure types. For concrete foundations, the excavation process will utilize temporary steel casing and rebar, concrete and anchor bolts will be placed in the hole. The standard projection of a concrete foundation is one foot above grade.[81]

Once foundations are constructed, structures (poles), insulators, hardware, clamps, and grounding equipment are moved from staging areas and delivered to the foundation locations. Steel arms and/or insulator assemblies, mast arms for shield wires, additional hardware and pulling blocks will all be attached to the structures while on the ground. After attachment of component parts, structures are lifted into place with a crane or similar heavy-lift equipment and secured.

Once structures are in place, conductors are strung. Stringing setup areas are established to store spools of conductor cables. Where conductors cross streets, roads, or highways, temporary guard or clearance poles will be used to ensure that conductors do not obstruct or otherwise interfere with traffic. Conductor pulling lines are secured through stringing blocks suspended from insulators on the poles. The conductors are pulled through each block by the pulling lines. Once final sag is established

[78] SPA, at pp. 43-45.
[79] Ibid.
[80] Ibid.
[81] SPA, at p. 45.

conductors are clipped by workers. Conductor-marking devices (bird flight diverters) will be installed, as necessary, once conductors are in place. Shield wire is installed in a similar manner.

Wherever large construction projects require the clearing of existing vegetation, the potential for unwanted plant species to invade and establish themselves is a general concern. The Minnesota Noxious Weed Law defines a noxious weed as an annual, biennial, or perennial plant that the Commissioner of the Minnesota Department of Agriculture (MDA) designates to be injurious to the public health, the environment, public roads, crops, livestock, or other property. The application of best management practices (BMP) will limit the spread of noxious and invasive weeds by cleaning construction equipment before it enters the construction work area and by using only invasive-free mulches, topsoil, and seed mixes.

### Restoration

The Applicants indicate that construction crews will attempt to minimize ground disturbance during construction, consistent with BMPs required as part of the SWPPP and other permits and approvals.[82] Nonetheless, parts of the project area will be disturbed during the normal course of construction.

Commonly used BMPs to control soil erosion and assist in reestablishing vegetation that may be used include, but are not limited to:

- Erosion control blankets with embedded seeds
- Silt fences
- Hay bales
- Hydro seeding
- Planting individual seeds or seedlings of non-invasive native species

In accordance with Minnesota Pollution Control Agency (MPCA) construction permit requirements, temporary restoration before the completion of construction in some areas along the ROW could be required.

Once construction is complete and restoration activities have commenced, a Permittee's representative will contact the landowner to discuss any damage that has occurred as a result of project construction. If fences, drain tile, or other property have been damaged, the Permittee (or a contractor) will repair damages or provide the landowner reimbursement for repairs, consistent with the conditions in the easement agreement.[83] Commission HVTL route permits require permittees to compensate landowners for damage to crops and drain tile (**Appendix C**).

[82] SPA, at p. 45.
[83] Ibid.

Once construction of the transmission project is complete, temporary road approaches, access roads, and staging areas will be removed, revegetated, and restored to their original condition to the extent practicable, and as negotiated with each landowner or responsible agency/official.

Areas where vegetation is disturbed or removed during construction will be allowed to naturally reestablish to pre-disturbance conditions. Resilient species of common grasses and shrubs typically reestablish with few problems after disturbance. Areas with significant soil compaction and disturbance from construction activities may require assistance to reestablish vegetation and control soil erosion. Commonly used methods to accomplish this include, but are not limited to, prompt reseeding of disturbed areas, erosion control blankets, silt fences, and weekly inspection of construction sites for compliance. Reseeding of non-cropped areas disturbed during construction will be done with a seed mix free of noxious weeds, similar to that which was removed. Vegetation that is consistent with NESC-prescribed clearances would be allowed to reestablish.[84]

Construction activities on agricultural land will be conducted in accordance with an Agricultural Impact Mitigation Plan (AIMP) developed in coordination with the Minnesota Department of Agriculture and approved as a post-permit compliance deliverable.

### Maintenance

Transmission lines are designed to operate for decades and require only moderate maintenance, particularly in the first few years of operation. Nationwide, the electric transmission system is very reliable. The average annual availability of transmission infrastructure is in excess of 99%. Protective relaying equipment automatically take a transmission line out of service when a fault is sensed on the system. Both system faults and scheduled maintenance are infrequent.

The Permittee is responsible for the operation, maintenance, and, when necessary, repair of the transmission project. The Permittee, or its agents, will periodically access to the ROW to perform inspections, conduct maintenance, and repair damage over the life of the Project. The principal operating and maintenance cost for transmission facilities is the cost of inspections, which will be performed monthly by either truck or by air. Inspections will be conducted to ensure that the transmission line is fully functional, and that no vegetation has encroached so as to violate NESC prescribed clearances.[85]

Annual operating and maintenance costs for 345 kV transmission lines in Minnesota and the surrounding states are expected to be approximately $500 per mile per year. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

[84] SPA, at p. 45.
[85] SPA, at pp. 45-46.

Generally, vegetation within the ROW that has the potential to interfere with the operation of the Project will be removed. Native shrubs that will not interfere with the safe operation of the transmission line will be allowed to reestablish in the ROW. Clearing needs are determined from annual ROW inspection. When necessary, problem vegetation will be cleared through a combination of mechanical and hand clearing, along with herbicide application, where allowed, to remove or control vegetation growth.

Typically, utilities will use commercial pesticide applicators licensed by the MDA to apply herbicides approved by the U.S. Environmental Protection Agency (EPA) and the MDA. If during post-construction monitoring of the restored ROW a higher density and cover of noxious weeds on the ROW is noted when compared to adjacent off-ROW areas, the utility will obtain landowner permission and work to mitigate noxious weed concerns.

### 4.1.4 Project Decommissioning

Because the transmission line is designed, operated, and constructed solely to deliver the output of the solar farm to the electric grid, the anticipated lifespan of the transmission line is considered to be the same as for the solar farm – 35 years.[86]

The Sherburne County Substation (the Projects interconnection substation) will continue to be owned by the transmission line owner.

It should also be noted that in practice because they have few mechanical elements and are designed and constructed to withstand the weather extremes typical of the region, high-voltage transmission lines are seldom completely retired. It is possible that, following the retirement or decommissioning of the solar farm, another entity may seek to leave the transmission line in place to support other transmission activities and the solar energy facility and the transmission line could be decommissioned separately.

### 4.1.5 Project Costs

The Applicants estimate the total cost for the West HVTL Project to be approximately $6.9 million (based on 2021 dollars).[87] This estimate is an engineering estimate and expected to reflect actual costs within 20 percent. Final costs are dependent on a variety of factors, including the approved route, timing of construction, cost of materials, and labor.

[86] SPA, at p. 45.
[87] SPA, at p. 40.

As previously stated, if the Commission grants the necessary HVTL route permit, Xcel Energy will construct, operate, and maintain the proposed 345 kV West HVTL, as well as the solar farm. Operating and maintenance costs after construction of the transmission line will be nominal for several years because the line will be new and minimal initial vegetation management is required. The anticipated annual operating and maintenance costs for the 345 kV West HVTL Project is approximately $500 per mile. The principal operating and maintenance costs include inspections, which are typically ground-based but occasionally are done aerially. Inspections are generally performed on a yearly basis.

### 4.1.6 Project Schedule

The West Route HVTL is being developed to facilitate an in-service date of all components of the Project by Q4 2024. The Applicants assert the ability to begin commercial operations for portions of the Project via a phased approach beginning in 2023 to accommodate an in-service date for the entire Project by Q4 of 2024.

This schedule is based on information known as of the date of filing and may be subject to change as further information develops or if there are delays in obtaining the necessary federal, state, or local approvals that are required prior to construction.

### 4.1.7 Future Expansion

The Project is proposed to be up to 460 MW, half of which will be generated in the West Block and carried by the West Route HVTL. The West Route HVTL structures will be designed to be double circuit capable, which allows for potential future expansion of generation in the area without requiring additional new transmission line structures. This allowance capitalizes on the construction of the West Route HVTL and minimizes environmental impacts both now and in the future. The future addition of the second circuit to the route, or other transmission upgrades would be subject to future filings with the Commission.[88]

## 4.2 East HVTL Project

The East HVTL route begins at the proposed Project east collector substation to be constructed in the northwest corner of the East Block (**Figure 6 and 7**) just southeast of the intersection of 140th Avenue SE (Sherburne Avenue) and 137th Street and approximately 0.8 mile southwest of U.S. Highway 10. The East Route will then generally travel west and north for approximately 1.5 miles to the existing Sherburne County Substation. The collector substations will be permitted with the Project because they are essential components to the solar facility; that is, the solar facility cannot operate without the

[88] SPA, at p. 42.

collector substations. There are no substation improvements at the Sherburne County Substation planned outside the existing footprint; this point of interconnection has capacity for the necessary equipment within its existing footprint (**Figure 6and 7**).

There are no substation improvements at the Sherburne County Substation required outside the existing footprint; this point of interconnection has capacity for the necessary equipment within its existing footprint.

The East HVTL will be constructed, owned, and operated by Xcel Energy.

### 4.2.1 Route Width, Right-of-Way, and Anticipated Alignment

For a definition of terms (route, ROW, route width, and alignment) see **Section 4.1.1** above, as these are common between the West and East HVTL routes.

The Commission may include conditions in a route permit (see sample route permit in **Appendix C**). These conditions address the route width or anticipated alignment in a specific area of the project, for example, requiring the alignment of a specific portion of the route to be north rather than south of a road, or requiring that the route width be narrower than initially requested in certain areas.

#### Route Width

The Applicants propose a route width of approximately 860 feet between the East Collector Substation and the intersection of 140th Avenue SE (Sherburne Avenue) and 137th Street, where the east route enters the existing fence line of the SGP. Inside this fence line, the Applicants propose a varying route width of approximately 950 to 1,800 feet to provide flexibility in routing around and near existing transmission lines and the SGP and associated facilities. The widest route width, approximately 1,800 feet, is proposed around the Sherburne County Substation (**Figure 6 and 7**).

#### Right-of-Way

The Applicants anticipate constructing the new single-circuit 345-kV transmission line and structures using a design and span lengths that require a 150-foot-wide right-of-way. The East Route does not parallel any existing public roads.

### 4.2.2 Transmission Structure and Conductor Design

For a description of structures and conductors see **Section 4.1.2** above, as these are common between the West and East HVTL routes.

### 4.2.3 ROW Acquisition, Construction, Restoration, and Maintenance

For a discussion on construction, restoration, and maintenance **Section 4.1.3** above, as these are common between the West and East HVTL routes.

#### ROW Acquisition

The Applicants sited the East Collector Substation on the west side of the East Block to facilitate a direct transmission route to the Sherburne County Substation. The east route exits the west side of the East Collector Substation within the solar farm footprint, crosses Sherburne Avenue, and then into the SGP. As such, there are no private landowners along the East HVTL Project, and therefore, no standalone transmission easement agreements.[89]

### 4.2.4 Project Decommissioning

For a discussion on decommissioning see **Section 4.1.4** above, as these are common between the West and East HVTL routes.

### 4.2.5 Project Costs

The Applicants estimate the total cost for the East HVTL to be approximately $3.7 million (based on 2021 dollars).[90] This estimate is an engineering estimate and expected to reflect actual costs within 20 percent. Final Project costs are dependent on a variety of factors, including the approved route, timing of construction, cost of materials, and labor.

As previously stated, (**Section 4.1.5**) if the Commission grants the necessary approvals, Xcel Energy will construct, operate, and maintain the proposed 345 kV HVTL, as well as the solar farm. Operating and maintenance costs after construction of the transmission line will be nominal for several years because the line will be new and minimal initial vegetation management is required. The anticipated annual operating and maintenance costs for the 345 kV East HVTL is approximately $500 per mile. The principal operating and maintenance costs include inspections, which are typically ground-based but occasionally are done aerially. Inspections are generally performed on a yearly basis.[91]

### 4.2.6 Project Schedule

The Project is being developed to facilitate an in-service date of all components of the Project by Q4 2024. Xcel Energy maintains the ability to begin commercial operations for portions of the Project via a phased approach beginning in 2023 to accommodate an in-service date for the entire Project by Q4 of 2024.

[89] SPA, at p. 53.
[90] SPA, at p. 51.
[91] Ibid.

This schedule is based on information known as of the date of filing and may be subject to change as further information develops or if there are delays in obtaining the necessary federal, state, or local approvals that are required prior to construction.

### 4.2.7 Future Expansion

The Project is proposed to be up to 460 MW, half of which will be generated in the East Block and carried by the East Route HVTL. The East Route HVTL structures will be designed to be double circuit capable, which allows for potential future expansion of generation in the area without requiring additional new transmission lines across the SGP. This allowance capitalizes on the construction of the West HVTL Project and minimizes environmental impacts both now and in the future. The future addition of the second circuit to the route, or other transmission upgrades would be subject to future filings with the Commission.[92]

[92] SPA, at p. 51.

# 5 Sherco Solar Project - Affected Environment, Potential Impacts and Mitigation Measures

The construction and operation of the proposed Project (LEPGP Site, West HVTL, and East HVTL) has the potential to impact human and environmental resources in the Project area. Some impacts will be short term and similar to those of any large construction project (noise, dust, soil disturbance). These impacts are fairly independent for each component (LEPGP or HVTLs) of the Project. However, they can be mitigated by measures common to most construction projects, for example, the timing of construction activities, application of wetting agents to suppress dust, and use of erosion control blankets and silt fencing.

Other impacts will exist for the life of the Project and may include aesthetic impacts, impacts to community development, and impacts to agriculture. These long-term impacts result from the design and location of the Project, not the manner in which it is constructed. Long term impacts can be mitigated through prudent selection of the site and routes and design of the Project.

## 5.1 Chapter Summary

This section provides a general description of the environmental and human setting of the Project, including the solar farm, the West Route HVTL, and the East Route HVTL. Topics discussed in the following subsections include environmental setting, human settlement, land-based economies, archaeological and historic resources, hydrologic features, vegetation and wildlife, and rare and unique natural resources that are known to occur or may potentially occur within the project area.

## 5.2 Affected Environment

For purposes of the review, the analysis of the affected environment studies different areas, or regions of influence (ROI), depending upon the resource evaluated (**Table 8**). The following terms and distances are used in this analysis.

- **Solar Farm Footprint (Solar Farm).** The solar farm footprint encompasses all areas proposed for solar development (**Figure 7**). With the exception of two temporary laydown areas on Xcel Energy property totaling 20.1 acres, the rest of the solar footprint represents the facilities within the perimeter fence line that will be converted to a solar use for the life of the Project.

**Table 8. Regions of Influence**

| Type of Resource | Specific Resource/Potential Impact to Resource | Impact Assessment Area | |
|---|---|---|---|
| | | Solar Project | West and East Routes |
| Human Settlement | Displacement, Electric and Magnetic Fields, Noise | Residences within and adjacent to the Solar Footprint | Right-of-Way[1] |
| | Aesthetics and Electronic Interference | 1,000 feet | 1,000 feet[2] |
| | Public Health and Safety, Socioeconomics, Cultural Values, Recreation, Public Services, Zoning and Land Use Compatibility, Transportation, Air Quality | Project Study Area | Project Study Area |
| Land-Based Economies | Agriculture, Forestry, Mining | Solar Project Footprint | Right-of-Way[1] |
| | Tourism | Project Study Area | Project Study Area |
| Archaeological and Historic Resources | - | One Mile | One Mile |
| Natural Environment | Geology and Groundwater Resources, Soils, Water Resources, Flora, Fauna | Solar Project Footprint | Right-of-Way[1] |
| Rare and Unique Species | - | One Mile | One Mile |

[1] The right-of-way is 150 feet wide, centered on the Application Alignments.
[2] On each side of the anticipated alignment, for a total 2,000-foot area of analysis.

• **Right-of-Way (West Route and East Route)**. The HVTL projects have a ROW of 150 feet (75 feet on either side of the alignment). This distance is used as the ROI for analyzing potential displacement impacts and impacts to land-based economies (agriculture, forestry, and mining) and natural resources.

• **One thousand feet (Solar Farm, West Route, and East Route)**. A distance of 1,000 feet from the solar farm footprint and on each side of the HVTL alignments is used as the ROI for analyzing aesthetic and electronic interference impacts. Impacts may extend outside of this 1,000-foot distance but are anticipated to diminish relatively quickly with distance from the conductors such that potential impacts outside this distance would be negligible.

• **One mile (Solar Farm, West Route, and East Route)**. A distance of one mile from the solar farm footprint and proposed HVTL routes is used as the ROI for analyzing potential impacts to archaeological and historic resources, rare and unique species, and airports and airstrips.

• **Project Study Area (Solar Farm, West Route, and East Route)**. The Project Study Area is defined generally as the townships and/or county within which the Project is located (Clear Lake Township, Becker Township, and Sherburne County) and is used as the ROI for analyzing potential impacts to cultural values, socioeconomics, public services, zoning and land use, emergency services and public health and safety, transportation, air quality, tourism, and recreation. These are resources for which impacts may extend throughout the host communities.

### 5.2.1 Describing Potential Impacts and Mitigation

This EA analyzes potential impacts of the project on various resources. The discussion of the duration, size, intensity, and location of the impacts provides context. This context is used to determine an overall resource impact level. Impact levels are described using qualitative descriptors. These descriptors are not intended as value judgments, but rather as a means to both ensure a common understanding among readers and compare resource impacts among these three projects.

- **Negligible** - Negligible means the impacts are so small or unimportant as to be not worth considering; they are insignificant.
- **Minimal** - Minimal impacts do not considerably alter an existing resource condition or function. Depending upon the resource and the location, minimal impacts may be noticeable to an average observer. These impacts generally affect common resources over the short-term.
- **Moderate** - Moderate impacts alter an existing resource condition or function and are generally noticeable or predictable for the average observer. Effects may be spread out over a large area making them difficult to observe but can be estimated by modeling or other means. Moderate impacts may be long-term or permanent to common resources but are generally short- to long-term for rare and unique resources.
- **Significant** - Significant impacts alter an existing resource condition or function to the extent that the resource is severely impaired or cannot function. Significant impacts are likely

noticeable or predictable for the average observer. Effects may be spread out over a large area making them difficult to observe but can be estimated by modeling. Significant impacts can be of any duration and may affect common and rare and unique resources.

This EA also discusses ways to avoid, minimize, or mitigate specific impacts. These actions are collectively referred to as mitigation.

- **Avoid** - Avoiding an impact means the impact is eliminated altogether by moving or not undertaking parts or all of a project.
- **Minimize** - Minimizing an impact means to limit its intensity by reducing project size or moving a portion of the project from a given location.
- **Mitigate** - Impacts that cannot be avoided or minimized could be mitigated. Impacts can be mitigated by repairing, rehabilitating, or restoring the affected environment, or compensating for it by replacing or providing a substitute resource elsewhere.

## 5.3 Environmental Setting

The Project (solar farm and the two HVTL routes) are located immediately adjacent to the SGP, southwest of U.S. Highway 10, northeast of the Mississippi River adjacent to the City of Becker. Residences are scattered throughout the rural area and increase in density around the cities of Clear Lake and Becker (**Figure 7**). The predominant land use in and surrounding the Project is center-pivot irrigation agriculture. The West Route is characterized by agriculture for the first 1.25 miles of the route followed by industrial/developed land within the existing footprint of the SGP. Similarly, the East Route is characterized by industrial/developed land within the SGP. The solar farm is bordered by 95th Avenue on the west, U.S. Highway 10 to the northeast, with several county and township roads within and adjacent to the solar farm footprint. The West Route follows county and township roads, while the East Route crosses one township road (Sherburne Avenue SE) before entering the SGP property. There are numerous transmission lines south of the East Block of the solar farm and the East Route that connect to the Sherburne County Substation. There are additional transmission lines that connect to the Sherburne County Substation from the north and along the West Route. The solar farm is located on relatively flat fields conducive to solar development.

The DNR and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota.[93]

Ecological land classifications are used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features. The system uses associations of biotic and

[93] DNR *Ecological Classification System*, http://www.dnr.state.mn.us/ecs/index.html

environmental factors, including climate, geology, topography, soils, hydrology, and vegetation. The ECS enables resource managers to consider ecological patterns for areas as large as North America or as small as a single timber stand and identify areas with similar management opportunities or constraints relative to that scale. There are eight levels of ECS units in the United States. Map units for six of these levels occur in Minnesota: Provinces, Sections, Subsections, Land Type Associations, Land Types, and Land Type Phases. **Diagram 13** represents the Ecological Subsections in Minnesota.

The solar farm and associated HVTLs are located in the Anoka Sand Plain ecological subsection. This subsection encompasses the Anoka Sand Plain and sandy valley trains along the Mississippi River in Central Minnesota. The Mississippi River and its valley forms the western boundary. This subsection consists of a flat, sandy lake plain and terraces along the Mississippi River; much of the sand plain, once thought to be fluvial, is probably lacustrine in origin. Low moraines are locally exposed above the outwash and there are small dune features present. There are also ice block depressions and southwest trending tunnel valleys on the sand plain.[94]

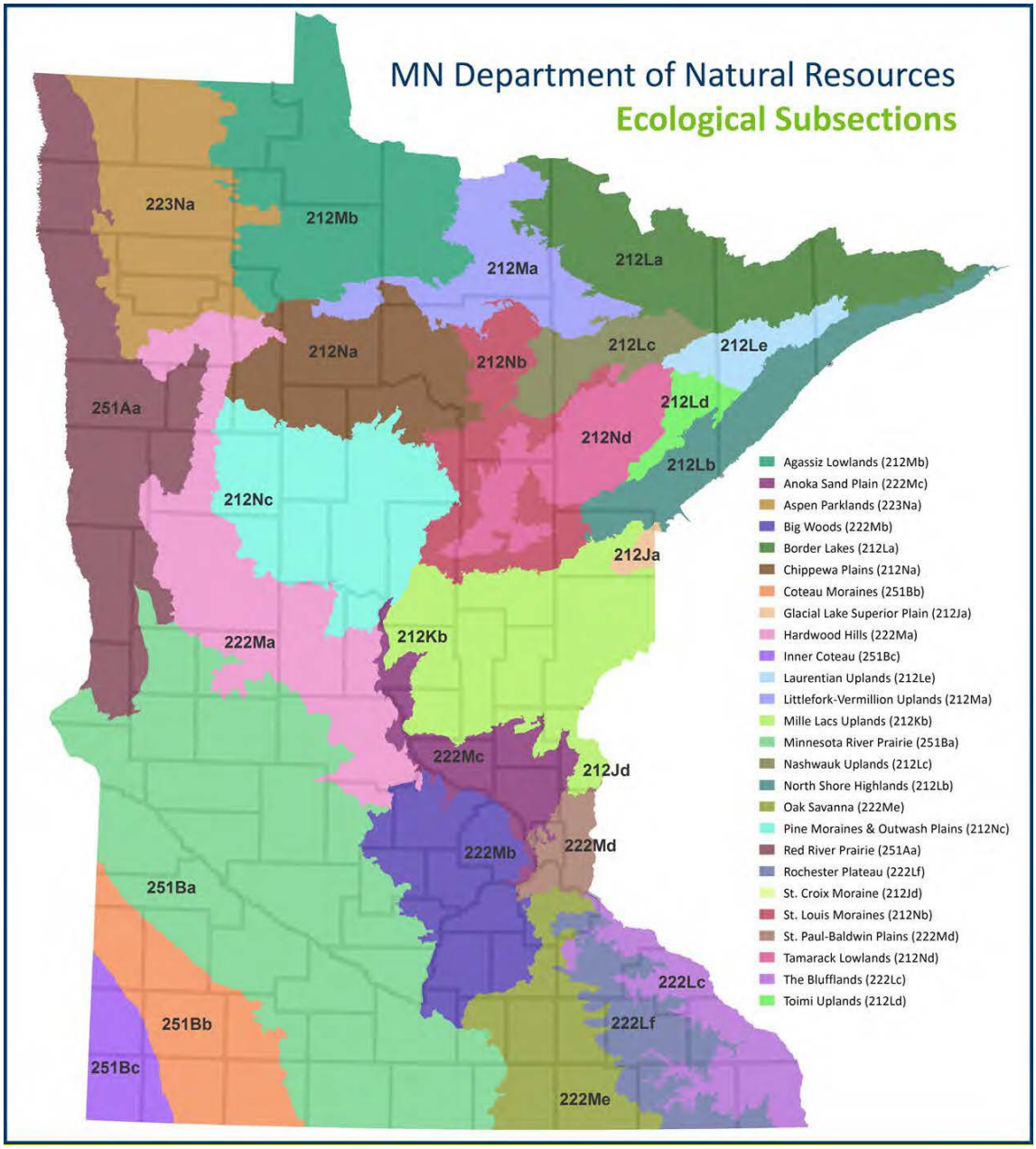
The major landform is a broad sandy lake plain, which contains small dunes, kettle lakes, and tunnel valleys. Topography is level to gently rolling, with small inclusions of ground moraine and end moraine. The other important landform is a series of sandy terraces associated with historic levels of the Mississippi River; terraces are also associated with major tributaries of the Mississippi river. Locally exposed bedrock can be observed in the St. Cloud area; surficial glacial deposits are less than 200 feet thick. The subsection is underlain by Cambrian and Ordovician dolomite, sandstone, and shale.[95]

Soils are derived primarily from fine the sands of the sandy plain; most of these sandy soils are droughty, upland soils but there are organic soils in the ice block depressions and tunnel valleys, and poorly drained prairie soils along the Mississippi River. Seventy to eighty percent of the soils are excessively well drained sands and another 20 percent are very poorly drained.[96]

Prior to Euro-American settlement, vegetation in this subsection was predominantly the droughty uplands was oak barrens and openings. Characteristic trees included small bur oak and northern pin oak. Jack pine was present locally along the northern edge of the subsection, and brushland characterized large areas of the sandplain. Upland prairie formed a narrow band along the Mississippi River, as well as areas of floodplain forest.[97]

[94] Anoka Sand Plain Subsection | Minnesota DNR (state.mn.us).
[95] Ibid.
[96] Ibid.
[97] Ibid.

Diagram 13. Minnesota Ecological Subsections[98]




## 5.4 Human Settlements

Large electric power generating plants (facilities including solar farms) and high voltage transmission lines have the potential for effects, real or perceived on a local area, during construction and operation

[98] DNR (1999) *Ecological Section of Minnesota*, Available from: https://gisdata.mn.gov/

of a project. Potential public and health and safety issues during construction include injuries due to falls, equipment use, and electrocution. Potential health concerns related to operation of a solar farm, may include health impacts from electric and magnetic fields (EMF), stray voltage, induced voltage, and electrocution. Solar farm and associated transmission lines may also have the potential to displace homes or businesses, introduce new noise sources, affect the aesthetics and socioeconomics of the region in which the project would occur, be incompatible with local land use and zoning, interfere with electronic communications, and impact public services.

The following subsections present an overview of the resources related to human settlement in the project area and discuss how the solar farm, the West Route HVTL, and East Route HVTL may affect these resources and the measures available to mitigate these effects.

### 5.4.1 Aesthetics

Aesthetic, or visual resources, are generally defined as the natural and built features of a landscape that may be viewed by the public and contribute to the visual quality and character of an area. Aesthetic resources form the overall impression that an observer has of an area or its landscape character. Distinctive landforms, water bodies, vegetation, and human-made features that contribute to an area's aesthetic qualities are elements that contribute to an area's visual character. Visual quality is generally defined as the visual significance or appeal of a landscape based on cultural values and the landscape's intrinsic physical elements.

Visual sensitivity is a measure of viewer interest and concern for the visual quality of the landscape and potential changes to it, which is determined based on a combination of viewer sensitivity and viewer exposure. Viewer sensitivity varies for individuals and groups depending on the activities viewers are engaged in, their values and expectations related to the appearance and character of the landscape, and their potential level of concern for changes to the landscape. High viewer sensitivity is typically assigned to viewer groups engaged in recreational or leisure activities; traveling on scenic routes for pleasure or to and from recreational or scenic areas; experiencing or traveling to or from protected, natural, cultural, or historic areas; or experiencing views from resort areas or their residences. Low viewer sensitivity is typically assigned to viewer groups engaged in work activities or commuting to or from work.

Viewer exposure varies for any particular view location or travel route depending on the number of viewers and the frequency and duration of their views. Viewer exposure would typically be highest for views experienced by high numbers of people, frequently, and for long periods. Other factors, such as viewing angle and viewer position relative to a feature or area, can also be contributing factors to viewer exposure.

### Solar Project

The solar farm site topography is generally flat, with elevations ranging from 925 to 985 feet above sea level, and land use is dominated by agricultural (potatoes and corn) crops. There are windbreaks along some roadways and between some agricultural fields, as well as around most current and former farmsteads and agricultural buildings.

The existing SGP and the Sherburne County Substation are located between the West and East Blocks of the Project. The SGP, Sherburne County Substation, and multiple transmission lines are the current man-made focal points. There are numerous transmission lines that are within or adjacent to the Project, including (**Figures 8a, 8b, and 8c**):

- Several 345 kV transmission lines that run into and out of the Sherburne County Substation.
- A 69 kV transmission line that parallels U.S. Highway 10 on the south side that is within the Solar Project Area.
- A 69 kV that parallels 157th Street SE immediately adjacent to the southern portion of the East Block.
- A double circuit 230/115 kV line that bisects the southeast portion of the East Block in a north-south direction between agricultural fields.
- A 115 kV transmission line adjacent to the western boundary of the East Block that runs in a southeast to northwest direction.
- A 69 kV line on the western boundary along 140th Avenue.
- A 69 kV line that parallels River Road SE (CSAH 8) that bisects the southern portion of the West Block in an east-west direction through agricultural fields.
- A 115 kV line that bisects the southern portion of the West Block in an east-west direction through agricultural fields.

The Becker Substation is also adjacent to the western border of the East Block on the west side of 140th Avenue (Sherburne Avenue) and within the SGP.

While the solar farm site is primarily devoted to agricultural production, there are residences and agricultural structures in the area. There is one residence within, and several residences adjacent to the solar farm (**Figures 4 and 5; Table 9**). There is also a residential development south of the West Block along the Mississippi River; this development is well shielded from the solar farm due to the required vegetative buffer associated with the Mississippi River District zoning and Mississippi River riparian corridor.

### Impacts and Mitigation

Because they are generally large facilities with numerous highly geometric and sometimes highly reflective surfaces, solar farms may create visual impacts; however, being visible is not necessarily the same as being intrusive.

**Table 9. Proximity of Residences to the Sherco Solar Project[99]**

| Residence[1] | Location | Existing Vegetative Screening?[2] | Distance to Project Area (feet) | Distance to Solar Arrays (feet) [3] | Distance to Nearest Inverter (feet) [3] |
|---|---|---|---|---|---|
| W1 | North side of River Road SE (CSAH 8); west of West Block | Dense | 530 | 637 | 1371 |
| W2 | South side of River Road SE (CSAH 8); west of West Block | Dense | 625 | 710 | 1701 |
| W3 | North side of River Road SE (CSAH 8); within West Block "exception" | Moderate | 90 | 232 | 599 |
| W4 | North side of River Road SE (CSAH 8); north of West Block | Limited | 75 | 273 | 1058 |
| W5 | South side of River Road SE (CSAH 8); south of West Block | Dense | 165 | 318 | 961 |
| W6 | North side of River Road SE (CSAH 8); south of West Block | Dense | 471 | 605 | 1140 |
| W7 | North side of River Road SE (CSAH 8); east of West Block | Dense | 313 | 404 | 1248 |
| W8 | East of 115th Avenue SE (County Road 53); east of West Block | Moderate | 190 | 462 | 915 |
| W9 | East of 115th Avenue SE (County Road 53); east of West Block | Dense | 134 | 398 | 821 |
| E1 | East of Sherburne Avenue; south of East Block | Dense | 96 | 185 | 776 |
| E2 | South of 137th Street; within East Block | Dense | Within | 288 | 825 |

[1] W corresponds to residences within or adjacent to the West Block and E corresponds to residences within or adjacent to the East Block.

[2] Limited screening represents no existing trees or scattered trees that do not create a visual obstruction of vegetation; moderate screening represents existing trees on at least one side of the residence that are one tree line in density; dense screening represents multiple tree lines and a dense visual obstruction.

[3] Based on preliminary design.

[99] SPA, at p. 84; Table 5.2-7.

Installation of the proposed solar farm at the site will result in visible landscape changes as land that is now primarily covered in row crops or hay/pastureland is converted to a solar facility. Based on preliminary designs, approximately 2,988 acres will be converted from its current use (primarily cropland or pasture) for at least 25 years, the minimum estimated useful life of a PV facility. The primary components of the solar farm that will alter the landscape are the solar arrays and the perimeter fencing; electrical transformers and inverters, collector substations, and access roads are additional features of the proposed solar farm. The East and West Collector Substations will be of similar vertical profile as the existing Becker Substation adjacent to the East Block and of lower vertical profile than the transmission lines in and near the West and East Blocks.

The Applicant has generated several photo-renderings of how the solar farm would appear from various public locations (**Diagrams 14, 15, 16, and 17**). **Table 9** provides distances to the nearest residences to the solar farm.

Because of their relatively low profile, the arrays will not be visible from great distance and the visual impacts deemed minimal, however, the Above-Ground Layout option, if chosen, would have the larger impact. The aesthetic impacts will be experienced primarily by nearby residents and people using the roads adjacent to the site.

The solar farm has been designed to avoid tree clearing on the perimeter of the footprint. The closest residence is approximately 185 feet immediately adjacent to the south side of the East Block. This residence has dense existing vegetative screening surrounding the farmstead. The Applicant has stated that it will implement vegetative screening on the perimeter of the solar farm footprint near residences W-3, W-4, and E-1, which are those residences closest to the solar panels (**Figures 4 and 5**).[100]

The minimal aesthetic impacts can be mitigated by screening such as vegetative tree rows, berms, or fences. Vegetative screening would be most effective in select lines of sight and if the vegetation was coniferous and functional year-round. Aesthetic impacts can be further mitigated by ensuring that damage to natural landscapes during construction is minimized.

The Applicants indicate that lighting at the project will be minimal and will be used primarily for repair or maintenance work. The project substations will have security lighting, and project entrances will have motion activated down lit security lights. Aesthetic impacts due to lighting can be minimized by using lighting that provides only downward illumination (shielded lighting) at all locations where lighting is required.

[100] SPA, at pp. 85-86.

### West HVTL Project

The topography along the west Route is generally flat. There are existing tree lines around farmsteads, along roads, and that serve as windbreaks between some agricultural fields. Viewsheds in this area include several vertical elements such as the SGP and existing transmission lines. There is a 69 kV transmission line within the West Route on the north side of River Road SE (CSAH 8) between 115th Avenue SE (County Road 53) and 125th Avenue SE (County Road 52). Within the SGP, the West Route crosses (perpendicular) two collocated 345 kV and 115 kV transmission lines on the north side of the facility (**Figures 9a and 9c**).

### Impacts and Mitigation

The West Route will result in an alteration of the current landscape through construction of steel poles of 135 to 165 feet in height. Given that the West Route is collocated with existing transmission and along roads and field edges, along with the presence of the SGP and numerous other transmission lines in the vicinity of the Project, the aesthetic impacts of the new structures and conductors is anticipated to be minimal, requiring no mitigation.

### East HVTL Project

The East Route is generally flat, with uniformly low vegetative cover. The viewshed on the east side of the SGP is comprised of the vertical features of the SGP and numerous transmission lines. There are four 345 kV transmission lines that connect into the Sherburne County Substation from the south; these lines are not crossed by the East Route. The East Route crosses two transmission lines perpendicularly: a 69 kV line along Sherburne Avenue and a 115 kV line within the SGP (**Figures 9b** and **9d**).

### Impacts and Mitigation

The East Route will result in an alteration of the current landscape through construction of steel poles of 135 to 165 feet in height. Given that the majority of the length of the East Route is within the SGP the aesthetic impacts of the new structures and conductors is anticipated to be minimal, requiring no mitigation.

Diagram 14. Visual Rendering of Sherco Solar Project from River Road SE (CSAH 8) near W-3 (West Block)[101]


[101] SPA, at p. 87; Image 5.2-1

Diagram 15. Visual Rendering of Sherco Solar Project along River Road SE (CSAH 8; West Block)[102]


[102] SPA, at p. 88; Image 5.2-2

Diagram 16. Visual Rendering Sherco Solar Project from 115th Avenue SE (CR 53) near Residence W-6 (West Block)[103]


[103] SPA, at p. 89; Image 5.2-3

Diagram 17. Visual Rendering Sherco Solar Project from 115th Avenue SE (CR 53) near Residence W-6 (West Block)[104]


[104] SPA, at p. 90; Image 5.2-4

### 5.4.2 Displacement

In the context of Chapter 216E-Electric Power Facility Permits (aka Minnesota Power Plant Siting Act) proceedings, displacement refers to the removal of a residence or building to facilitate the safe operation of a LEPGP or HVTL.

Because of the land requirements, solar facilities are generally sited away homes or business and rarely result in the need to displace any residences. In some cases, however, construction of solar facilities may require displacement of existing homes or businesses to allow for the efficient use of land.

In the context of transmission line routing proceedings, displacement refers to the removal of a residence or building to facilitate the safe operation of a transmission line. The National Electric Safety Code (NESC) standards require certain minimum clearances between transmission lines and objects such as trees, buildings, or other structures to ensure that the transmission line can be operated safely. For electrical safety code and maintenance reasons, utilities generally do not allow residences or other buildings within the ROW of a transmission line. Any residences or other buildings located within a proposed ROW are generally removed, or "displaced." Displacements can be avoided through several means including transmission line structure placement, the use of specialty transmission line structures, and modifications of the right-of-way width.

#### Solar Project

There is one residence (E-2) and associated structures within the perimeter of the solar farm; this property is under ownership of a participating landowner. This residence is located in the East Block on the south side of 137th Street (**Figure 5**).

While not within the footprint of the solar farm, there is a residence (W-4) immediately adjacent to the West Block; this property lies within an "exception" or cut out in the solar farm footprint such that the homestead parcel is surrounded by the solar farm (**Figure 4**). This is the previously identified parcel (southwestern corner of the West Block, **Appendix B Plate W-4**) who elected to sign a lease, after the SPA was submitted, for two portions of land totaling approximately 4.1 acres on the east and west sides of the landowner's home.

There are several small groupings of agricultural storage buildings and associated grain bins in the solar farm footprint: a building and four grain bins on the south side of River Road SE (CSAH 8) in the West Block, and eight buildings on either side of 137th Street in the northeast corner of the East Block (**Figure 4** and **Figure 5,** respectively).

#### Impacts and Mitigation

The participating residence (E-2), associated buildings and grain bins in the East Block are avoided by design. Arrangements have been made with the owner for the removal of the building and four grain bins (south side of River Road SE, CSAH 8) prior to construction of the solar farm in the West Block.

There will be no other displacements as a result of siting the solar farm; therefore, no mitigation is required.

#### West HVTL Project

The West Route crosses low density rural areas that are used for agricultural production and the SGP. The route was designed to limit proximity to residences and other buildings; the alignment was designed to avoid residences along 115th Avenue SE (County Road 53). There is one residence on the east side of 115th Avenue SE (County Road 53) between U.S. Highway 10 and River Road SE/CSAH 8 (**Figure 6**); the alignment was intentionally designed on the west side of the road across from this residence and on the east side of this road south of this residence. Similarly, there is a residence on the northwest corner of the intersection of 115th Avenue SE (County Road 53) and River Road SE /CSAH 8 (**Figure 6**); the alignment was intentionally designed on the east side of 115th Avenue SE (County Road 53) to avoid the transmission line in the side yard of this residence.

#### Impacts and Mitigation

There will not be displacement of any residences or building; there are no structures within the west Route or its anticipated alignment. No mitigation is required.

#### East HVTL Project

The East Route is primarily located within the SGP; there are no residences or buildings within the east route.

#### Impacts and Mitigation

There will not be displacement of any residences or building; there are no structures within the East Route or its anticipated alignment. No mitigation is required.

### 5.4.3 Noise

Large electric generation facilities and high voltage transmission line projects have the potential to produce noise, both during construction and operation. During construction from operation of construction vehicles, equipment, and construction activities. During operation of a solar farm the inverters generate low levels of noise from the air conditioners housed in each and to a lesser extent from the transformers and rotation of the tracking system. Transmission lines may produce noise during rainy conditions due to the corona effect, a type of electrical conduction that occurs in the atmosphere near the conductor that may result in an audible hissing and cracking sound.

Potential human impacts due to noise include hearing loss, stress, annoyance, and sleep disturbance. This EA examines noise impacts from the construction and operation as required by Minnesota Rule 7849.1500, subpart 2.

Noise can be defined as any undesired sound.[105] It is measured in units of decibels on a logarithmic scale. A sound meter is used to measure loudness. The meter sums up the sound pressure levels for all frequencies of a sound and calculates a single loudness reading. This loudness reading is reported in decibels, with a suffix indicating the type of calculation used. The A-weighted decibel scale (dBA) is commonly used to measure the selective sensitivity of human hearing. This scales the physical sound levels that are measured as a pressure wave to match an equivalent "loudness" level across the audible spectrum that more closely resembles what a human ear would perceive. The A-weighted scale effectively puts more relative weight on the range of frequencies that the average human ear perceives clearly (e.g., mid-level frequencies) and less weight on those that humans do not perceive as well (e.g., very high and lower frequencies). Noise levels depend on the distance from the noise source and the attenuation of the surrounding environment. **Table 10** below provides an estimate of decibel levels of common noise sources.[106] A three dBa change in sound is barely detectable to average human hearing, whereas a five dBa change is clearly noticeable. A 10 dBa change is perceived as a sound doubling in loudness.

Minnesota's noise standards differ based on noise area classifications (NAC), which correspond to the location of the listener (or receptor) and the time of day (**Table 11**).[107] Although the NACs are based on the land use activity (residential, educational, and manufacturing) of the location where the noise is heard, the NACs do not always reflect the zoning of the location. Noise standards are expressed as a range of permissible dBA over a one-hour time period.

In a residential setting, for example, noise restrictions are more stringent than in an industrial setting. Rural residential homes are considered NAC 1 (residential), while agricultural land and agricultural activities are classified as NAC 3 (industrial). The rules also distinguish between nighttime and daytime noise; less noise is permitted at night. Sound levels are not to be exceeded for 10 percent and 50 percent of the time in a one-hour survey ($L_{10}$ and $L_{50}$) for each noise area classification.

The proposed Project (site and transmission lines) is in a rural, agriculturally dominated area; ambient noise levels in these types of locations are generally between 30 and 40 dBA during daytime hours, with higher ambient noise levels of 50 to 60 dBA expected near roadways. The primary noise receptors within the vicinity of the route would be residences.

### Solar Project

Background noise in the vicinity of the solar farm is typically a result of farming equipment/operations, wind, snowmobiles, and vehicle and rail traffic along U.S. Highway 10 and the Burlington Northern-Santa Fe Railroad.

[105] MPCA (n.d.) *Noise Program*: https://www.pca.state.mn.us/air/noise-program.
[106] MPCA (November 2015) *A Guide to Noise Control in Minnesota*: https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf.
[107] Minn. R, 7030.0050, https://www.revisor.leg.state.mn.us/rules/?id=7030.0050.

Table 10. Common Noise Sources and Levels (A-weighted Decibels)[108]

| Sound Pressure Level (dBA) | Common Indoor and Outdoor Noise Sources |
|---|---|
| 100-110 | Rock band (at 16.4 ft [5 m])<br>Jet flyover (at 984.3 ft [300 m]) |
| 90-100 | Gas lawnmower (at 3.28 ft [1 m]) |
| 80-90 | Food blender (at 3.28 ft [1 m]) |
| 70-80 | Shouting (at 3.28 ft [1 m])<br>Vacuum cleaner (at 9.84 ft [3 m]) |
| 60-70 | Normal speech (at 3.28 ft [1 m]) |
| 50-60 | Large business office<br>Dishwasher next room, quiet urban daytime |
| 40-50 | Library, quiet urban nighttime |
| 30-40 | Quiet suburban nighttime |
| 20-30 | Bedroom at night |
| 10-20 | Quiet rural nighttime<br>Broadcast recording studio |
| 0 | Threshold of hearing |

Table 11. MPCA Noise Standards - Hourly A-Weighted Decibels

| Noise Area Classification | Daytime (7:00 a.m. – 10:00 p.m.) | | Nighttime (10:00 p.m. – 7:00 a.m.) | |
|---|---|---|---|---|
| | L50 | L10 | L50 | L10 |
| 1-Residential | 60 | 65 | 50 | 55 |
| 2-Commerical | 65 | 70 | 65 | 70 |
| 3-Industrial | 75 | 80 | 75 | 80 |

Noise concerns for the solar farm will be related primarily to the construction phase as the result of heavy equipment operation and increased vehicle traffic associated with the transport of construction materials and personnel to and from the work area. It is anticipated that construction activities will only occur during daylight hours.

### Impacts and Mitigation

Construction associated noise will likely be perceptible at adjacent residences. Grading equipment, bobcats, and other construction equipment are anticipated to emit noise between 76-85 dBA at 50

[108] Minnesota Pollution Control Agency (MPCA). 2015. *A Guide to Noise Control in Minnesota: Acoustical Properties, Measurement, Analysis and Regulation*. pca.mn.us

feet.[109] Noise associated with these types of equipment will primarily occur during the initial site set up – grading and access road construction which is expected to last approximately four months for each solar farm block.

Pile driving of the rack supports is expected to create the most noise measured at 101 dBA at 50 feet.[110] Installation of each rack support takes between 30 seconds to 2 minutes depending on the soil conditions; it is anticipated that this activity will take up to 15 months to complete for the entire solar farm. A forklift will be used to place individual panels on the tracking rack system.

The noise from these construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. Construction activities will be sequenced; site preparation may occur at a portion of the site while pile driving occurs at a different location with the locations of impact shifting as construction proceeds in a sequence across the area.

These noise impacts will be temporary and limited to daytime hours.

During operation of the solar farm, the primary source of noise will be from the inverters, and to a lesser extent from the transformers and rotation of tracking systems, located at each facility. All electrical equipment would be designed to National Electrical Manufacturer Association standards; anticipated inverter and tracker noise for the solar farm are summarized in **Table 12**.[111]

Table 12. Representative Inverter and Tracker Noise Levels[112]

| Facility Type | Equipment Model | Distance to 50 dBA | dBA at 50 feet |
|---|---|---|---|
| Inverter | Power Electronics HEM 660V | 93 feet | 55.4 |
| | SMA Sunny Central UP | 143 feet | 59.1 |
| | TMEIC Ninja | 104 feet | 56.3 |
| Tracker | ATI DuraTrack HZ v3 | 5 feet | 30 |
| | NexTracker | 82 feet | 54 |

The results of noise modeling show that noise levels will be less than 50 dBA between 93 and 143 feet from the inverter. Similarly, noise levels will be less than 50 dBA between 5 and 82 feet from the trackers. The closest residence to the facility is 185 feet away from the edge of a solar array. The distance of the nearest inverter to a residence is 599 feet.[113] Noise from the electric collection system is not expected to be perceptible.

[109] SPA, at p. 78.
[110] Ibid.
[111] Ibid.
[112] SPA, at p. 78, Table 5.2-5.
[113] SPA, at pp. 78-79.

During construction, activities are planned to limit construction to daylight hours. No noise impacts are anticipated during operation; therefore, no mitigation measures are required.

### West HVTL Project

The MPCA state noise standards applicable for the West Route include areas classified as residential for the portion of the West Route outside the SGP and industrial within the SGP. Ambient noise levels in these locations are generally between 35 and 40 dBA during daytime hours. Noise levels will increase sporadically with passing vehicle and rail traffic, high winds, or use of farm equipment, all-terrain vehicles, or snowmobiles. The primary noise receptors within the vicinity of the West Route are residences and farmsteads. Residences are assigned to NAC 1, which have lower daytime and nighttime limits than areas classified as NAC 3 - Industrial.

### Impacts and Mitigation

During the construction of the transmission line projects, temporary, localized noise from heavy equipment and increased vehicle traffic is expected to occur along the ROW during daytime hours. Construction activity and crews would be present at a particular location during daytime hours for a few days at a time but on multiple occasions throughout the period of approximately five to seven months between initial ROW clearing and final restoration. Construction equipment produces sound levels in the range of 74 to 85 dBA, measured at 50 feet from the source:[114]

- Clearing and grading: grader (85 dBA), chainsaw (84 dBA), and tractor (85 dBA),
- Material delivery: flatbed truck (74 dBA) and crane (81 dBA),
- Auguring foundation holes: augur drill rig (84 dBA); and
- Setting structures: crane (81 dBA).

Construction noise could temporarily affect residences that are close to the ROW. All residences are greater than 75 feet from the centerline of the anticipated alignment (**Figure 6**). As sound pressure levels decrease with distance, no exceedances of MPCA daytime noise standards are anticipated.

Several means to mitigate potential construction noise impacts include:

- Limiting heavy equipment use to the shortest possible time period.
- Minimizing construction equipment idling.
- Ensuring that proper mufflers are used on equipment.
- As practicable, locating stationary equipment (e.g., compressors, generators) away from receptors or behind barriers.

[114] SPA, at p. 79.

Noise from the operation of transmission lines is due to small electrical discharges along the conductors that ionize surrounding air molecules. This phenomenon is known as corona. The level of noise from these discharges depends on conductor conditions, voltage levels, and weather conditions. Noise emissions are greatest during heavy rains when conductors are consistently wet. However, during heavy rains, the background noise level is usually greater than the noise from the transmission line and few people are in close proximity to the transmission line in these conditions. As a result, audible noise is not generally noticeable during heavy rains.

In foggy, damp, or light rain conditions, transmission lines may produce audible noise higher than background levels. During dry weather, noise from transmission lines is a perceptible hum and sporadic crackling sound.

The applicant modeled and estimated noise levels for the transmission lines, assuming a 2-bundle Dover T-2 ACSR conductor in a vertical configuration with 18" spacing with 230 MVA loading, the noise levels would be anticipated to be well below state standards (nighttime limit of 50 dBA in residential areas and 75 dBA in industrial areas).[115]

**Table 13** presents predicted noise levels for the west route. Audible noise from the transmission line would only be expected during quiet, foggy, or rainy conditions and would be rare.

Table 13. Noise Calculations for 345 kV Single Circuit Monopole in Vertical Configuration [116]

| Predicted Audible Noise Level Results, $L_{50}$ [1] [dB(A)]Distance from Centerline | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **-300** | **-200** | **-100** | **-75** | **-50** | **-25** | **0** | **25** | **50** | **75** | **100** | **200** | **300** |
| 34.1 | 36.7 | 40.3 | 41.4 | 42.7 | 43.7 | 43.8 | 43.0 | 42.0 | 41.0 | 39.9 | 36.5 | 34.0 |

1 $L_{50}$ is defined as the noise level exceeded 50 percent of the time, or for 30 minutes in an hour.

Noise impacts resulting from the operation of the West Route are not anticipated and no mitigation is required.

### East HVTL Project

The east route is classified as NAC 3 – Industrial within the SGP. Ambient noise levels in these locations are generally between 60 and 70 dBA during daytime hours. Noise levels will increase sporadically with passing vehicle and rail traffic, high winds, or use of farm equipment at adjacent properties, or snowmobiles. There are a number of noise receptors in proximity to the East Route; the closest residences to the East Route are half mile east (E-2) and half mile south (E-1) of the East Route's anticipated alignment (**Figure 6**).

[115] SPA, at p. 80.
[116] SPA, at p. 80, Table 5.2-6.

### Impacts and Mitigation

The construction impacts (equipment, duration, sound levels) described for the west route apply to the East Route as well. The actual perceived impact is anticipated to be minimal and short term because the nearest residences are at their closest one-half mile to the East Route.

Since noise for transmission lines is a function of voltage and conductor geometry, the audible noise analysis presented for the west route transmission line is also applicable to the East Route. At the edge of the ROW, noise levels were modeled to be at 41 dBA (**Table 13**), below the state standard for residential areas (nighttime limit of 50 dBA) and well below the state standard for industrial (nighttime limit of 75 dBA) areas for which the majority of the east route is within.

Noise impacts resulting from the operation of the east route are not anticipated and no mitigation is required.

## 5.4.4 Property Values

Large electric power generation plants have the potential to impact property values. Because property values are influenced by a complex interaction between factors specific to each individual piece of real estate as well as local and national market conditions, the effect of one particular project on the value of one particular property is difficult to determine.

The placement of infrastructure near human settlements has the potential to impact property values. The impacts can be positive and negative. The type and extent of impacts depends on the relative location of the infrastructure and existing land uses in a given area. For example, a new highway may increase the value of properties anticipated to be used for commercial purposes but decrease the value of nearby residential properties.

Potential impacts to property values due to large energy facilities are related to three main concerns:

- Potential aesthetic impacts of the facility,
- Concern over potential health effects from emissions (air emissions, wastewater discharges, electric and magnetic fields, etc.), and
- Potential interference with agriculture or other land uses.

### Solar Project

The presence of the solar farm will become one of many interacting factors that could affect a property's value. Unlike fossil-fueled electric generating facilities, the solar farm will have no emissions and essentially no noise impacts to adjacent land uses during operation of the facility. The installation of the solar farm would create a visual impact, but lacking the height of smokestacks or wind turbines, the visual impact at ground level, or within a neighboring property, would be more limited.

### Impacts and Mitigation

A review of the literature found no research specifically aimed at quantifying impacts to property values based solely on proximity to utility-scale PV facilities. As the industry continues to develop comparable data should become available.

For these reasons, the impact to the value on one particular property based solely on its proximity to the solar farm is difficult to determine. Widespread negative impacts to property values are not anticipated, however, in unique situations it is possible that individual property values might be negatively impacted. As discussed in Section 4.4.1 *Aesthetic* and Section 4.4.3 *Noise*, those factors relevant to property values can also be mitigated through proper siting, BMPs (restoration and vegetation management) and screening the site (berms, deer fencing, and vegetation).

### West HVTL Project

Potential impacts to property values due to transmission lines are related to three main concerns: (1) potential aesthetic impacts of the line, (2) concern over potential health effects from electric and magnetic fields (EMF), and (3) potential interference with agriculture or other land uses. Research on the relationship between property values and proximity to transmission lines has not identified a clear cause and effect relationship. Rather, the presence of a transmission line is one of many factors that affect the value of a specific property. The research has revealed trends which are generally applicable to properties near transmission lines:[117]

The West Route is located in sections 26, 27, and 35 of Clear Lake Township and Sections 25 and 36 (T34N R29W) and Sections 1 and 2 (T33N 29W), all four of which are within the City of Becker. The West Route was developed based on the Applicant's routing criteria[118] and voluntary landowner participation. Land within the solar farm was also leased by the Applicant's for the transmission line; outside the solar farm, the West Route is sited on Xcel Energy property. The West Route traverses predominately cultivated crop lands utilizing roads and parcel lines and accounting for landowner preferences for the anticipated alignment.

### Impacts and Mitigation

When negative impacts on property values occur, the potential reduction in property values is in the range of 1 to 10 percent.

Impacts on property values decrease with distance from the line. Thus, impacts on the sale price of smaller properties are usually greater than impacts on the sale price of larger properties. Other amenities, such as proximity to schools or jobs, lot size, square footage of a house, and neighborhood characteristics, tend to have a much greater effect on sale price than the presence of a power line.

[117] Final Environmental Impact Statement, Arrowhead–Weston Electric Transmission Line Project, Volume I, Public Service Commission of Wisconsin Docket 05-CE-113, October 2000, p. 212-215.
[118] SPA, at Section 3.3 West HVTL Project-Facility Design and Route Selection Process, pp.40-43.

Negative impacts appear to diminish over time. The value of agricultural property is likely to decrease if the power line poles are placed in an area that inhibits farming operations.

A recent literature review examined 17 studies on the relationship between transmission lines and property values.[119] The reviewers concluded that the studies indicate small or no effects on the sale price of properties due to the presence of transmission lines.[120]

Impacts to property values could be mitigated by minimizing aesthetic impacts, perceived EMF health risks, and agricultural impacts. Selecting routes and alignments that maximize the use of existing rights-of-way and that place the transmission line away from residences and out of agricultural fields could address these concerns, thus minimizing impacts to property values. Impacts can be mitigated through inclusion of specific conditions in individual easement agreements with landowners along the transmission line.

#### East HVTL Project

The new 1.7-mile single circuit 345 kV transmission line (East Route), to connect the solar farm to the existing Sherburne County Substation on the south side of the SGP, is located in sections 1, 6, and 7 of the City of Becker and Becker Township. The East Route was developed based on the Applicant's routing criteria[121] and prioritized a direct route that utilized land within the SGP. The East Route exits the west side of the East Collector Substation and immediately crosses Sherburne Avenue before entering the SGP.

#### Impacts and Mitigation

The general potential impacts and mitigations to property values analysis presented for the West Route are also applicable to the East Route, however, there are no private landowners along the East Route.

### 5.4.5 Socioeconomics/Demographics and Environmental Justice

Socioeconomics is an umbrella term used to describe aspects of a project that are either social or economic in nature, or a combination of the two. A socioeconomic analysis evaluates how elements of the human environment such as population/demographics, employment, housing, and public services might be affected by the proposed action and alternative(s).

Broadly defined, demography is the study of the characteristics of populations through statistical data. It provides a description of a population and how those characteristics change over time. Where there

[119] The Effects of Transmission Lines on Property Values: A Literature Review, Journal of Real Estate Literature, 2010, www.real-analytics.com/Transmission Lines Lit Review.pdf.
[120] Ibid.
[121] SPA, at Section 3.3 West HVTL Project-Facility Design and Route Selection Process, pp.40-43.

are foreseeable impacts, the incorporation of demographic data into environmental review may be useful in the evaluation of these potential impacts to the host community. These impacts may be beneficial or adverse. The discussion should address whether any social group is disproportionally impacted and identify possible mitigation measures to avoid or minimize any adverse impacts.

Environmental justice is the concept that seeks to achieve the fair and equitable distribution of environmental benefits and burdens associated with economic production, which includes the siting of large infrastructure projects. The original conception of environmental justice in the 1980s focused on harms to certain marginalized racial groups within rich countries such as the United States. The movement was later expanded to consider gender, international environmental discrimination, and inequalities more completely within disadvantaged groups. The ROI for environmental justice includes the census tract intersected by the project.

Large infrastructure projects have the potential to impact the socioeconomic conditions of the areas in which they are sited, both positively and negatively. In the short term through an influx of non-local personnel, creation of construction jobs, construction material and other purchases from local businesses, and expenditures on temporary housing and support for non-local personnel. In the long term, large infrastructure projects may have socioeconomic impacts through changes in land use and local tax base, permanent job creation or relocation of project personnel to the area. Large renewable projects, such as utility scale solar and wind projects, which are generally sited in rural, less densely populated regions in Minnesota, would be anticipated to have similar local socioeconomics impacts. However, along with these socioeconomic impacts, the transition away from traditional carbon-based sources of energy, has the potential for geographically broader impacts associated with the displacement or stranding of workers and communities.[122]

The Project site is located in Minnesota Economic Development Region 7W (**Diagram 18**); this region includes a total of four counties, located in the larger 13-county Central Minnesota planning region.

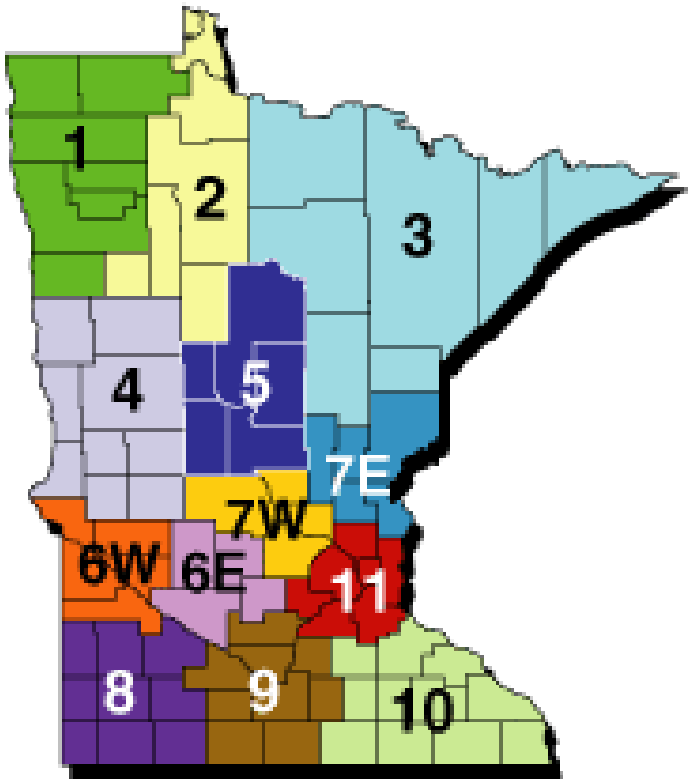
For the current Comprehensive Economic Development Strategy planning period (2017-2021), one of the most significant economic transitions or impacts for the 7W region will occur in the coming decade and concerns the closing of the SGP. The SGP is a significant coal-fired power plant in Becker, Minnesota (Sherburne County) and its three units have a combined capacity of 2,400 megawatts, making it the largest power plant in the Midwest, and 16th largest in the nation.[123]

On October 2, 2015, Xcel Energy filed plans with the Minnesota Public Utilities Commission to shut down the plant's Unit 2 in 2023 and Unit 1 in 2026. The generating capacity will be partly replaced

[122] Just Transition A Report for the OECD, May 2017. International Trade Union Confederation - Building Workers' Power (ituc-csi.org).
[123] REGION 7W Comprehensive Economic Development Strategy in Central Minnesota, 2017. 9.2BigLakeActionFile.pdf (state.mn.us).

with a new natural gas-fired power plant and partly through renewable energy investments. Regulators approved the plan in October 2016.

Diagram 18. Economic Development Region 7W[124]




The SGP employs over 300 workers in "high pay, high demand" jobs; in addition, a recent analysis by the University of Minnesota Extension Office indicates that for every 100 electric power generation jobs, an additional 227 indirect and induced jobs are created. Of equal significance, the coal plant represents 75 percent of the tax base in Becker, and 15 percent for the entire county. Local leaders are eager to use the transition period to diversify the tax base and create or retain jobs in new or related sectors. Substantial investments by local government and partners have already been made to assess feasibility of transportation and related infrastructure investments to support the attraction or expansion of businesses in the Becker Industrial Park (located adjacent to SGP) as a mitigation for the job and tax losses associated with the transitions at the power plant.[125]

### Solar Project

As stated, the ROI for this analysis includes the census tracts intersected by the Project; this census tract is the best approximation of the geographic area within which potential disproportionate adverse

[124] https://apps.deed.state.mn.us/assets/lmi/areamap/edr.shtml.
[125] REGION 7W Comprehensive Economic Development Strategy in Central Minnesota, 2017. 9.2BigLakeActionFile.pdf (state.mn.us).

impacts from the Project could occur. Sherburne County, which contains this census tract, is considered representative of the general population in the Project area against which census tract poverty and demographic data can be compared.

The Project is located in a rural area just outside of Becker within Becker and Clear Lake Townships. The solar farm is directly adjacent to the municipal boundary of the City of Becker. Additional incorporated communities that are geographically closest to the Project are Clear Lake (2.4 miles northwest), Clearwater (3.8 miles west), Big Lake (1.2 miles east), and Monticello (1.3 miles south/southeast). The nearest metropolitan area is St. Cloud, which is approximately 12 miles northwest of the Project (**Figure 1**).

**Table 14** presents population and economic information about Minnesota and Sherburne County. Data is provided at the county level to characterize the socioeconomic environment in the Project area and at the state level for the purpose of comparison.

**Table 14. Population and Socioeconomic Characteristics of Project Area[126]**

| Socioeconomic Category | Minnesota | Sherburne County |
|---|---|---|
| Total Population (2010)[1] | 5,303,925 | 88,499 |
| July 1, 2019 Population Estimate[1] | 5,639,632 | 97,238 |
| Population Change 2010 to 2019 (percent)[1] | 6.3 | 9.9 |
| Total Minority Population (percent)[1, 2] | 20.9 | 9.5 |
| Total Housing Units[3] | 2,420,473 | 33,542 |
| Vacant Housing Units[3] | 252,672 | 1,805 |
| Per Capita Income (U.S. Dollars)[4] | $36,245 | $34,013 |
| Unemployment Rate (percent)[4] | 3.9 | 3.1 |
| Persons Living Below the Poverty Rate (percent)[4] | 10.1 | 7.1 |
| Top Three Industries[4,5] | E (25.2%), M (13.4%), and R (11.0%) | E (21.3%), M (15.8%), and R (11.7%) |

1 U.S. Census Bureau, 2019
2 Total minority percentage equals the total population minus the percentage of white alone, not Hispanicor Latino.
3 U.S. Census Bureau, 2018a
4 U.S. Census Bureau, 2018b
5 Industries are defined under the 2012 North American Industry Classification System and abbreviated asfollows: E = Educational, Health and Social Services; M = Manufacturing; and R = Retail Trade.

The population of Sherburne County is 88,499 persons, which represents 1.6 percent of the total population of Minnesota.[127] The total population in Sherburne County has increased by just under 10 percent since the 2010 census. The per capita income of Sherburne County is $34,013, which is lower

[126]SPA, at p. 92, Table 5.2.8.
[127] U.S. Census Bureau QuickFacts: Sherburne County, Minnesota; Minnesota.

than the state average. The unemployment rate in Sherburne County (3.1 percent) is slightly lower than the state average of 3.9 percent and the percentage of individuals classified as living below the poverty level (7.1 percent) in Sherburne County is lower than the state average of 10.1 percent. The primary industries in Sherburne County are classified as educational services, health care, and social assistance (21.3 percent), followed by manufacturing (15.8 percent), and retail trade (11.7 percent). The top three industries at the state level are the same as at the county level, with the manufacturing and retail trade industries playing a slightly lower role at the state level than at the county level.

According to the 2018 American Community Survey 5-year Estimates, approximately 1,805 vacant housing units exist in Sherburne County. In the nearest metropolitan area, St. Cloud, there are approximately 1,414 vacant housing units (U.S. Census Bureau, 2018c). In addition, according to the Visit St. Cloud website (visitstcloud.com, n.d.) 23 hotels and motels, three bed and breakfasts, and seven campgrounds are available in the greater St. Cloud area[128]

### Impacts and Mitigation

If approved by the Commission, construction activities at both the solar farm and associated HVTLs will provide temporary increases in revenue to the area through increased demand for lodging, food services, fuel, transportation, and general supplies.

During construction, the Project is expected to create new local job opportunities for various trade professionals that live and work in the area. Additional personal income will also be generated by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes. General skilled labor is anticipated to be available in Sherburne County or Minnesota to serve the Project's basic infrastructure and site development needs, however, specialized labor will be required for certain aspects of the Project.

The Applicants have stated that procurement of construction resources will give preference to women, veteran, and minority owned business contractors, and the permittee will establish a "*Workforce and Training Development Program*", which will help provide utility industry skills and training to women and members of the black, indigenous and people of color (BIPOC) community.[129] The Applicants continue, that they will utilize union labor to construct the Project; the use of union labor will ensure the payment of prevailing wages for construction workers.[130] The Applicants estimate construction of the Project will provide an approximately $115 million in wages from nearly 900 union construction jobs, in addition to opportunities for sub-contracting to local contractors for gravel, fill, and civil work.[131]

[128] SPA, at p.92.
[129] SPA, at pp. 93-95.
[130] Ibid.
[131] Ibid.

The availability of temporary or permanent housing is anticipated to be adequate. It is assumed that during construction, out-of-area workers will likely use lodging facilities nearby. The operations and maintenance of the solar farm will require approximately 24 long-term personnel; sufficient temporary lodging and permanent housing is available within Sherburne County, and within the St. Cloud metropolitan area, to accommodate construction workers and long-term personnel.

The Applicants feel that the overall socioeconomic impacts associated with the Project will be positive; wages will be paid, and expenditures will be made to local businesses and landowners during the Project's construction and operation.[132] The Project will provide more than $240 million in state and local benefits over the life of the project, including $172 million in landowner payments and $32 million in state and local property taxes in addition to production taxes of approximately $36 million.[133] In addition, lease and purchase payments paid to the landowners will offset potential financial losses associated with removing a portion of their land from agricultural production.[134]

City of Becker commented during the EA scoping process that the proposed layout of the solar farm presents significant impacts to the city and its local economy and planned future growth.[135] In the fall of 2020, the State awarded the City of Becker $20.5 million in bonding money to acquire land, predesign, design, construct, furnish, and equip public infrastructure, including water, sanitary sewer, storm sewer and drainage systems, roads, and lighting for a business park in the city of Becker.[136] The city states, that in an effort to replace the revenue (approximately 73 percent of the City's current tax base and 54 percent of Becker School District's tax base are attributable to the coal-fired units) provided by hosting the SGP, it has planned for and pursued the expansion of the Becker Business Park (beyond lots planned for the data center) to improve and diversify the City's tax base.[137]

The City continues, the Project as proposed would abut the boundary of the data center to be located in the Business Park, which would limit options for other businesses to take advantage of this infrastructure and locate in the anticipated expansion of the Business Park over the course of the expected 35-year lifetime of the Project.[138]

The City concludes with its belief that the exclusion of the five parcels identified in Alternatives 1 and 2 would help to alleviate some of negative impacts the City and local jurisdictions will already experience as a result of the decommissioning of the SGP coal-fired units and cancelation of the planned combined-cycle natural gas plant. The removal of 235 acres from the footprint of the Project

[132] Ibid.
[133] Ibid.
[134] Ibid.
[135] City of Becker EA Scoping Comment Letter, September 15, 2021, eDocket 20219-177995-02.
[136] City of Becker White Paper, February 7, 2022. eDocket No. 20222-182514-03, 06, 09, 12, 15, and 18.
[137] City of Becker White Paper, February 7, 2022. eDocket No. 20222-182514-03, 06, 09, 12, 15, and 18.
[138] Ibid.

will not, in the long-term, negatively impact Xcel Energy, but including these parcels in the Project will significantly harm the City of Becker.[139]

A demographic review of the affected community to identify low-income and minority populations that might be present was conducted. U.S. Census data was used to identify low-income and minority populations. Low-income and minority populations are determined to be present in an area when the low-income percentage or minority group percentage exceeds 50 percent or is "meaningfully greater" than in the general population of the larger ROC. In this analysis, a difference of 10 percentage points or more was used as the threshold to distinguish whether a "meaningfully greater" low-income or minority population resides in the ROI.

Error! Reference source not found.**14** lists the percentage of individuals living below the poverty level and household income. It also lists the percentage of those persons who did not self-identify as non-Hispanic white alone. Information about Minnesota is provided for context. None of the percentages for the census tracts exceed 50 percent or the Sherburne County percentage by 10 percentage points or more, which is the defined threshold of significance for potential environmental justice impacts from the Project.

A meaningfully greater low-income or minority population does not reside in the Project area; therefore, disproportionate, and adverse impacts to these populations are not expected. Mitigation is not proposed.

### West HVTL Project

The West Route is in a mixed industrial and agricultural area just west of and partially within the municipal boundary of the City of Becker and in Becker Township, Sherburne County. Additional incorporated communities that are geographically closest to the West Route are Monticello (3.5 miles south/southeast), Big Lake (5.4 miles southeast), Clearwater (5.3 miles west), and Clear Lake (3.7 miles northwest). The nearest metropolitan area is St. Cloud which is approximately 13 miles northwest of the west route (**Figure 1 and Figure 7**).

The U.S. Census data presented in **Table 14** and environmental justice analysis for the solar farm is also applicable and representative of the conditions along the West Route.

### Impacts and Mitigation

If approved by the Commission, construction activities along the West Route are expected to have minimal, short-term impacts on the existing socioeconomic conditions in the area; nor are long-term, significant changes in the population/demographics, or employment/income within the area

[139] Ibid.

anticipated. The construction and operation of the west route is not anticipated to create or remove jobs in the Project area or result in the permanent relocation of individuals to or from the area.

The Applicants feel that the host communities will likely experience short-term positive economic impacts related to the increase in expenditures during construction of the west route.[140] Construction will take approximately four months and require approximately 40 workers. Due to the short construction timeline, construction personnel will likely commute to the West Route project site on a daily or weekly basis instead of relocating to the area. The influx of additional construction personnel in the area will have a small positive impact on the local economy from construction crew expenditures in the local community (e.g., lodging, fuel, food). Construction materials (e.g., lumber, concrete, aggregate) may be purchased from local vendors where feasible.

No permanent staff will be necessary for the operation and maintenance of the proposed transmission line; no change to population trends, economic indicators, or employment are anticipated. However, long-term beneficial impacts to the local tax base will result from the incremental increase in revenues from utility property taxes.

### East HVTL Project

The East Route is in a mixed industrial and commercial area within the southern municipal boundary of the City of Becker in Becker Township, Sherburne County. Additional incorporated communities that are geographically closest to the East Route are Big Lake (4.5 miles east/southeast), Monticello (4.9 miles south/southeast), Clear Lake (6.0 miles northwest), and Clearwater (7.0 miles northwest). The nearest metropolitan area is St. Cloud which is approximately 14 miles northwest of the East Route (**Figure 1 and Figure 7**).

The U.S. Census data presented in **Table 14** and environmental justice analysis for the solar farm is also applicable and representative of the conditions along the East Route.

### Impacts and Mitigation

If approved by the Commission, construction activities along the east route are expected to have minimal, short-term impacts on the existing socioeconomic conditions in the area; nor are long-term, significant changes in the population/demographics, or employment/income within the area anticipated. The construction and operation of the east route is not anticipated to create or remove jobs in the Project area or result in the permanent relocation of individuals to or from the area.

The Applicants feel that the host communities will likely experience short-term positive economic impacts related to the increase in expenditures during construction of the west route.[141] Construction

[140] SPA, at p. 94.
[141] SPA, at p. 95.

will take approximately four months and require approximately 40 workers. Due to the short construction timeline, construction personnel will likely commute to the west HVTL project on a daily or weekly basis instead of relocating to the area. The influx of additional construction personnel in the area will have a small positive impact on the local economy from construction crew expenditures in the local community (lodging, fuel, food). Construction materials (lumber, concrete, aggregate) may be purchased from local vendors where feasible.

No permanent staff will be necessary for the operation and maintenance of the proposed transmission line; no change to population trends, economic indicators, or employment are anticipated. However, long-term beneficial impacts to the local tax base will result from the incremental increase in revenues from utility property taxes.

### 5.4.6 Zoning and Land Use Compatibility

Solar farms and transmission lines have the potential to adversely impact existing land uses and to be incompatible with existing land use patterns, local zoning requirements, and the future land use planning goals of local governmental units.

#### *Preemption of Local Zoning*

Large electric power facilities, like the solar farm and associated transmission lines, are subject to Minnesota's Power Plant Siting Act. Under this statute, the site and route permit issued for such facilities are "the sole site or route approval required to be obtained by the utility. Such permit shall supersede and preempt all zoning, building or land use rules, regulations or ordinances promulgated by regional, county, local and special purpose government."[142] Therefore, the applicant is not required to seek permits or variances from local governments to comply with applicable zoning codes. Nonetheless, impacts to local zoning are clearly impacts to human settlements, and the Commission considers impacts to human settlements as a factor in selecting sites and routes.

#### Solar Project

The solar farm is located within a rural landscape between the City of Becker and the City of Clear Lake (West Block) and between the Cities of Becker and Big Lake (East Block); the SGP lies between the two solar blocks.

The Applicants reviewed the U.S. Geological Survey (USGS) National Land Cover Database (NLCD) to identify land cover/use categories present within the solar farm.[143] The primary land use category is cultivated crops (93.0 percent).[144] The remaining land use consists of hay/pasture land (3.8 percent), developed land (2.1 percent), emergent herbaceous wetlands (0.3 percent), open water (0.3 percent),

[142] Minnesota Statutes, Section 216E.10.
[143] SPA, at pp. 100-101.
[144] Ibid.

deciduous/evergreen/mixed forest land (0.1 percent), herbaceous land (0.1 percent), barren land (0.1 percent), and woody wetlands and scrub/shrub land (<1 percent). This information is shown in **Table 15** and illustrated on **Figure 9.**

The cultivated cropland within the solar farm site is dominated by row-crop agriculture, such as corn and soybeans; the site is heavily irrigated by center pivot irrigation. Developed portions of the land generally consists of public roads. Forested land within the solar site consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. There are small areas of woody wetlands (1.1 acres) and shrub/scrub land (1.1 acres) within the solar site within the East Block and are associated with the small areas of open water (a total of 11.5 acres, spread across three ponds). Also, approximately 11.7 acres of emergent herbaceous wetlands within the solar site are predominantly within the East Block, again associated with the areas of open water.

**Table 15. Land Cover Types/Land Use Within the Solar Farm Area**[145]

| Land Cover/Use Category | Acres in Solar Project Area | Percent of Total Acreage |
|---|---|---|
| Cultivated Crops | 3,237.4 | 93.0 |
| Hay/Pastureland | 133.3 | 3.8 |
| Developed Areas (i.e., low density, medium density, high density, and open space) | 71.8 | 2.1 |
| Emergent Herbaceous Wetlands | 11.7 | 0.3 |
| Open Water | 11.5 | 0.3 |
| Deciduous/Evergreen/Mixed Forest | 4.6 | 0.1 |
| Herbaceous Land | 5.1 | 0.1 |
| Barren Land | 1.8 | 0.1 |
| Woody Wetlands | 1.1 | < 0.1 |
| Scrub/Shrub Land | 1.1 | < 0.1 |
| **Total** | **3,479.5** | **100.0%** |

Source: 2016 NLCD (Yang et al., 2018)

Farmsteads and agricultural outbuildings are sparsely scattered throughout the solar farm area and neighboring parcels, generally situated near public roads. The SGP, multiple transmission lines, and other commercial and industrial facilities south of the City of Becker are adjacent to the solar farm. Based on review of available aerial photography, there is one residence within and several residences and agricultural buildings on parcels adjacent to the solar farm site; development of the solar farm will not cause displacement or relocation of residences.

[145] Ibid and Table 5.2-9.

The Project is located within three zoning jurisdictions: Sherburne County, Becker Township, and the City of Becker (**Table 16** and **Figure 10**). All three zoning authorities have solar energy ordinances.

Sherburne County Zoning Ordinance Section 17 (General Development Regulations), Subdivision 17 (Solar Energy Systems and Solar Energy Farms) addresses the development of solar farms within the general agricultural district; solar farms are not permitted within the Mississippi and Rum Scenic and Recreational River Districts.[146] Sherburne County Zoning Ordinance applies to land in the West Block.

**Table 16. Zoning Authorities for the Solar Project[147]**

| Block | Zoning Authority | Zoning Districts in Solar Farm Area |
|---|---|---|
| West Block | Sherburne County | Agricultural |
| | | Recreational River |
| | | Shoreland Overlay[1] |
| East Block | City of Becker | Power Generation |
| | Becker Township | Agricultural |

[1] Xcel Energy has applied the structure setback of 150' in this overlay district. Source: Sherburne County, 2018; Becker Township, 2019.

Sherburne County also has a Shoreland Overlay District that is comprised of land located within 1,000 feet from the ordinary high-water level of natural environment lakes listed in the Sherburne County Shoreland Ordinance.[148] The solar farm was designed to comply with the Shoreland Ordinance Structure Setback of 150 feet from the ordinary highwater mark of natural environment lakes.[149]

Becker Township permits solar farms as a conditional use within the agricultural district.[150] Becker Township is the zoning authority for most of the land in the East Block. There are approximately 72 acres of the East Block within the City of Becker (to be used as temporary laydown areas only) on Xcel Energy property and within the SGP boundary.

Solar panels will not be sited within the City of Becker.

The solar farm complies with the setbacks within each of these three zoning authorities and districts. The structure setback in each of the four zoning jurisdictions is the same, with minor differences in the side yard or rear yard setback; the Applicants applied the most conservative setback across the Project, which is 50 feet.

[146] Sherburne County Zoning Ordinance Section 17 (General Development Regulations), Subdivision 17 (Solar Energy Systems and Solar Energy Farms, SECTION 17 - GENERAL DEVELOPMENT (sherburne.mn.us).
[147] SPA, at pp. 103-104 and Table 5.2-12.
[148] Sherburne County Shoreland Overlay District. SECTION 14 - SHORELAND OVERLAY DISTRICT. SECTION 14 - SHORELAND DISTRICT (sherburne.mn.us).
[149] SPA, at p.104.
[150] Becker Township Zoning Ordinance, Section 7; Becker Township, 2019. section_seven_ag_district_rev_jan_2019.pdf (beckertownship.org).

### Impacts and Mitigation

Development of solar farms in agricultural districts (Sherburne County and Becker Township) is a permitted use. No solar facilities are proposed to be sited in the Recreation River District (Sherburne County) or within the City of Becker. Notwithstanding Minnesota Statutes, Section 216E.10, the Applicants have stated that they will continue to coordinate with Sherburne County, Clear Lake Township, and Becker Township on potential permits (driveway and utility crossing permits) for the development of the solar farm.[151] Developed land is present within the solar farm footprint in the form of public roadways (13.9 acres); the solar farm design avoids impacting this land cover/use type by incorporating the setback requirements from Sherburne County and Becker Township.

Cultivated crop land will be converted from an agricultural use to solar energy production use for the life of the Project. The conversion of agricultural land to a solar farm is anticipated to have minimal impact on the rural character of the surrounding area or Sherburne County; of the 277,069 acres that comprise Sherburne County, approximately 102,544 acres (37 percent) are farmland. The conversion of 2,912 acres of cultivated cropland to solar energy production would reduce the amount of agricultural land in the county by 2.8 percent. The Applicants have developed a draft Agricultural Impact Mitigation Plan (AIMP)[152] in an effort to maintain the land in a condition to allow for conversion back to agricultural production at the end of the Project's life. The AIMP is a typical post permit compliance deliverable for siting LEPGP facilities in agricultural lands (**Appendix C**). The draft AIMP developed by the Applicants[153] incorporates BMPs associated with pre-construction and construction methods to avoid and minimize impacts to soil and productivity.

Forested land within the solar farm footprint consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. Some tree clearing will be necessary for installation of the solar farm components; however, the Applicants have designed the solar farm to avoid tree clearing on the perimeter of the site.

The majority of open water areas and emergent herbaceous wetlands are located within the East Block of the solar farm (4.0 and 2.1 acres, respectively). The small areas of woody wetlands and shrub/scrub land (1.1 acres each) within the East Block are associated with these small areas of open water; these areas will also not be impacted. Open water and emergent herbaceous wetlands in the West Block (0.3 and 0.2 acre, respectively) are associated with ponds located just outside the footprint, off the northwestern corner of the West Block; design of the solar farm avoids impacts to open water and emergent herbaceous wetlands in the West Block.

**Table 17** provides the total acres of each land cover/use type within the Solar Project Footprint.

[151] SPA, at p. 106.
[152] SPA, at Appendix F.
[153] SPA, at Appendix F.

**Table 17. Land Use Impacts for the Solar Farm[154]**

| Land Cover/Use Category | Acres in Project Footprint | Percent of Total Acreage |
|---|---|---|
| Cultivated Crops | 2,912.7 | 96.3 |
| Hay/Pastureland | 86.5 | 2.9 |
| Developed Areas (i.e., low density, medium density, high density, and open space) | 13.9 | 0.5 |
| Emergent Herbaceous Wetlands | 2.3 | 0.1 |
| Open Water | 4.3 | 0.1 |
| Deciduous/Evergreen/Mixed Forest | 1.0 | < 0.1 |
| Herbaceous Land | 1.1 | < 0.1 |
| Barren Land | 0.2 | < 0.1 |
| Woody Wetlands | 1.1 | < 0.1 |
| Scrub/Shrub Land | 1.1 | < 0.1 |
| **Total** | **3,024.2** | **100.0%** |
| Source: 2016 NLCD | | |

### West HVTL Project

The Applicants reviewed the U.S. Geological Survey (USGS) National Land Cover Database (NLCD) to identify land cover/use categories present within the transmission line proposed routes (**Table 18**).

**Table 18. Land Cover Types within the West Route[155]**

| Land Cover/Use Category | Acres | Percent |
|---|---|---|
| Route Length (miles) | 3.2 | |
| 150-foot Right-of-Way (acres) | 58.0 | |
| ***Land Cover*** | | |
| Cultivated Crops in 150-foot Right-of-Way (acres) | 35.0 | 60.4 |
| Hay/Pastureland in 150-foot Right-of-Way (acres) | 5.6 | 9.6 |
| Herbaceous Land in 150-foot Right-of-Way (acres) | 1.2 | 2.0 |
| Developed Areas in 150-foot Right-of-Way (acres) (i.e., low density, medium density, high density, and open space) | 16.2 | 28.0 |
| Barren Land in 150-foot Right-of-Way (acres) | < 0.1 | < 0.1 |
| Source: 2016 NLCD | | |

Approximately 35.0 acres of cultivated crop land lie within the proposed 150-foot ROW for the West Route anticipated alignment. The remaining 23.0 acres within the 150-foot ROW is comprised of developed, hay/pasture, and herbaceous land except for less than 0.1 acre of barren land. Developed

[154] SPA, at pp. 105 and Table 5.2-13.
[155] SPA, at pp. 101 and Table 5.2-10.

lands are roads that are either crossed by or co-located with the West Route anticipated alignment or associated with the SGP. There are no emergent herbaceous wetlands, woody wetlands, or forested land within the proposed 150-foot ROW for the West Route anticipated alignment (**Figure 9**).

Typical crops grown in the cultivated crop areas along the West Route include corn, soybeans, and vegetables harvested for sale.

The West Route is sited within the agricultural district of Sherburne County (Clear Lake Township) and power generation district of the City of Becker (**Figure 10**). The NESC standards require certain clearances between transmission line facilities and buildings for safe operation of the transmission line. Areas zoned as commercial, industrial, or residential are the most likely areas where future development of residences and other structures may occur. The industrial area of the SGP has several existing transmission lines; residential development is unlikely adjacent to the SGP.

### Impacts and Mitigation

Construction and operation of the West Route is not expected to have a significant impact on land use within Sherburne County or the City of Becker. Existing land uses will experience minimal, short-term impacts during the period of construction. The anticipated alignment for the West Route will be co-located with roads or property lines outside the SGP, which will minimize impacts. Upon completion of construction activities, the permittee will restore temporary workspaces and the ROW according to the vegetation management plan[156]; agricultural land uses outside the SGP will be allowed to continue as before.

The anticipated alignment for the West Route crosses areas zoned as agricultural in Sherburne County and power generation in the City of Becker. In both zoning districts, the construction and operation of the West Route is not anticipated to affect the underlying land use, as the West Route is collocated with roads in the agricultural district (avoiding greenfield crossings of agricultural fields) and within the SGP. This routing facilitates future planned commercial and industrial development within and adjacent to the SGP.

### East HVTL Project

The Applicants reviewed the U.S. Geological Survey (USGS) National Land Cover Database (NLCD) to identify land cover/use categories present within the transmission line proposed routes (**Table 19**).

Approximately 20.2 acres of cultivated crop land would be within the 150-foot ROW for the East Route anticipated alignment. The remaining 10.4 acres within the 150-foot ROW are developed and hay/pastureland, except for less than 0.1 acre of open water. Developed lands are roads that are

[156] SPA, at Appendix G.

**Table 19. Land Cover Types within the East Route[157]**

| Land Cover/Use Category | Acres | Percent |
|---|---|---|
| Route Length (miles) | 1.7 | |
| 150-foot Right-of-Way (acres) | 30.6 | |
| ***Land Cover*** | | |
| Cultivated Crops in 150-foot Right-of-Way (acres) | 20.2 | 66.0 |
| Hay/Pastureland in 150-foot Right-of-Way (acres) | 3.1 | 10.0 |
| Developed Areas in 150-foot Right-of-Way (acres) (i.e., low density, medium density, open space) | 6.7 | 21.9 |
| Open Water in 150-foot Right-of-Way (acres) | 0.6 | 2.1 |
| Source: 2016 NLCD (Yang et al., 2018) | | |

either crossed by or co-located with the proposed East Route alignment or associated with the SGP. Open water crossed by the proposed 150-foot ROW of the East Route anticipated alignment is a stormwater retention pond within the existing SGP, just east of the Sherburne County Substation. There is no herbaceous land, emergent herbaceous wetlands, woody wetlands, forest land, or barren land within the 150-foot ROW of the East Route anticipated alignment (**Figure 9**).

The East Route is located within the agricultural district of Becker Township and the power generation district of the City of Becker (**Figure 10**). The industrial area of the SGP has several existing transmission lines; residential development is unlikely adjacent to the SGP.

#### Impacts and Mitigation

Construction and operation of the East Route is not expected to have a significant impact on land use within Sherburne County. Existing land uses will experience minimal, short-term impacts during the period of construction. The East Route anticipated alignment leaves the East Collector Substation, and crosses 140th Avenue (Sherburne Avenue), the anticipated alignment is sited within the fence line of the existing SGP. Upon completion of construction activities, the permittee will restore temporary workspaces and the ROW to allow land uses to continue as before.

The East Route anticipated alignment predominantly crosses areas zoned as power generation within the SGP. The anticipated alignment has been designed to facilitate potential future commercial, industrial and energy generation development within and adjacent to the SGP and to avoid existing infrastructure and land uses associated with the SGP.

### 5.4.7 Cultural Values

[157] SPA, at pp. 102 and Table 5.2-11.

Cultural values are those community beliefs and attitudes which provide a framework for community unity and animate community actions. Cultural values are informed, in part, by history and heritage. The Project area has been home to a variety of persons and cultures. Solar projects and transmission line projects have the potential to impact public perceptions of identity and may impact participation in community and regional events during construction or operation of large infrastructure projects.

### Solar Project

Sherburne County was created on February 25, 1856 (Organized in 1862) from Benton County; originally the area was contested middle ground between the northern Ojibwa people and the southern Dakotas. A treaty in 1837 opened the area to whites and created a buffer zone between the tribes. After the treaty, ox cart trains moved goods and people through the area; by the 1860s there were several small communities supporting the farmers who had settled. They were drawn by the available prairie land and the proximity to the Mississippi River, which is Sherburne County' southern border.[158] The township of Becker was settled in 1855, organized in 1871, and its railway village, founded in 1867. The township of Clear Lake was settled in 1850, organized in 1858, and its railway village, founded in 1867 and platted in 1879.[159]

In the book, *Our Patchwork Nation*, authors Chinni and Gimpel draw on two years of research, interviews, and U.S. Census data to offer regional portraits of the U.S. that look at political, social, economic, and cultural perspectives of the entire country county by county. They provide a list of 12 distinct types of communities that comprise the nation.[160] In Chinni and Gimpel's analysis, Sherburne County is characterized as *Boom Town* community. A county's development as a boom town appears to be linked to their distance from an industrial metropolis. Areas that offered commuting distance to major employment centers boomed, while some surrounding areas, such as the Emptying Nests, began to lose population.

Today the majority of population in Sherburne County identifies as White alone, not Hispanic or Latino with an ethnic background of European origin. Cultural representation in community events appears to be more closely tied to seasonal events, national holidays, and municipal events than to those based in ethnic heritage.

### Impacts and Mitigation

No impacts to cultural values are anticipated as a result of the construction and operation of the solar farm and therefore no mitigation is deemed warranted. The Project will not adversely impact the work or recreation of residents in the vicinity of the solar farm that underlie the area's cultural values, nor will it adversely impact geographical features that inform these values.

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[158] Research – Sherburne History Center.

[159] History of Sherburne County Surveying, History of Sherburne County Surveying - Baldwin Township (govoffice.com).

[160] Chinni and Gimpel. Our Patchwork Nation: The Surprising Truth About the "Real" America. ISBN 1-101-46213-2.

The Project contributes to the growth of renewable energy and is likely to strengthen and reinforce this value in the area, should it currently exist. Should it not currently exist, it might foster this value. At the same time, the development of the Project will change the character of the area. The value residents put on the character of the landscape within which they live is subjective, meaning its relative value depends upon the perception and philosophical or psychological responses unique to individuals. Because of this, construction of the Project might—for some residents—change their perception of the area's character thus potentially eroding their sense of place. This tension between infrastructure projects and rural character creates real tradeoffs.

#### West HVTL Project

Given that the ROI for the potential impacts to cultural values is defined as the townships or county in which the Project is sited, the area for the West Route is the same as the solar farm, and as such, the cultural values of the local populace and the community events for the solar farm are representative of the West Route.

#### Impacts and Mitigation

No impacts due to the construction or operations of the West Route are anticipated; no mitigative measures specific to cultural values are warranted.

#### East HVTL Project

The ROI for the East Route is the same as the solar farm, and as such, the cultural values of the local populace and the community events for the solar farm are representative of the East Route.

#### Impacts and Mitigation

No impacts due to the construction or operations of the East Route are anticipated; no mitigative measures specific to cultural values are warranted.

### 5.4.8 Electronic Interference (*Radio, Television, Cellular Phone, and GPS Systems)*

This chapter summarizes the potential impacts of the Project on electronic communications and communication devices, including radios, televisions, and microwave communications.

#### Solar Project

Solar farms could produce electromagnetic interference (EMI) and the potential effects have brought about concerns from stakeholders whose infrastructure may be affected by this type of interference. EMI is typically taken to mean radiofrequency (RF) emissions emanating from PV systems impacting nearby radio receivers, but can also include interference with communication devices, navigational aids, and explosives triggers.[161]

[161] Electro-Magnetic Interference from Solar Photovoltaic Arrays, U.S. Department of the Navy, Electro-Magnetic Interference from Solar Photovoltaic Arrays, U.S. Department of the Navy, Renewable Energy Program Office (REPO) (nrel.gov).

There are 58 Amplitude Modulation (AM) and Frequency Modulation (FM) radio broadcasting stations operating near Becker, Minnesota including, KCMP (89.3 FM), KNOW (91.1 FM), KQRS (92.5 FM), KSTP (94.5 FM), KQQL (107.9 FM), WXYG (540 AM), WDGY (740 AM), and WCCO (830 AM). These stations, and others, operate or can be heard within the vicinity of the solar farm.[162]

There are more than 44 television channels broadcast in the Project area; these channels would be received from cities including St. Cloud and the Minneapolis-St. Paul area. Mid-Continent is the local cable television service provider for the Becker area.[163]

Telephone services are provided by Frontier Communications, Mid-Continent, and Windstream Communications. There are several broadband providers in Sherburne County offering a range of available technologies including mobile, fiber, satellite, and cable broadband service.[164]

There are 33 cellular phone towers registered with the Federal Communications Commission (FCC) that are located near the City of Becker and in the Project area. One tower is in Becker, about 1.2 miles east of the solar farm. Several cellular phone service providers operate in the Project area, including large carriers like Verizon, AT&T, Sprint, T-Mobile, Virgin Mobile, and Consumer Cellular.[165]

GPS applications are important components of daily life, used in aviation, vehicle navigation, surveying, and agricultural activities. GPS equipment relies on satellites and typically mobile receiver equipment to provide locational information for navigation between endpoints, as well as geographic orientation for farm and other equipment. GPS equipment is likely used throughout the Project area.[166]

The Federal Aviation Admiration (FAA) has indicated that EMI from PV installations is low risk. PV systems equipment such as step-up transformers and electrical cables are not sources of electromagnetic interference because of their low frequency (60 Hz) of operation and PV panels themselves do not emit EMI. The only component of a PV array that may be capable of emitting EMI is the inverter. Inverters, however, produce extremely low frequency EMI similar to electrical appliances and at a distance of 150 feet from the inverters the EM field is at or below background levels. Proper inverter enclosure grounding, filtering, and circuit layout further reduce EM radiation. Photovoltaic inverters are inherently low-frequency devices that are not prone to radiating EMI. No interference is expected above 1 MHz because of the inverters' low frequency operation. In addition,

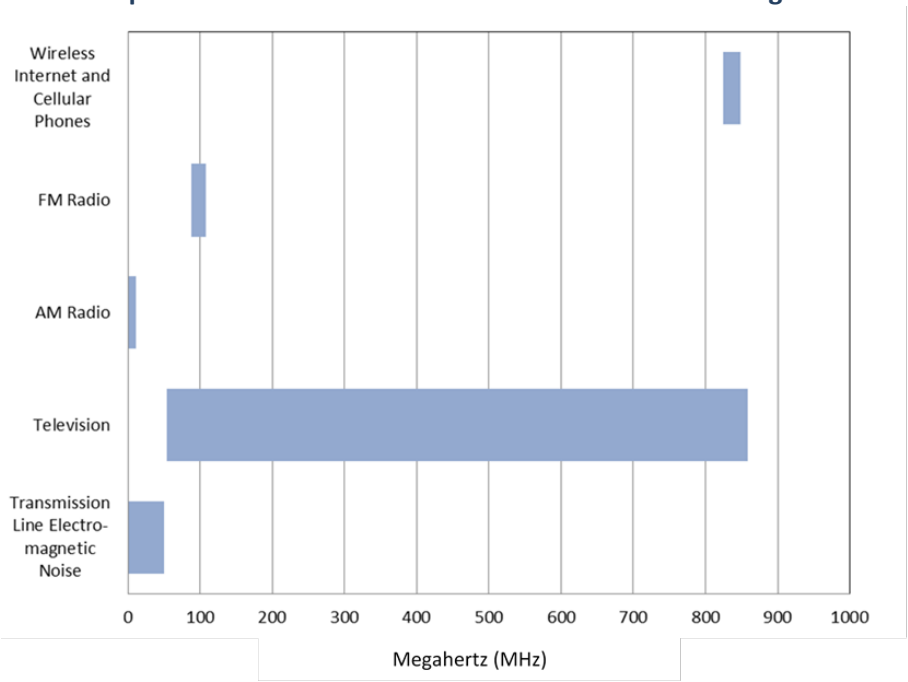
[162] SPA, at p. 109.
[163] SPA, at p. 109.
[164] Ibid.
[165] SPA, at p. 109.
[166] Ibid.

interaction at lower frequencies (100 kHz to1 MHz) is also very low risk because of the poor coupling of these extremely long wavelengths to free space, limiting propagation of the signal.[167]

**Diagram 19** compares the spectrum of transmission frequencies for several communication and media signals to the frequencies associated with electromagnetic noise from transmission lines.

Another potential concern is the blocking or attenuation of nearby radar by the PV array, which are similar to other non-transmitting-built structure like building or sheds in that they are constructed of metal and glass. PV arrays have low profiles relative to most built structures that may be found on or around airfields and in general airport radar systems are installed on elevated platforms or towers. The FAA has published a number of case studies that indicate that a setback of 250' to 500' between the leading edges of a PV array and existing radar equipment is sufficient to prevent blocking and/ or signal reflection issues.[168]

**Diagram 19. Frequencies of Electronic Communication and Electromagnetic Noise[169]**




[167] Electro-Magnetic Interference from Solar Photovoltaic Arrays, U.S. Department of the Navy, Electro-Magnetic Interference from Solar Photovoltaic Arrays, U.S. Department of the Navy, Renewable Energy Program Office (REPO) (nrel.gov).

[168] Electro-Magnetic Interference from Solar Photovoltaic Arrays, U.S. Department of the Navy, Electro-Magnetic Interference from Solar Photovoltaic Arrays, U.S. Department of the Navy, Renewable Energy Program Office (REPO) (nrel.gov).

[169] Marshall Brain "How the Radio Spectrum Works" 1 April 2000.HowStuffWorks.com. https://electronics.howstuffworks.com/radio-spectrum.htm.

### Impacts and Mitigation

Due to the low-profile nature of a solar farms (less than 20 feet), which is well below the line of sight of some communication system signals, interference with communication systems is not anticipated from the solar farm; no mitigation is proposed.

### West HVTL Project

EMI could result from electromagnetic noise created by the ionization of air molecules surrounding transmission line conductors. This ionization is commonly known as corona. Interference could also result from transmission line structures which block line-of-sight communications.

Relative to potential electronic communications affect, the location of the West Route is the same as that for the solar farm. As such, the radio, television, cellular phone, and GPS communication systems described for the solar farm are representative of the West Route.

Electromagnetic noise from transmission lines may interfere with electronic communications when it is generated at the same frequencies as communication and media signals. This noise could interfere with the reception of these signals depending on the frequency and strength of the signal and distance from the electromagnetic noise source. Corona interference from transmission lines causes the greatest disturbance in a relatively narrow frequency spectrum, in the range of about 0.1 to 50 megahertz (MHz). Because many communication and media signals are transmitted at higher frequencies, impacts to communication signals are limited (**Diagram 19)**.

AM radio frequencies are most commonly affected by corona-generated noise. AM radio frequency interference typically occurs immediately under a transmission line and dissipates rapidly within the ROW to either side.

Television broadcast frequencies are typically high enough that they are not affected by corona-generated noise. In particular, digital and satellite television transmissions are not affected by corona-generated noise because they are dependent on packets of binary information or transmitted in the Ku band of radio frequencies (12,000-18,000 MHz). Digital and satellite transmissions are more likely to be affected by multi-path reflections (shadowing) generated by nearby towers. In addition, line-of-sight interference from transmission line structures can affect satellite television transmissions. The use of shielded coaxial cable for cable television transmittals generally makes them insusceptible to interference from electromagnetic noise.

Cellular phone signals use an ultra-high frequency, generally around 900 MHz, which is significantly higher than the range of electromagnetic noise generated by transmission line conductors. GPS signals operate at a higher frequency as well, within the range of 1,225 to 1,575 MHz.

Electromagnetic noise from transmission lines is not an issue for microwave communications. However, microwave communications can be physically blocked by taller transmission structures.

Microwave beams are transmitted along aerial pathways between microwave communication towers. Microwave beam pathways can extend as close as 150 feet to the ground. Transmission line structures for this project would be 135 feet to 165 feet tall.

#### Impacts and Mitigation

No impacts to radio, cellular phones, or GPS units are expected from construction or operation of the West Route. Because both cellular phone signals and GPS operate at frequencies outside the range of electromagnetic noise generated by transmission line conductors, the risk of interference is negligible.

EMI to digital and satellite television signals as a result of the West Route is not anticipated. If EMI to these signals were to occur from multi-path reflections or line-of-sight interference, such interference can be mitigated by use of an outdoor antenna to improve digital signals or by moving the affected satellite antenna to a slightly different location. EMI from a spark discharge source due to imperfections on the conductor or associated equipment can be found and corrected.

Because no impacts on radio, television, cellular phones, or GPS units are anticipated from construction or operation of the West Route, no mitigation measures are proposed.

Given the existing tall structures in the area, obstruction of microwave beam pathways is unlikely. Any potential impacts could be avoided during project design by identifying the microwave beam pathways in the Project area and siting the transmission line structures at locations where they would not interfere with any identified pathways.

#### East HVTL Project

Relative to potential electronic communications affect, the location of the East Route is the same as that for the solar farm. As such, the radio, television, cellular phone, and GPS communication systems described for the solar farm are representative of the East Route.

#### Impacts and Mitigation

The impacts and mitigation described for the West Route are applicable to the East Route. No impacts to radio, television, cellular phones, or GPS units are expected from construction or operation of the East Route, as such, no mitigation measures are proposed.

### 5.4.9 Transportation

Large electric power facility projects have the potential to impact local transportation networks such as roadways, railroads, airports, and airstrips. Heavy equipment used during construction has the potential to damage existing road surfaces and local roadways could experience temporary road and/or lane closures during construction. The inflow of construction contractors could increase traffic volumes on local roadways. Co-location of transmission lines with existing public roads could complicate future roadway expansion or realignments and could interfere with routine maintenance

of roadways. In addition, if sited too close to an operating railroad, it could interfere with safe operation of the railroad.

The Federal Aviation Administration (FAA) and the MNDOT have both established guidelines for development of transmission lines near public airports. The FAA has developed height restrictions for development near public airports and has developed guidelines for placement of buildings and other structures near high frequency omni-directional range navigation systems

MNDOT has established zoning areas around public airports that restrict the area where buildings and other structures can be placed. Both the FAA and MNDOT guidelines apply only to public airports and are not applicable to private airstrips.

### Solar Project

The major roadway near the solar farm is U.S. Highway 10 and the solar farm is south of U.S. Highway 10 with some small portions of the boundary paralleling the highway. Other roadways near and within the solar farm are a mix of County State Aid Highways (CSAHs), county roads, and local and township roads (**Figure 8a and Figure 8b**).

Annual Average Daily Traffic (AADT) counts based on Minnesota Department of Transportation's (MNDOT) Traffic Mapping Application for the roads surrounding and within the Solar Project are provided in **Table 20**.

The current design of the solar farm allows for the following access points:[170]

- The West Block will be accessed from 115th Avenue SE (County Road 53; two access points), 108th Avenue, (five access points), 100th Avenue SE (one access point), and River Road SE (CSAH 8; two access points).
- The East Block will be accessed from 165th Avenue SE (one access point), 157th Street SE (two access points), 140th Avenue (Sherburne Avenue; two access points), and 137th Street (one access point).
- There will also be an access to the East Collector Substation from 137th Street and to the West Collector Substation from 115th Avenue SE (County Road 53; this same access point provides access to the solar farm).

There are six Federal Aviation Administration (FAA)-registered airports in Sherburne County. The nearest FAA-registered airport to the solar farm is the Leaders Clear Lake airport located approximately 1.9 miles north/northwest of the West Block. This airport operates one asphalt runway.[171]

[170] SPA, at pp. 110-111.
[171] Ibid.

There are no railroads within solar farm; however, the Burlington Northern-Santa Fe Railroad (BNSF Railroad) parallels U.S. Highway 10 near the solar farm. Just east of 125th Avenue SE (County Road 52), a spur from the BNSF Railroad turns south for about 1.3 miles until it reaches the BNSF Rail Loop, just north of the SGP. The main route of the BNSF Railroad continues along U.S. Highway 10 through the City of Becker. In addition, a second spur of the BNSF Railroad (about 0.75 mile in length), separate from the spur to the BNSF Rail Loop described above, is located along the south side of Liberty Lane between Liberty Paper Company and U.S. Highway 10 (**Figure 8a and Figures 8b**).

**Table 20. Annual Average Daily Traffic in the Solar Farm Area**[172]

| Roadway | Year | AADT Traffic Volume |
|---|---|---|
| U.S. Highway 10 | 2016 | 13,900 – 19,300[1] |
| CSAH 11 | 2018 | 12,800 |
| CSAH 23 | 2018 | 5,800 |
| 125th Avenue SE (County Road 52) | 2018 | 430 |
| Minnesota Highway 25 | 2016 | 3,650 |
| River Road SE (CSAH 8) | 2018 | 2,750 |
| 115th Avenue SE (County Road 53) | 2018 | 160 |

[1] As is typical for most roadways, AADT traffic volumes for U.S. Highway 10 are available in distinct segments along the length of the highway. Five of these distinct segments are in the vicinity of the Solar Project Area (i.e., between east of Becker and Clear Lake); for this reason, the lowest and highest volumes are provided.
Source: MNDOT

### Impacts and Mitigation

Access to the solar farm will be via existing county and township roads, with the limited possible exception of minor field access or driveway changes depending on final design. No changes to existing roadways will occur. During the construction phase, temporary impacts are anticipated on some public roads within and immediately adjacent to the solar farm, primarily through additional traffic and slow-moving construction vehicles.

No impacts to the BNSF Railroad mainline or spurs are anticipated from construction or operation of the solar farm.

Construction traffic will use the existing federal, state, and county roadway system to access the solar farm and deliver construction materials and personnel. Traffic during construction is estimated to be approximately on average 275-350 pickup trucks, cars, and/or other types of employee vehicles onsite for the majority of construction. It is estimated that approximately 30-40 semi-trucks per day will be used for delivery of solar farm components. Semi-truck delivery will vary per day depending on time of construction and delivery timeline of equipment. If required, the Permittee will obtain the appropriate approvals prior to construction for any overweight or oversized loads.

[172] SPA, at p. 110, Table 5.2-14.

The functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day (AADT). Since some roadways in the area have AADTs that are well below capacity, this increased traffic may be perceptible to area residents, but the incremental increase in volume is not expected to affect traffic function. Slow-moving construction vehicles may also cause delays on smaller roads, similar to the impact of farm equipment during planting or harvest; these delays should be minimal for the relatively short construction delivery period.

After construction is complete, traffic impacts during the operations phase of the solar farm will be negligible. A small maintenance crew driving through the area in pickup trucks on a regular basis will monitor and maintain the facilities as needed, but traffic function will not be impacted as a result.

The Applicants filed an FAA form 7460-1 *Notice of Proposed Construction form*; on February 18, 2021, the FAA provided Determinations of No Hazard to air navigation for the Project Boundary. As such, solar farm facilities will not exceed obstruction standards and would not be a hazard to air navigation. No mitigation measures are anticipated or proposed for air traffic.

### West HVTL Project

The West Route is south and west of U.S. Highway 10; other roadways near and crossed by the West Route are a mix of CSAHs, county roads and local and township roads. The West Route anticipated alignment crosses and then parallels 115th Avenue SE (County Road 53), parallels then crosses River Road SE (CSAH 8), and then parallels 125th Avenue SE (County Road 52) until it reaches the Sherburne County Substation (**Figure 8c**). The AADT counts for the roads surrounding and crossed by the West Route anticipated alignment are provided in **Table 21**.

**Table 21. Annual Average Daily Traffic along the West Route**[173]

| Roadway | Year | AADT Traffic Volume Total |
|---|---|---|
| U.S. Highway 10 | 2016 | 16,400 |
| 115th Avenue SE (County Road 53) | 2018 | 160 |
| River Road SE (CSAH 8) | 2018 | 2,750 |
| 125th Avenue SE (County Road 52) | 2018 | 430 |
| Source: MNDOT, 2021 | | |

Routing transmission lines along existing ROWs can minimize the proliferation of new utility ROW and the effects on private landowners. In order to share or occupy ROW, however, the applicant would have to acquire necessary approvals from the ROW owner (like the state, county, or township). Any occupation of state highway right-of-way requires a Utility Permit from the MNDOT, per Minn. R. Ch. 8810.3100-3600. MNDOT's Accommodation Policy provides requirements and guidelines for the

[173] SPA, at p. 113, Table 5.2-15.

installation of utility facilities in and along MNDOT rights-of-way, which the HVTL Project was developed to meet.[174]

The West Route anticipated alignment does not cross railroads, including those servicing the SGP.

There are six FAA-registered airports in Sherburne County; the nearest FAA-registered airport to the West Route anticipated alignment is the Leaders Clear Lake airport located approximately three miles northwest. This airport operates one asphalt runway.

### Impacts and Mitigation

Construction activities will create a minor increase in traffic from construction vehicles and material/equipment delivery along the area's roadways; these impacts are not expected to impact transportation permanently or significantly in the Project area. The increase would be temporary and traffic volumes would return to normal conditions after construction activities are completed. The Applicants have stated that it will limit vehicle traffic to the West Route ROW and existing access points to the greatest extent feasible.[175]

Temporary road or lane closures may occur during the construction process to ensure safety of the construction crews and the traveling public. While the line is being constructed, the electrical conductors will be strung on support structures using a pulley system or a tensioner mounted on the back of a digger/derrick truck. At road crossings, roads or lands may be temporarily closed for safety purposes when stringing electrical conductors between support structures. These closures could range in duration from minutes to hours based on the width of the road and the complexity of the crossing. Temporary closings are not expected to have significant impacts on transportation in the area because of the generally rural nature of the area and subsequent low traffic levels on most roads. Once an aerial crossing is completed, the road(s) will be reopened to allow normal traffic flow.

The primary means of mitigating potential impacts to roadways is by coordinating with roadway authorities and by considering the need for roadways to be safely operated and maintained.

After the completion of construction, the Permittee must ensure that township, city, and county roads used for purposes of access during construction are returned to pre-construction condition. The Applicants have stated that they will meet with township road supervisors, city road personnel, or county highway departments to address any issues that arise during construction with roadways to ensure the roads are adequately restored, if necessary, after construction is complete.[176]

[174] Reasonable Accommodation - Policies - MnDOT (state.mn.us).
[175] SPA, at p.117.
[176] Ibid.

### East HVTL Project

Similar to the solar farm and West Route, the major roadway nearest to the East Route is U.S.; Highway 10 is north and west of the East Route. Roadways paralleled and crossed by the East Route anticipated alignment are local roads (**Figure 8c**). The East Route anticipated alignment parallels 137th Street at the East Collector Substation, then crosses 140th Avenue SE (Sherburne Avenue) into the SGP, then continues traveling westward until it reaches the Sherburne County Substation.

AADT counts for U.S. Highway 10 in the vicinity of the East Route is 19,300; AADT counts for the local roads surrounding and crossed by the East Route anticipated alignment were not available at the time of SPA preparation.[177]

The East Route anticipated alignment does not cross railroads; the nearest railroad is the BNSF Railroad and BNSF Rail Loop, which are just north of the SGP and about 0.3 mile north of the East Route anticipated alignment. A second spur of the BNSF Railroad (about 0.75 mile in length) is located along the south side of Liberty Lane between Liberty Paper Company and U.S. Highway 10, about 0.4 mile north of the East Route anticipated alignment.

The nearest FAA-registered airport to the East Route is the Leaders Clear Lake airport located approximately 5.9 miles northwest of the anticipated alignment. This airport operates one asphalt runway.

### Impacts and Mitigation

Since the majority of the East Route is within the existing SGP, the use of public roadways will be limited. Construction could create a minor increase in traffic from construction vehicles and material/equipment delivery along these and other roadways; however, this increase would be temporary and traffic volumes would return to normal conditions after construction activities are completed. Construction activities near the intersection of 140th Street SE and 137th Street may cause temporary delays. The Applicants have stated that it will limit vehicle traffic to the East Route ROW and existing access points to the greatest extent feasible.[178]

Temporary road or lane closures may occur during the construction process to ensure safety of the construction crews and the traveling public. While the line is being constructed, the electrical conductors will be strung on support structures using a pulley system or a tensioner mounted on the back of a digger/derrick truck. At road crossings, roads or lands may be temporarily closed for safety purposes when stringing electrical conductors between support structures. These closures could range in duration from minutes to hours based on the width of the road and the complexity of the crossing. Temporary closings are not expected to have significant impacts on transportation in the area because

[177] SPA, at p. 114.
[178] SPA, at p. 118.

of the generally rural nature of the area and subsequent low traffic levels on most roads. Once an aerial crossing is completed, the road(s) will be reopened to allow normal traffic flow.

After the completion of construction, the Permittee must ensure that township, city, and county roads used for purposes of access during construction are returned to pre-construction condition (**Appendix C**). The Applicants have stated that they will meet with township road supervisors, city road personnel, or county highway departments to address any issues that arise during construction with roadways to ensure the roads are adequately restored, if necessary, after construction is complete.[179]

### 5.4.10 Public Utilities/Services

Large electric power facility projects have the potential to damage or interfere with the use of public utilities. The presence of a LEPF could also preclude construction and operation of new utility infrastructure.

#### Solar Project

The proposed Project is in a rural area, residences located outside of incorporated areas (cities and towns) rely on private wells for water and individual sewage treatment systems (septic tanks and drain fields) for sanitary services. Within the cities and towns residences rely on municipal water and sewer services; this includes Becker and Clear Lake. The residences nearest to the solar farm have private septic systems and wells.

Telephone services in the Project area are provided by Frontier Communications, Mid- Continent, and Windstream Communications. There are several broadband providers in Sherburne County offering a range of available technologies including mobile, fiber, satellite, and cable broadband service.

School districts in the Project area include Becker (Independent School District [ISD] 726), St. Cloud (ISD 742), Big Lake (ISD 727), Foley (ISD 51), Princeton (ISD 477), Elk River (ISD 728), and Monticello (ISD 882).

Other public services in the Project area are located primarily within municipalities. Public works and utility departments design, build, and maintain streets and sidewalks, sanitary sewers, water mains, and public landscaping. Public facilities within municipalities in the Project area include swimming pools, ice rinks, parks, and libraries.

The solar farm is adjacent to the existing SGP and Sherburne County Substation; the proposed West and East HVTLs will tie into the Sherburne County Substation to connect the solar farm to the

[179] SPA, at p. 118.

transmission grid. There are numerous existing transmission lines in the Project area (see 5.4.1-Aesthetics).

Electrical service in the Project area is provided by Xcel Energy and Connexus Energy. Natural gas service is provided by Xcel Energy and CenterPoint Energy. There are no pipelines in the footprint of the solar farm.

### Impacts and Mitigation

With proper coordination, project construction and operation should not directly affect any of these public utilities. Construction of the solar farm will temporarily increase the population and workforce present within the vicinity of the Project. This increase in population may temporarily increase in individuals requesting the use of public services. However, this minimal increase in population should not create the need for more public services than already exist. Therefore, impacts to the public services system associated with a temporary increase in population are not anticipated.

The Permittee will coordinate with Gopher State One Call before and during construction to fully understand infrastructure locations and safety concerns and to avoid possible structural conflicts. The Applicants have stated that they will conduct an American Land Title Association survey to identify the locations of underground utilities, drain tiles, or other features.[180] Underground utilities will be marked prior to construction start; if there is a need to cross an underground utility or other underground infrastructure with heavy equipment, the Permittee will employ BMPs to protect the infrastructure, such as construction matting.

The solar farm will interconnect into the existing Sherburne County Substation via the proposed West and East Routes and will not impact existing transmission lines or result in any customer outages during connection to the Sherburne County Substation.

Since no impacts to public utilities or infrastructure are anticipated, no mitigation measures are proposed.

### West HVTL Project

The West Route being adjacent to the solar farm, the public services described for the solar farm are also representative of the West Route.

The West Route is located between 115th Avenue SE (County Road 53) and the existing SGP and Sherburne County Substation; the West Route will tie into the Sherburne County Substation to connect the West Block of the Project to the transmission grid.

[180] SPA, at pp. 114-115.

There is a 69 kV transmission line within the West Route on the north side of River Road SE (CSAH 8) between 115th Avenue SE (County Road 53) and 125th Avenue SE (County Road 52); the West Route anticipated alignment crosses this transmission line when it turns south near the intersection of River Road SE (CSAH 8) and 125th Avenue SE (County Road 52). There are numerous existing 345 kV transmission lines that tie into the Sherburne County Substation. Within the SGP, the West Route crosses (perpendicular) two collocated 345 kV and 115 kV transmission lines on the north side of the facility (**Figure 8c**).

Electrical service in the Project area is provided by Xcel Energy and Connexus Energy. Natural gas service is provided by Xcel Energy and CenterPoint Energy. There are no pipelines crossed by the West Route anticipated alignment.

### Impacts and Mitigation

The impacts and mitigation, relative to public services, for the solar farm are also representative of the West Route due to their proximity.

The West Route will interconnect into the existing Sherburne County Substation to deliver power from the solar farm (west block) to the grid. The West Route anticipated alignment will cross a collocated 345 kV transmission line and 115 kV transmission line in the same location; the West Route has been designed to cross over these existing lines. No customer outages are anticipated during the connection to the Sherburne County Substation.

### East HVTL Project

The East Route being adjacent to the solar farm, the public services described for the solar farm are also representative of the East Route.

The East Route is located between U.S. Highway 10 and the existing SGP and Sherburne County Substation. The East Route will tie into the Sherburne County Substation to connect the East Block of the solar farm to the transmission grid.

There are four 345 kV transmission lines that connect into the Sherburne County Substation from the southeast that are south and west of the East Route; these lines are not crossed by the East Route anticipated alignment. There are two transmission lines crossed by the East Route: a 69 kV line along Sherburne Avenue and a 115 kV line within the SGP; both of these crossings are perpendicular (**Figure 8c**).

Electrical service in Project area is provided by Xcel Energy and Connexus Energy. Natural gas service is provided by Xcel Energy and CenterPoint Energy. There are no pipelines crossed by the East Route anticipated alignment.

### Impacts and Mitigation

The impacts and mitigation, relative to public services, for the solar farm and West Route are also representative of the East Route due to their proximity

The East Route will interconnect into the existing Sherburne County Substation to deliver power from the solar farm (east block) to the grid. The East Route anticipated alignment will cross the existing 69 kV transmission line which travels along 140th Avenue SE (Sherburne Avenue) and 115 kV transmission line about 0.5 mile west of 140th Avenue SE. The East Route will cross over both of these existing transmission lines. No customer outages are anticipated during the connection to the Sherburne County Substation.

## 5.4.11 Emergency Services

Large electric power facilities (LEPGP and HVTL) have the potential to impact the availability of emergency and public health and safety services of the local population during construction activities. The inflow of temporary construction personnel could increase demand for emergency and public health services. On the job injuries of construction workers requiring assistance due to slips, trips or falls, equipment use, or electrocution can create a demand for emergency, public health, or safety services that would not exist if the Project were not to be built. As road closures may be required during construction, such closures could impede police, fire, and other rescue vehicles access to the site of an emergency.

During operation, solar facilities and HVTLs are required to meet certain safety qualifications and standards such as fencing of solar facilities to prevent public access to energized equipment and breakers to deenergize lines in certain situations. Construction of towers or transmission lines must consider potential effects on existing emergency communication systems to avoid line-of-sight disturbances.

### Solar Project

Emergency response services in the Project area are provided by local law enforcement and emergency response agencies located in nearby communities. These include the Sherburne County Sheriff, Becker City Police Department, Big Lake Police Department, and Elk River Police Department. Fire departments near the solar farm include the Becker City Fire Station, Clear Lake Fire Department, Clearwater Fire Department, Monticello Fire Department, Big Lake Fire Station, and Elk River Fire Department.

Ambulance response is provided by local ambulance services: CentraCare Health EMS in Big Lake, Monticello Ambulance Service in Monticello, Elk River Ambulance Service in Elk River, North Ambulance Service in Princeton, and Mayo Clinic Ambulance and Central Minnesota EMS Region in St. Cloud.

All of these law enforcement and emergency response agencies are within 20 miles or less of the Project.

Hospitals within the Project area include: the St. Cloud Hospital, which has numerous locations throughout the city; the St. Cloud VA Medical Center; and Sweet Health Care, and various eye clinics, dental offices, and chiropractors. Other hospitals and clinics near the solar farm are CentraCare Health Monticello Care Center and Emergency Room in Monticello, Mercy Hospital Surgery Center and Metropolitan Heart and Vascular Institute in Elk River, and Fairview hospital in Princeton.

All of the hospitals and clinics are within 20 miles or less of the Project.

As part of the Allied Radio Matrix for Emergency Response (ARMER) there are four towers located in Sherburne County. These ARMER towers are a part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for emergency responders. The ARMER radio system operates by line of sight, talking to other ARMER towers. In order for the system to operate effectively, multiple towers are needed to produce a solid blanket of coverage.

### Impacts and Mitigation

The construction and operation of the solar farm is anticipated to have minimal impacts on the security and safety of the local population. Temporary road closures, if required during construction, will be coordinated with local jurisdictions to provide safe access of police, fire, and other rescue vehicles. Local law enforcement resources may be utilized for traffic control and law enforcement during construction activities. In the event that emergency services are needed for local residents during the estimated 32 months of construction, construction in the vicinity of the emergency site will stop, and any impeding equipment will be relocated so that emergency vehicles may access the emergency site.

The Permittee will coordinate law enforcement agencies, local fire departments, ambulance services, and 911 services to inform them of the construction activities; accidents that may occur during construction of the solar farm would be handled through these local emergency services. The influx of approximately 475 workers to construct the solar farm is not be expected to influence emergency or public health services. Once construction is complete, operation of the solar farm should not impede emergency services. As such, construction and operation of the solar farm is anticipated to have minimal impacts on the availability of emergency services.

The type and number of responding agencies will depend on the incident requiring emergency services; the Permittee will develop an Operations and Emergency Action Plan for the solar farm that outlines local contacts (first responders and internal operation and maintenance staff) and emergency procedures for evacuation, fire response, extreme weather, injury, and criminal behavior.[181]

[181] SPA, at p. 63.

Construction will comply with local, state, and federal regulations regarding installation of the solar farm and standard construction practices. Established industry safety procedures will be followed during and after construction of the solar farm; these include clear signage during all construction activities, and fencing of all facilities to prevent public access, including the West and East Collector Substations.[182]

The ARMER system can be interrupted if tall objects are proposed within the line-of-sight, typically ARMER towers are over 150 feet tall. There are no ARMER towers within one mile of the solar farm; the nearest ARMER tower is about 3.5 miles north/northeast of the Project; the solar farm will not impact this communication system as the proposed facilities are well below the typical height of a ARMER tower's line-of-sight. The tallest solar farm component is estimated to be up to 50 feet tall at the West and East Collector Substations; no mitigation is proposed relative to the ARMER system.

### West HVTL Project

The West Route being adjacent to the solar farm, the emergency services, public health and safety services described for the solar farm are also representative of the West Route.

There are four ARMER towers in Sherburne County, none of which are within one mile of the West Route anticipated alignment; the nearest ARMER tower is about 3.6 miles to the northeast.

### Impacts and Mitigation

The impacts and mitigation, relative to emergency services, public health and safety services, for the solar farm are also representative of the West Route due to their proximity.

The influx of approximately 40 workers for construction is not be expected to influence emergency or public health services. Once construction is complete, the West Route will not impede emergency services. As such, construction and operation of the West Route will have minimal impacts on the availability of emergency services.

The West Route will be designed to meet local, state, and NESC safety standards. The proposed transmission line will be equipped with protective devices to prevent damage from transmission line or pole falls or other potential accidents. The West Route will be equipped with protective devices (circuit breakers and relays located in substations where transmission lines terminate) to safeguard the public in the event of an accident, or if a structure or conductor falls to the ground. The protective equipment will de-energize the transmission line should such an event occur. Signage around the transmission line will warn the public of the safety risks associated with the energized equipment. The construction of the West Route is not expected to have a negative impact on public health or safety. Construction crews will comply with Occupational Safety and Health Administration measures to

[182] Ibid.

ensure their own safety. Any accidents that might occur during construction of the West Route would be handled through local emergency services.

Most structures associated with the West Route will be tangent or angle structures, which are less than the typical height of a ARMER tower and its line-of-sight. Tangent and angle structures are estimated to be up to 145 feet tall, while dead end structures at the West Collector Substation and Sherburne County Substation are estimated at 150 to 165 feet tall. Some of the dead end structures may slightly exceed the height of the ARMER tower, however, since they are sited to be adjacent to existing structures that are similar in height, no impacts to the ARMER system are anticipated. No mitigation relative to the ARMER system is proposed.

#### East HVTL Project

The impacts and mitigation, relative to emergency services, public health and safety services, for the solar farm and West Route are also representative of the East Route due to their proximity.

There are four ARMER towers in Sherburne County, none of which are within one mile of the East Route anticipated alignment; the nearest ARMER tower is about 4.1 miles to the north/northeast.

#### Impacts and Mitigation

The impacts and mitigation, relative to emergency services, public health, and safety services, for the West Route's construction and operation are also representative of the East Route due to their proximity.

## 5.5 Public Health and Safety

Large electric power facilities (LEPGP and HVTL) have the potential to negatively impact public health and safety during both construction and operation of a project. As with any project involving heavy equipment, electrical components, and transmission lines, there are safety issues to consider during construction. Potential health and safety impacts from construction activities include injuries due to falls, equipment use, and electrocution. Potential health impacts related to the operation of the LEPGP and HVTL projects include health impacts from electric and magnetic fields (EMF), stray voltage, induced voltage, impaired air quality, and electrocution.

### 5.5.1 Electric and Magnetic Fields (An Overview)

Electric and magnetic fields (EMFs) are invisible regions of force resulting from the presence of electricity and are produced by all electric devices, including transmission and distribution lines. Naturally occurring EMFs are caused by the earth's weather and geomagnetic field. Man-made EMFs are caused by electrical devices and are characterized by the frequencies at which they alternate, that is, the rate at which the fields change direction each second. All electrical lines in the United States

have a frequency of 60 cycles per second or 60 Hertz (Hz). EMFs at this frequency level are known as extremely low frequency (ELF) EMF.

This chapter summarizes the potential health impacts of transmission line EMF, regulatory standards, and predicted EMF levels from this project. **Appendix E** provides detailed background on EMF health impact research.

#### *5.5.1.1 Magnetic Field Background Levels*

The wiring and appliances located in a typical home produce an average background magnetic field of between 0.5 mG and 4 mG [183]. A U.S. government study conducted by the EMF Research and Public Information Dissemination Program determined that most people in the United States are on average exposed daily to magnetic fields of 2 mG or less.[184] Typical magnetic field strengths near common appliances are shown in **Table 22**.

**Table 22. Typical Sources of Magnetic Field[185]**

| Source | Distance from Source (feet) | | | |
|---|---|---|---|---|
| | 0.5 | 1 | 2 | 4 |
| Air Cleaners | 180 | 20 | 3 | - |
| Copy Machines | 90 | 20 | 7 | 1 |
| Fluorescent Lights | 40 | 6 | 2 | - |
| Computer Displays | 14 | 5 | 2 | - |
| Hair Dryers | 300 | 1 | - | - |
| Baby Monitor | 6 | 1 | - | - |
| Microwave Ovens | 200 | 4 | 10 | 2 |
| Vacuum Cleaner | 300 | 60 | 10 | 1 |

#### *5.5.1.2 Health Studies and Potential Health Impacts*

A concern related to EMFs is the potential for adverse health effects due to EMF exposure. In the 1970s, epidemiological studies indicated a possible association between childhood leukemia and EMF levels. Since then, various types of research have been conducted to examine EMF and potential

[183] EPA. 1992. *EMF in Your Environment, Magnetic Field Measurements of Everyday Electrical Devices*. 1992. https://nepis.epa.gov/.
[184] National Institute of Environmental Health Sciences. 2002. EMF *Electric and Magnetic Fields Associated with the Use of Electric Power - Questions & Answers*. June 2002. https://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf.
[185] EPA. 1992. *EMF in Your Environment, Magnetic Field Measurements of Everyday Electrical Devices*. 1992. https://nepis.epa.gov/.

health effects, including animal studies, epidemiological studies, clinical studies, and cellular studies. Scientific panels and commissions have reviewed and studied this research data (**Appendix E**). In general, these studies concur that:

- There is an association between childhood leukemia and EMF exposure. There is no consistent association between EMF exposure and other diseases in children or adults.
- Laboratory, animal, and cellular studies fail to show a cause-and-effect relationship between disease and EMF exposure at common EMF levels. A biological mechanism for how EMF might cause disease has not been established.

Because a cause-and-effect relationship cannot be established, and yet an association between childhood leukemia and EMF exposure has been shown, there is:

- Uncertainty as to the potential health effects of EMF.
- No methodology for estimating health effects based on EMF exposure.
- A need for further study of the potential health effects of EMF.
- A need for a prudent avoidance approach in the design and use of all electrical devices, including transmission lines.

#### *5.5.1.3 Regulatory Standards*

There are currently no federal regulations regarding allowable electric or magnetic fields produced by transmission lines in the United States. A number of states, however, have developed state-specific regulations (**Table 23**), and a number of international organizations have adopted EMF guidelines (**Table 24**).

The Commission has established a standard that limits the maximum electric field under transmission lines to 8 kV/m. All transmission lines in Minnesota must meet this standard. The Commission has not adopted a magnetic field standard for transmission lines. The Commission has, however, adopted a prudent avoidance approach in routing transmission lines and, on a case-by-case basis, considers mitigation strategies for minimizing EMF exposure levels associated with transmission lines.

Some public health scientists have questioned whether state and international EMF guidelines sufficiently protect public health. These scientists have urged state utility commissions to be more rigorous in applying a precautionary or prudent avoidance approach. Dr. David Carpenter, a public health physician at the University of Albany, and Cindy Sage, an EMF researcher, note that there is "strong scientific evidence that exposure to magnetic fields from power lines greater than 4 mG is associated with an elevated risk of childhood leukemia"[186].

[186] Carpenter, D. O. and Sage, C. *Setting prudent public health policy for electromagnetic field exposures*. Reviews of Environmental Health. 2008, Vol. 23, 2, pp. 91-117.

They conclude that the evidence for effects on human health from ELF-EMF is strong enough to merit regulatory action to reduce EMF exposure levels. They suggest that "such a reduction could be achieved by setting EMF exposure goals that are lower than levels known to be associated with disease, understanding that these exposure goals are significantly lower than many current exposures." Dr. Carpenter and Ms. Sage, in collaboration with other public health researchers, have also authored the *Bio-Initiative Report*, which argues for a more proactive application of a precautionary approach to radio frequency and ELF-EMF.[187]

**Table 23. State Electric and Magnetic Standards[188]**

| State | Area where limits applies | Field | Limit |
|---|---|---|---|
| Florida | Edge of ROW | Electric | 2 kV/m (lines ≤ 500 kV) |
| | | Magnetic | 150 mG (lines of ≤ 230 kV)<br>200 mG (>230 kV - ≤ 500)<br>250 mG (>500 kV) |
| | On ROW | Electric | 8 kV/m (≤230 kV)<br>10 kV/m (>230 kV - ≤ 500)<br>15 kV/m (>500 kV) |
| Minnesota | On ROW | Electric | 8 kV/m |
| Montana | Edge of ROW(1) | Electric | 1 kV/m |
| | Road crossings | Electric | 7 kV/m |
| New Jersey | Edge of ROW | Electric | 3 kV/m |
| New York | Edge of ROW | Electric | 1.6 kV/m |
| | | Magnetic | 200 mG |
| | Public road crossings | Electric | 7 kV/m |
| | Private road crossings | Electric | 11 kV/m |
| | On ROW | Electric | 11.8 kV/m |
| Oregon | On ROW | Electric | 9 kV/m |

(1) May be waived by landowner.

For the Brookings County to Hampton 345 kV transmission line project (Commission docket number TL-08-1474), Dr. Carpenter testified before the Commission on behalf of a party which argued that

[187] Bioinitiative Working Group. 2012. *A Rationale for Biologically based Exposure Standards for Low-Intensity Electromagnetic Radiation*. Prepared for Bioinitiative Working Group. 2007. https://bioinitiative.org/.

[188] National Institute of Environmental Health Sciences. 2002. EMF *Electric and Magnetic Fields Associated with the Use of Electric Power - Questions & Answers*. June 2002. https://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf.

magnetic field levels for that project would exceed safe exposure levels. Testimony was provided in opposition to Dr. Carpenter's opinion by Dr. Peter Valberg. After examining and weighing the competing testimony of Drs. Carpenter and Valberg, the administrative law judge and, ultimately, the Commission, determined that the state's current exposure standard for ELF- EMF (an electric field standard of 8 kV/m) is adequately protective of human health and safety.

The Commission has repeatedly found that there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects. In the Huntley- Wilmarth 345 kV Transmission Line Project, for example, the Commission concluded that "No adverse health impacts from electronic and magnetic fields are anticipated for persons living or working near the Project."[26] Similarly, the Commission has reached similar conclusions for a utility-scale solar project by concluding that, "based on the most current research on electromagnetic fields, and the distance between the [Elk Creek] Project and houses, the [Elk Creek] Project will have no impact to public health and safety due to EMF or magnetic fields."[189]

**Table 24 International Electric and Magnetic Field Guidelines[190]**

| Organization | Electric Field (kV/m) | | Magnetic Field (mG) | |
|---|---|---|---|---|
| | General Public | Occupational | General Public | Occupational |
| Institute of Electrical and Electronics Engineers | 5 | 20 | 9,040 | 27,100 |
| International Commission on Non-ionizing Radiation Protection | 4 | 8 | 2,000 | 4,200 |
| American Conference of Industrial Hygienists | - | 25 | - | 10,000/1,000(1) |
| National Radiological Protection Board | 4 | - | 830 | 4,200 |
| (1) For persons with cardiac pacemakers or other medical electronic devices. | | | | |

#### *5.5.1.4 Implantable Medical Devices*

Electromechanical implantable medical devices, such as cardiac pacemakers, implantable cardioverter defibrillators (ICDs), neurostimulators, and insulin pumps may be subject to interference from electric and magnetic fields, which could mistakenly trigger a device or inhibit it from responding appropriately.

ICD manufacturers' recommended threshold for modulated magnetic fields is one gauss. Since one gauss is five to 10 times greater than the magnetic field likely to be produced by a high-voltage

[189] SPA, pp.65-66.

[190] International Commission on Non-ionizing Radiation Protection. 2010. *Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz – 100 kHz)*. Health Physics. Vol. 99, 6, pp. 818-836. https://www.icnirp.org/cms/upload/publications/ICNIRPLFgdl.pdf.

transmission line,[191] research has focused on electric field impacts. A 2004 Electric Power Research Institute report states that sensitivity to electric fields was reported at levels ranging upwards from 1.5 kV/m, particularly for older (unipolar) pacemakers; some modern (bipolar) units are immune at 20 kV/m. Medtronic and Guidant, manufacturers of various implantable medical devices, have indicated that electric fields below 6.0 kV/m are unlikely to affect most of their devices.[192]

Scholten conducted a theoretical study evaluating the risk for a patient with a unipolar cardiac pacemaker under worst case and real-life conditions under a high- voltage transmission line.[193] This study concluded that a life-threatening situation for cardiac pacemaker patients beneath high-voltage transmission lines is very unlikely; however, an interference between the implant and the electromagnetic fields cannot be excluded. Definitive conclusions about the real risk can be drawn only by conducting additional studies with pacemaker patients.

In the event that a cardiac device is affected, the effect is typically a temporary asynchronous pacing (fixed-rate pacing), and the device returns to its normal operation when the person moves away from the source of the electric field.[194]

#### *5.5.1.5 Stray Voltage*

Electrical systems that deliver power to end-users and electrical systems within the end-user's business, home, farm, or other buildings are grounded to the earth for safety and reliability reasons. The grounding of these electrical systems results in a small amount of current flow through the earth.

Stray voltage (also referred to as neutral-to-earth voltage) could arise from neutral currents flowing through the earth via ground rods, pipes, or other conducting objects, or from faulty wiring or faulty grounding of conducting objects in a facility. Thus, stray voltage could exist at any business, house, or farm which uses electricity— independent of whether there is a transmission line nearby.

However, for purposes of stray voltage, transmission lines may not be completely independent of locally distributed electrical service. Where transmission lines parallel distribution lines, they can, in the immediate area of the paralleling, cause current to flow on these lines (additional current, as the distribution lines already carry current). For properly wired and grounded distribution lines and electrical service, these additional currents are of no consequence. However, for distribution lines and

[191] Public Service Commission of Wisconsin. 2013. *Environmental Impacts of Transmission Lines*. https://psc.wi.gov/Documents/Brochures/Enviromental%20Impacts%20TL.pdf.
[192] Electric Power Research Institute. 2004. *Electromagnetic Interference with Implanted Medical Devices*.
[193] Scholten, A., Joosten, S. and Silny, J. 2005. *Unipolar cardiac pacemakers in electromagnetic fields of high voltage overhead lines*. Journal of Medical Engineering & Technology, Vol. 29, 4, pp. 170-175.
[194] Public Service Commission of Wisconsin. 2013. *Environmental Impacts of Transmission Lines*. https://psc.wi.gov/Documents/Brochures/Enviromental%20Impacts%20TL.pdf.

electrical services that are not properly wired and grounded, these additional currents could create stray voltage impacts.

#### *5.5.1.6 Induced Voltage*

The electric field from a transmission line could extend to a conductive (metal) object in close proximity to the line, such as a vehicle or a fence. This may induce a voltage on the object. The magnitude of this voltage depends on several factors including the object shape, size, orientation, and location along the ROW.

If the objects upon which a voltage is induced are insulated or semi-insulated from the ground and a person touches them, a small current would pass through the person's body to the ground. This might be accompanied by a spark discharge and mild shock, like what could occur when a person walks across a carpet and touches a grounded object or another person. Modern tires provide an electrical path to ground because carbon black, a good conductor of electricity, is added when they are produced. Metal parts of farming equipment are frequently in contact with the ground when plowing or engaging in various other activities. Therefore, the induced charge on vehicles will normally be continually flowing to ground unless they have unusually old tires or are parked on dry rock, plastic, or other surfaces that insulate them from the ground.

The primary concern with induced voltage is the current flow (amps) through a person to the ground. Most shocks from induced current are considered more of a nuisance than a danger, but to ensure the safety of persons in proximity to a transmission line, the NESC requires that any discharge be less than 5 milliamps.

### 5.5.2 Electric and Magnetic Fields (Sherco Solar Project)

As stated in the overview (5.5.1), electric and magnetic fields are present around any electrical device. Electric fields arise from the voltage or electrical charges while magnetic fields arise from the flow of electricity or current that travels along transmission lines, power collection lines, substation transformers, house wiring, and electrical appliances. EMF is invisible just like radio, television, and cellular phone signals, all of which are part of the electromagnetic spectrum. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through wires.

#### Solar Project

The sources of EMF related to the solar farm include electrical collection lines and from the transformers installed at each inverter and collector substations. EMF from electrical collection lines and transformers dissipates rapidly with distance from the source and generally speaking, higher voltage electrical lines produce higher levels of EMF at the source before dissipating with distance. There is no federal standard for electric fields, however, the Commission has imposed a maximum

electric field limit of eight kV/m measured at one meter (3.28 feet) above the ground. There are presently no Minnesota regulations pertaining to magnetic field exposure, however, the internationally accepted guideline for the general public exposed to magnetic fields is 833 milliGauss.

### Impacts and Mitigation

Levels of EMF from the solar farm will be considerably below acceptable guidelines. While the Applicants did not model predicted EMF levels for the 34.5 kV electrical collection lines or inverters and transformers, several studies discuss EMF exposure associated with solar farms. The strength of EMF present at the perimeter of a solar facility or near a PV system in a commercial or residential building is significantly lower than the typical American's average EMF exposure.[195][196] Researchers in Massachusetts measured magnetic fields at PV projects and found the magnetic fields dropped to very low levels of 0.5 mG or less, and in many cases to less than background levels (0.2 mG), at distances of no more than nine feet from the residential inverters and 150 feet from the utility-scale inverters.[197] Even when measured within a few feet of the utility-scale inverter, the ELF magnetic fields were well below the International Commission on Non-Ionizing Radiation Protection's recommended magnetic field level exposure limit for the general public of 2,000 mG.[198] It is typical that utility scale designs locate large inverters central to the PV panels that feed them because this minimizes the length of wire required and shields neighbors from the sound of the inverter's cooling fans. Thus, it is rare for a large PV inverter to be within 150 feet of the project's security fence.

Anyone relying on a medical device such as pacemaker or other implanted device to maintain proper heart rhythm may have concern about the potential for a solar project to interfere with the operation of his or her device. However, there is no reason for concern because the EMF outside of the solar facility's fence is less than 1/1000 of the level at which manufacturers test for EMF interference, which is 1,000 mG.[199] Manufacturers of potentially affected implanted devices often provide advice on electromagnetic interference that includes avoiding letting the implanted device get too close to certain sources of fields such as some household appliances, some walkie-talkies, and similar transmitting devices.

[195] R.A. Tell et al, Electromagnetic Fields Associated with Commercial Solar Photovoltaic Electric Power Generating Facilities, Journal of Occupational and Environmental Hygiene, Volume 12, 2015, - Issue 11. Abstract Accessed March 2016: http://www.tandfonline.com/doi/full/10.1080/1545962 4.2015.1047021.

[196] Massachusetts Department of Energy Resources, Massachusetts Department of Environmental Protection, and Massachusetts Clean Energy Center. Questions & Answers: Ground-Mounted Solar Photovoltaic Systems. June 2015. Accessed August 2016. http://www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf.

[197] Ibid.

[198] Ibid.

[199] EMFs and medical devices, Accessed March 2017. www.emfs.info/effects/medical-devices/.

The electric fields associated with the solar farm will be well below the 6 kV/m metric noted by Medtronic and Guidant.[200] Impacts to implantable medical devices are not anticipated and no mitigation is proposed.

There is a real danger of electric shock to anyone entering any of the electrical cabinets such as combiner boxes, disconnect switches, inverters, or transformers; or otherwise coming in contact with voltages over 50 Volts.[201] Another electrical hazard is an arc flash, which is an explosion of energy that can occur in a short circuit situation. This explosive release of energy causes a flash of heat and a shockwave, both of which can cause serious injury or death. Properly trained and equipped technicians and electricians know how to safely install, test, and repair PV systems, but there is always some risk of injury when hazardous voltages and/or currents are present. Untrained individuals should not attempt to inspect, test, or repair any aspect of a PV system due to the potential for injury or death due to electric shock and arc flash. The National Electric Code (NEC) requires appropriate levels of warning signs on all electrical components based on the level of danger determined by the voltages and current potentials. The national electric code also requires the site to be secured from unauthorized visitors with appropriate fencing and adequate hazard warning signs.

All electrical components in the solar farm, including inverters and transformers, will be grounded in accordance with NESC. Soil resistivity measurements will be taken on site as part of the Project's geotechnical analysis, and that data will be used to help design grounding systems. For these reasons, the potential for stray voltage as a result of the solar farm are anticipated to be negligible. Should a fault occur during operation of the solar farm, it would be quickly identified by monitoring systems and corrected.[202]

Construction and operation of a solar farm does not introduce the same potential for induced voltage as transmission lines. Unlike transmission lines, in which vehicles and farm equipment can travel beneath and metal buildings may be located nearby, a solar facility is enclosed (fenced). Furthermore, the voltages associated with a solar farm are much less than HVTLs. There are no known concerns with farming operations, vehicle use, and metal buildings associated with a solar farm.

The nearest residence to either the solar arrays or an inverter is 185 feet and 599 feet, respectively (**Figure 4 and Figure 5, and Appendix B**). Similarly, the closest residence to a substation is 200 feet. At these distances, both electric and magnetic fields would have dissipated to background levels. As such, impacts will be negligible, and no mitigation measures are proposed

[200] SPA, at p. 70.
[201] Damon McCluer. Electrical Construction & Maintenance, NFPA 70E's Approach to Considering DC Hazards. September 2013. Accessed October 2016. http://ecmweb.com/safety/nfpa-70e-s-approach-considering-dc-hazards.
[202] SPA, at p. 70.

### West HVTL Project

Electric fields on a transmission line are solely dependent upon the voltage of the line, not the current. Electric-field strength is measured in kilovolts per meter (kV/m), and the strength of an electric field decreases rapidly as the distance from the source increases. Electric fields are easily shielded or weakened by most objects and materials, such as trees or buildings. As discussed in the overview, there is no federal standard for transmission line electric fields., however, the Commission has imposed a maximum electric field limit of 8.0 kV/m measured at one meter (3.28 feet) above the ground.

Magnetic fields are created by the electrical current (measures in amps) moving through a transmission line. The strength of a magnetic field is proportional to the electrical current and is typically measured in mG. As with electric fields, the strength of a magnetic field decreases rapidly as the distance from the source increases. Unlike electric fields, however, magnetic fields are not shielded or weakened by objects or materials. There are presently no Minnesota regulations pertaining to magnetic field exposure.

The West Route will be designed to meet or exceed minimum clearance requirements with respect to the NESC. The NESC establishes minimum electrical clearance zones from power lines for the safety of the general public and transmission owners often acquire easement rights that require clear areas in excess of these established zones. Transmission owners may permit encroachment into that easement for buildings and other activities when they can be deemed safe and still meet the NESC minimum requirements. Metal buildings may have unique issues due to induction concerns. For example, conductive buildings near power lines of 200 kV or greater must be properly grounded.

### Impacts and Mitigation

Predicted maximum electric fields for the West Route was conducted based on the assumption of a 2-bundle Dover T-2 ACSR conductor in a vertical configuration with 18" spacing with 230 MVA loading. **Table 25** provides the maximum calculated electric fields and **Diagram 20** provides a graphic representation of this information. The maximum calculated electric field for the single circuit West Route is 3.29 kV/m at 10 feet from the centerline. At the edge of the ROW (75 feet from centerline), the electric field from the single circuit line is calculated to be 0.3 kV/m. The closest residence to the West Route anticipated alignment is approximately 285 feet from the West Collector Substation. Electric fields at this residence are modeled to be less than 0.10 kV/m, which is well below the Commission standard of 8.0 kV/m.[203]

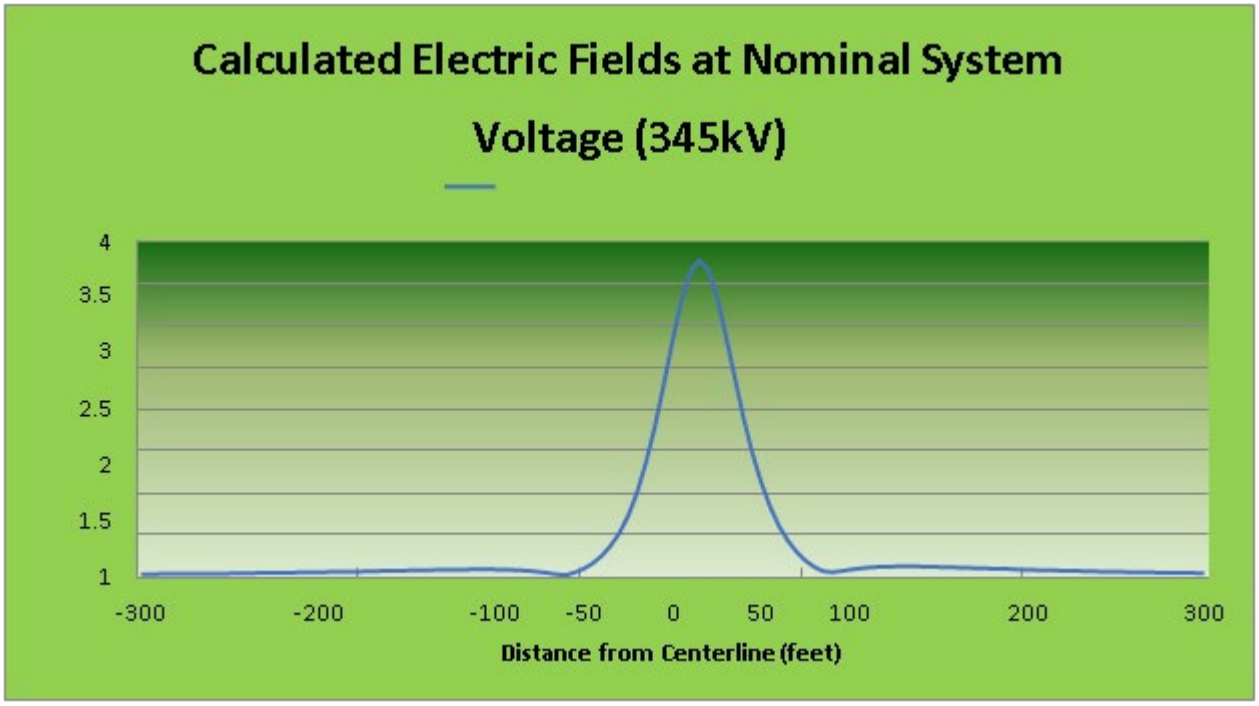
[203] SPA, at p. 71.

**Table 25. Predicted Electric Field Calculations for 345 kV Single Circuit Monopole (kV/m)[204]**

| Electric Field Strength (kV/m)[1] Distance from Centerline | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -300 | -200 | -100 | -75 | -50 | -10 | 0 | 10 | 50 | 75 | 100 | 200 | 300 |
| 0.03 | 0.06 | 0.09 | 0.07 | 0.05 | 1.36 | 2.29 | 3.29 | 1.48 | 0.3 | 0.07 | 0.09 | 0.05 |
| [1] Electric field values assume 230 MVA loading. | | | | | | | | | | | | |

Magnetic field modeling for the West Route was conducted based on the assumption of a 2-bundle Dover T-2 ACSR conductor in a vertical configuration with 18" spacing with 230 MVA loading. **Table 26** provides the maximum calculated magnetic fields and **Diagram 21** provides a graphic representation of this information. The maximum calculated magnetic field for the single circuit West Route is 42.30 mG at 10 feet from the centerline. At the edge of the ROW (75 feet from centerline), the magnetic field from the single circuit line is 17.58 mG.

**Diagram 20. Predicted Electric Field Strength in kV/m for Single Circuit 345 kV Transmission Line (5 feet above ground)[205]**



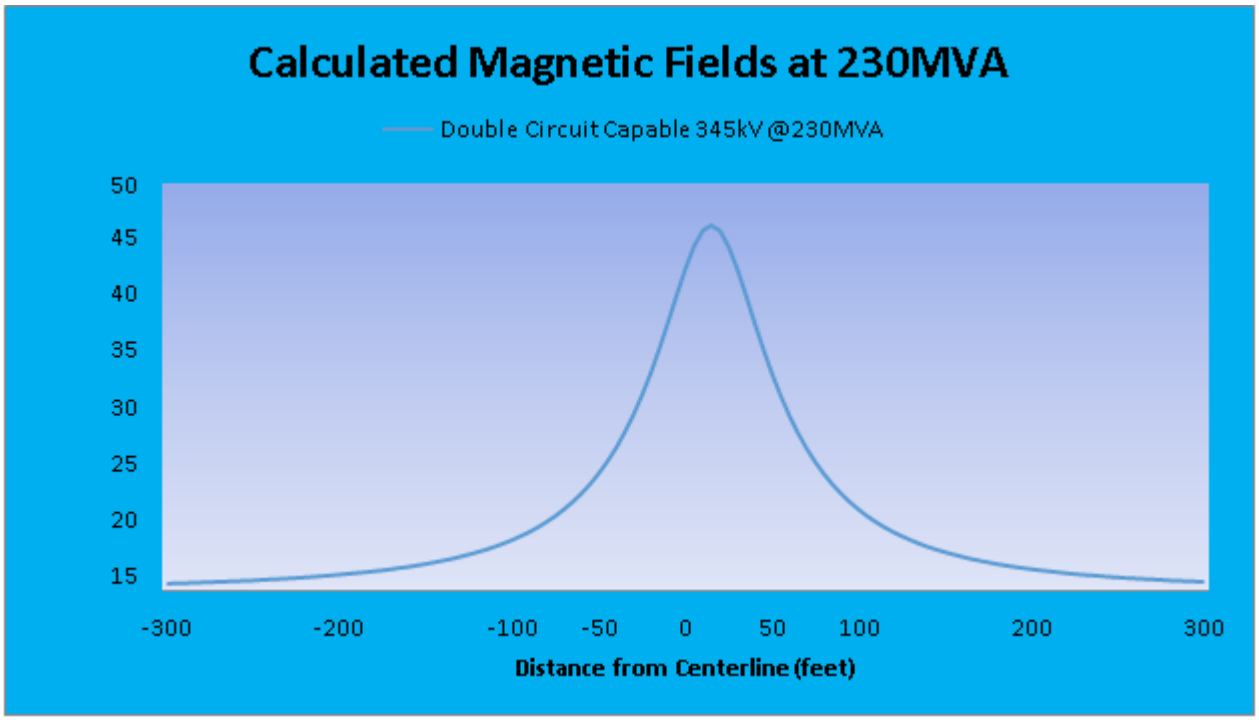

[204] Ibid, at p. 71, Table 5.2-1.
[205] SPA, at p. 71, Chart 5.2-1.

**Table 26. Predicted Magnetic Field Calculations for 345 kV Single Circuit Monopole[206]**

| Magnetic Field Strength (mG)[1] Distance from Centerline | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 200 | 100 | -75 | -50 | -10 | 0 | 10 | 50 | 75 | 100 | 200 | 300 |
| 1.02 | 2.12 | 5.95 | 8.62 | 13.24 | 29.82 | 36.34 | 42.30 | 29.69 | 17.58 | 11.00 | 2.93 | 1.28 |
| [1] Magnetic field values assume 230 MVA loading. | | | | | | | | | | | | |

The predicted electric fields for the West Route are well below levels at which modern bipolar devices are susceptible to interaction with the fields.

**Diagram 21. Predicted Calculated Magnetic Field Strength in mG for Single Circuit 345 kV Transmission Line (5 feet above ground)[207]**




Impacts from stray voltage are typically related to improper grounding of electrical service to the dwelling/structure (via distribution lines) or on-site electrical wiring. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences, and they

[206] SPA, at p. 72, Table 5.2-2.
[207] SPA, at p. 72, Chart 5.2-2.

are typically grounded properly. However, transmission lines can induce stray voltage on a distribution circuit that is parallel to and immediately under the transmission line.

There are no residences or other structures (barns, agricultural buildings, sheds) within the 150- foot-wide right-of-way for the West Route anticipated alignment. Appropriate measures, such as proper grounding, prevent stray voltage problems. The Applicants have stated that they would remedy any stray voltage issues caused by the West Route by working with landowners to ground fences, gates, buildings, or other structures that may be subject to induced current from the line.[208]

#### East HVTL Project

The description of EMF and associated regulations presented in the Overview (5.5.1) apply to all portions (solar farm, west and east transmission lines) of the Project; the discussions on implantable medical devices, stray, and induced voltage concerning the West Route also apply to the East Route.

#### Impacts and Mitigation

Because the East Route has the same MVA loading as the West Route and the same conductor configuration, electric field calculations for the East Route are the same as presented in **Table 25** and **Diagram 20**.

As with the West Route, the electric fields for the East Route are well below levels at which modern bipolar devices are susceptible to interaction with the fields.

Magnetic field modeling for the East Route is the same as presented for the West Route in **Table 26** and **Diagram 21** because both the West and East Routes have the same conductor configuration and loading.

There are no residences within the East Route. The East Route crosses one road, but induced charges on vehicles would be rare due to modern tires grounding the current.

### 5.5.3 Air Quality

Minnesota Rule 7849.1500 requires that this environmental report discuss certain pollutants that can be emitted from large electric power facilities. The rule is directed primarily at generating plants that use carbon fuels (natural gas, coal) that have air emissions and that reject waste heat into the environment, typically through cycled water. Though the rule is not directed to generating plants that use solar or wind energy, the pollutants noted in the rule are discussed here.

[208] SPA, at p.73.

Solar farm and transmission line projects have the potential to impact air quality through temporary, construction-related impacts from vehicle emissions and dust. Operation of transmission lines has the potential to create ozone due to corona discharges which can affect air quality.

Greenhouse gases (GHG) are compound gases that trap heat or longwave radiation in earth's atmosphere; their presence in the atmosphere makes the earth's surface warmer. Sunlight or shortwave radiation easily passes through these gases and the atmosphere. This radiation is absorbed by the surface of the earth and released as heat or longwave radiation. The molecular structure of GHGs allows them to absorb the heat released and re-emit them back to the earth. This heat-trapping phenomenon is known as the greenhouse effect. The accumulation of GHGs since the industrial revolution has accelerated this greenhouse effect, causing global warming and climate change.[209]

In 2019, the electricity sector was the second largest source of U.S. greenhouse gas emissions, accounting for 25 percent of the U.S. total. Greenhouse gas emissions from electricity have decreased by about 12 percent since 1990 due to a shift in generation to lower- and non-emitting sources of electricity generation and an increase in end-use energy efficiency.[210]

### Solar Project

The air quality in Minnesota is generally good and, for most pollutants, has been improving. Minnesota has been in compliance with all national ambient air quality standards since 2002. Air quality trends in the Project area mirror those in the state overall, with air quality generally improving over the last several years.[211]

In Minnesota, air quality is tracked using air quality monitoring stations across the State. The MPCA uses data from these monitors to calculate the Air Quality Index (AQI), on an hourly basis, for ozone (O3), particulate matter (PM10/PM2.5), sulfur dioxide (SO2), nitrogen dioxide (NO2), and carbon monoxide (CO). The pollutant with the highest AQI value for a particular hour sets the overall AQI for that hour. The AQI is used to categorize the air quality of a region as one of five levels of quality: good, moderate, unhealthy for sensitive groups (USG), unhealthy, or very unhealthy.[212]

The nearest air quality monitor station to the Project is in St Cloud, Minnesota.[213] This station monitors for O3 and PM2.5. The AQI for St. Cloud for the past five years is provided in **Table 27**. Air quality has been considered good for the majority of the past five reported years in St. Cloud. Since 2015, the largest number of days classified as moderate occurred in 2018. No days have been classified as unhealthy or very unhealthy.

[209] https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions - electricity. | US EPA.
[210] Ibid.
[211] Annual AQI summary reports | Minnesota Pollution Control Agency (state.mn.us).
[212] Annual AQI summary reports | Minnesota Pollution Control Agency (state.mn.us).
[213] Minnesota's air monitoring network | Minnesota Pollution Control Agency (state.mn.us).

**Table 27. Days in Each Air Quality Index Category (St. Cloud, Minnesota)[214]**

| Year | Good | Moderate | Unhealthy for Sensitive Groups | Unhealthy | Very Unhealthy |
|---|---|---|---|---|---|
| 2019 | 313 | 31 | 0 | 0 | 0 |
| 2018 | 310 | 54 | 1 | 0 | 0 |
| 2017 | 329 | 36 | 0 | 0 | 0 |
| 2016 | 338 | 28 | 0 | 0 | 0 |
| 2015 | 327 | 27 | 1 | 0 | 0 |

Source: MPCA, 2021c.

### Impacts and Mitigation

Air emissions during construction of the solar farm would primarily consist of emissions from construction equipment and would include carbon dioxide, NOX, and particulate matter (PM); dust generated from earth disturbing activities would also give rise to PM. Emissions would be dependent upon weather conditions, the amount of equipment at any specific location, and the period of operation required for construction at that location. Any emissions from construction would be similar to those from agricultural activities common in the Project area and would only occur for short periods of time in localized areas. Overall, it is anticipated that dust emissions currently experienced annually in the area through farming activities will be reduced for the life of the Project through the establishment of perennial vegetative cover.

Dust from construction activities will be controlled using standard construction practices such as watering of exposed surfaces, mulching exposed soils, maintaining vegetative cover (both cover crops and permanent vegetation), and reduced speed limits. Emissions from construction vehicles will be lessened by keeping construction equipment in good working order and reducing unnecessary idling.

The Project will partially replace energy generation of the Sherco Unit 2 coal generating facility, which will cease operations by the end of 2023. Xcel Energy's plan to cease operation of Sherco Unit 2, which was approved by the Commission, and the construction of the Project represents a key milestone step in the company's clean energy transition, which targets 100 percent carbon free electricity by 2050 and 80 percent less carbon by 2030.

Once operational, the Project will generate minimal GHG emissions; emissions that do occur would result from vehicle usage to and from the solar array and substation for maintenance and operation of the substation and switchyard. If electrical energy from the Project displaces energy that would otherwise be generated by carbon-fueled power plants (e.g., coal, natural gas), the project could result in a net reduction of GHG emissions. Thus, compared to non-renewable energy generation, the Project would be beneficial with respect to GHG emissions.

[214] SPA, at p. 135, Table 5.5-1.

### West HVTL Project

The description of the region's air quality and associated regulations and State monitoring programs covered in solar farm discussion above apply to all portions (solar farm, west and east transmission lines) of the Project.

### Impacts and Mitigation

Potential air quality impacts associated with the transmission project come from two primary sources:

- short-term emissions from construction activities, and
- ozone and nitrogen oxide (NOX) emissions from operating the facility.

Dust will be generated during construction of the transmission line. The amount of dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and road surface characteristics. Dust emissions would be greater during dry periods and in areas where fine-textured soils are subject to surface activity.

Ionization of air molecules surrounding the conductor (corona effect) produces a small amount of ozone and NOX, both of which are reactive compounds that contribute to smog and could adversely affect human and animal respiratory systems, crops, vegetation, and buildings. Because of their detrimental effects, air concentrations of these compounds are regulated by both the EPA and the MPCA. The state of Minnesota has an ozone limit of 0.07 parts per million (ppm) (Minnesota Rules, part 7009.0080), which matches the federal ozone limit of 0.07 ppm (8-hour limit).[215] Because the total emissions of ozone and NOX from operating a transmission line are very small, the transmission project is not expected to create any potential for concentrations of ozone that might exceed these standards. A corona signifies a loss of electricity and the Applicants have stated that the transmission line has been engineered to limit the corona.[216] Design of the transmission line influences its ozone production rate. The production rate decreases significantly as the conductor diameter increases and is greatly reduced for bundled conductors, as proposed here, over single conductors. The production rate of ozone increases with applied voltage, however, the emission of ozone from the operation of a transmission line of the voltages proposed for the West Route is not anticipated to have a significant impact on air quality and no mitigation is proposed.

Emissions from operating the proposed line are anticipated to have negligible impacts on air quality. Minor short-term air quality impacts from construction could be mitigated by equipping construction equipment with appropriate mufflers, using a water truck to reduce dust, and promptly reseeding areas of disturbed vegetation. Emissions of dust and PM can also be reduced by reducing the speed of truck traffic on unpaved roads and by covering open-bodied haul trucks.

[215] MPCA. *Ozone standard in Minnesota*. https://www.pca.state.mn.us/air/ozone-standard-minnesota.
[216] SPA, at p. 136.

#### East HVTL Project

The description of the region's air quality and associated regulations and State monitoring programs covered in solar farm discussion above apply to all portions (solar farm, west and east transmission lines) of the Project.

#### Impacts and Mitigation

The impacts and mitigation discussed for the West Route above are the same for the East Route.

## 5.6 Land Based Economies

Large electric power facilities (such as, solar farms and transmission lines) have the potential to impact land-based economies through introduction of a physical, long-term presence which could prevent or otherwise limit use of the land for other purposes.

### 5.6.1 Agriculture

The placement of a solar farm on land used for row crop cultivation would result in a permanent conversion from row crop production to electric power production for the life of the Project. The placement of transmission line structures in cultivated cropland has the potential to interfere with farming operations which may negatively impact farm income.

Activities associated with construction could impact farmland through soil compaction and rutting, accelerated soil erosion, crop damage, temporary disruption to normal farming activities, and introduction of noxious weeds to the soil surface.

#### Solar Project

Approximately 37 percent of the acreage in Sherburne County is devoted to farmland; with 501 individual farms averaging 205 acres in size.[217] The top crops (in acres) include corn, soybeans, and vegetables harvested for sale. Cattle tops the list of livestock inventory (by number), followed by poultry (broilers and other meat-type chickens sold), and sheep and lambs.[218]

The market value of agricultural production in Sherburne County in 2017 was approximately $89 million. Crop sales accounted for 83.9 percent of the total value of agricultural production, while livestock, poultry, and their products accounted for the remaining 16.1 percent.[219]

[217] Census of Agriculture County Profile, cp27141.pdf (usda.gov).
[218] Census of Agriculture County Profile, cp27141.pdf (usda.gov).
[219] Census of Agriculture County Profile, cp27141.pdf (usda.gov).

No prime farmland or farmland of statewide importance is present within the footprint of the proposed solar farm.[220]

### Impacts and Mitigation

Approximately 2,913 acres of cultivated crop land lie within the solar farm footprint, which constitutes 2.8 percent of the agricultural land in Sherburne County (102,544 acres). Agricultural production would continue in the surrounding areas during construction and operation of the solar farm. The revenue lost from removing land from agricultural production will be offset by the leases and purchase options with the landowners.

Areas disturbed during construction will be repaired and restored to pre-construction contours and characteristics to the extent practicable; this restoration will allow the topography within the solar farm footprint to drain properly, blending with the natural terrain and allow for revegetation and to minimize erosion. Implementation of the Vegetative Management Plan (VMP) should minimize the potential for soil erosion and the introduction/establishment of weeds to the site. During construction and operation of the solar farm, agricultural production would be allowed to continue outside of the fenced area.

The center-pivot irrigation systems and the water/utility lines servicing them, within the footprint of the solar farm, will be decommissioned. Any wells identified within the footprint will either be marked with flagging and a five-foot buffer around them fenced to avoid impacting these structures, or fully decommissioned.

No areas used for animal husbandry are located within the footprint of the solar farm; therefore, no impacts on livestock production are anticipated.

### West HVTL Project

The profile of the county's agriculture data covered in the solar farm discussion above apply to all portions (solar farm, west and east transmission lines) of the Project.

No prime farmland or farmland of statewide importance is present within the proposed West Route.

### Impacts and Mitigation

Potential impacts to agriculture due to the transmission project fall into two categories:

- **Temporary impacts**: Caused by construction activities and limited to the duration of construction. These activities could limit the use of fields or could affect crops and soil by

[220] SPA, at p. 119.

compacting soil, generating dust, damaging crops or drain tile, or causing erosion. Project construction activities would typically be limited to the transmission line ROW.

- **Permanent agricultural impacts:** Caused by the physical presence of transmission line structures in crop, pasture, and other agricultural lands. Foundations for transmission line structures will be 7.5 to 12 feet (depending on tangent, angle or dead end) in diameter.[221] The footprint of the transmission line structures is land that cannot be used for agricultural production. This footprint negatively impacts farm income and property values. However, more than the footprint itself, structures can impede the use of farm equipment and can significantly limit management options for agricultural operations. Each structure must be carefully avoided during tillage, planting, spraying, and harvesting of fields. Structures may require extra time and resources for the management of weeds.

The foremost means of minimizing the potential impacts of transmission lines on agricultural operations is through routing; predominately by following roads and property lines (avoiding greenfield crossings of agricultural fields). Permanent impacts to agricultural land will occur where structures are placed in cultivated fields. Structures in cultivated fields act as barriers and can hinder efficient operation of large machinery.

The Applicants state that the West Route anticipated alignment has been designed to minimize impacts to agricultural land by placing structures along field edges, as closely as feasible (approximately 10 feet) from the edge of road ROWs or property lines.[222] The Applicants state that they will work with landowners to finalize the structure locations.[223] The final spacing and location of structures will be designed to accommodate the movement of farm equipment within agricultural fields while still maintaining safety and design standards. The estimated permanent impacts from each transmission structure foundation will be up to 12 feet in diameter at the surface.

Construction of the West Route has the potential to impact farmland from soil compaction, rutting, erosion, and by direct impacts through crop damage, disrupting normal farming activities, and the introduction of noxious weeds. **Table 28** summarizes the potential impacts of the West Route anticipated alignment on farmland.

Construction impacts to farmland are anticipated to be short term and minimal in nature and would be mitigated through proper use and installation of BMPs, and the implementation of the approved AIMP and VMP; these measures are designed to reduce soil compaction, soil erosion, and the introduction of noxious weeds.

[221] SPA, at p. 39, Table 3.2-1.
[222] SPA, at p. 121.
[223] Ibid.

**Table 28. Summary of Impacts of the West Route on Agricultural Land[224]**

| Resource | West Route |
|---|---|
| Segment Length (miles) | 3.2 |
| 150-foot Right-of-Way (acres) | 58.0 |
| Cultivated Crop Land in 150-Foot Right-of-Way (acres)[1] | 35.0 |
| Number of Structures in Cultivated Crop Land (based on preliminary engineering design)[1] | 14 |
| Total Impact from Structures in Cultivated Crop Land (acres) | < 0.1 |

[1] Agricultural land includes row crops. The West Application Alignment is co-located with roads for most of its length and roads are classified as developed. Where structures are adjacent to roads (developed), the next closest land use type was used to reflect that poles will not be placed on roadways.

Additional efforts to mitigate impacts on agricultural production include coordinating with farm operators regarding the timing of construction to avoid peak growing season by limiting construction activities to before spring planting or after harvest in the fall. If this is not possible, the Applicants have stated that they will compensate the farm operator for crop damage, including any compaction that results from construction.[225]

### East HVTL Project

The profile of the county's agriculture data covered in the solar farm discussion above apply to all portions (solar farm, west and east transmission lines) of the Project.

No prime farmland or farmland of statewide importance is present within the proposed East Route.

### Impacts and Mitigation

Generally, the impacts and mitigation discussed for the West Route above are the same for the East Route. **Table 29** summarizes the potential impacts of the East Route anticipated alignment on farmland.

The East Route anticipated alignment was developed with attention to minimizing impacts on agricultural land and is predominately located within the SGP with a short segment that is outside of the plant that is co-located with roads. While the NLCD land cover data classifies the land within the SGP fence line as a mix of cultivated cropland and hay/pastureland, it is not used for agricultural production as it is part of an existing industrial facility. Based on preliminary design, only two transmission line structures would be placed outside of the SGP, between the East Collector Substation and 140th Avenue SE. One of these structures will be within the East Collector Substation and the other structure will be placed approximately 10 feet from the edge of road ROW in a vegetated area that is outside of the agricultural field (located in the corner margin of the center pivot irrigation field).

[224] SPA, at p. 120, Table 5.3-1.
[225] SPA, at p. 121.

**Table 29. Summary of Impacts of the East Route on Agricultural Land[226]**

| Resource | East Route |
|---|---|
| Segment Length (miles) | 1.7 |
| 150-foot Right-of-Way (acres) | 30.6 |
| Cultivated Crop Land in 150-Foot Right-of-Way (acres)[1] | 20.2 |
| Number of Structures in Cultivated Crop Land (based on preliminary engineering design)[1] | 5 |
| Total Impact from Structures in Cultivated Crop Land (acres) | < 0.1 |

[1] Agricultural land includes row crops. The East Application Alignment is co-located with roads between the East Collector Substation and the fenceline of the existing Sherco Generating Plant; roads are classified as developed. Where structures are adjacent to roads (developed), the next closest land use type was used to reflect that poles will not be placed on roadways.

No impacts to agricultural land are anticipated and no mitigation is proposed.

### 5.6.2 Forestry

Large electric power facilities (such as, solar farms and transmission lines) if sited on or routed through land used for forest production would limit the continued use of that land for the life of the Project.

A solar facility would necessitate the clearing of trees that would inhibit energy production; similarly, a HVTL will result in the removal or trimming of trees within and/or adjacent to the transmission line ROW. Vegetation management is necessary for the safe operation of the transmission line as tree branches can cause stress on transmission lines and increase the risk of outages.

#### Solar Project

There are no forestry operations within the footprint of the solar farm; wooded areas within the solar farm consist of isolated rows of trees that are used as shelter belts between agricultural fields, near farmsteads, along roadways, and in riparian areas along waterbodies.

#### Impacts and Mitigation

There are no tree farms, timber plots, or other commercial forestry operations within the proposed footprint of the solar farm. Accordingly, no impacts to forestry resources or operations are anticipated as a result of the development of the solar farm and no mitigative measures specific to forestry operations are proposed.

Some tree clearing will be necessary for construction of the solar farm; however, the Applicants have stated that the development of the site has been designed to avoid tree clearing on the perimeter of

[226] SPA, at p. 123, Table 5.3-2.

the solar farm which minimizes the total amount of tree clearing required and provides a natural buffer between the solar farm and the surrounding area.[227]

#### West HVTL Project

There are no tree farms, timber plots, or other commercial forestry operations within the proposed West Route; wooded areas within the West Route consist of isolated rows of trees that are used as shelter belts or wind breaks along the edges of agricultural fields and along roadways.

#### Impacts and Mitigation

No forestry operations are present along the proposed West Route. The West Route will result in the removal or trimming of trees within and/or adjacent to the transmission line ROW to ensure it is clear of obstructions (**Diagram 22**). Since none of the wooded areas along the West Route anticipated alignment are forestry operations, no mitigation measures specific to forestry operations are proposed for the West Route.

#### East HVTL Project

There are no tree farms, timber plots, or other commercial forestry operations within the proposed East Route; wooded areas within the East Route consist of isolated rows of trees that are used as shelter belts or wind breaks along the edges of agricultural fields and along roadways.

#### Impacts and Mitigation

No forestry operations are present along the proposed East Route. The East Route will result in the removal or trimming of trees within and/or adjacent to the transmission line ROW to ensure it is clear of obstructions (**Diagram 22**). Since none of the wooded areas along the East Route anticipated alignment are forestry operations, no mitigation measures specific to forestry operations are proposed for the East Route.

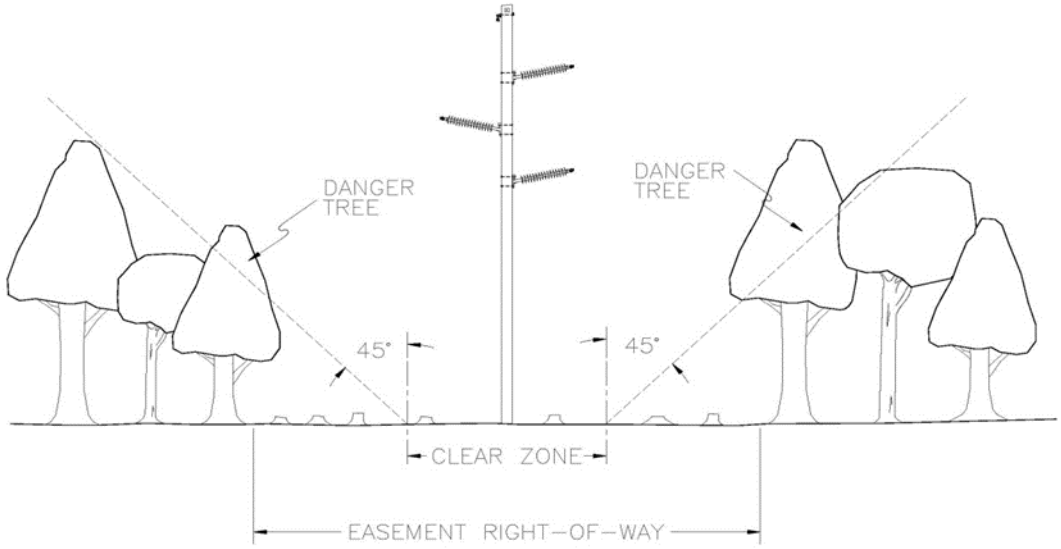
### 5.6.3 Mining

Mineral resources are resources that have a concentration or occurrence of natural, solid, inorganic, or fossilized organic material in such form, quantity, grade, and quality that it has reasonable prospects for commercial extraction.

Existing mines could be negatively impacted by large electric power facilities (such as, solar farms and transmission lines) if sited on or routed through land used for mineral production/extraction by interfering with access to minerals or the ability to remove them.

[227] SPA, at p. 123.

**Diagram 22. Vegetation Clearing Along Transmission ROW**




## Solar Project

While gravel mining operations are found throughout Sherburne County, there are no gravel pits within or adjacent to the solar farm footprint.[228]

The MNDOT Aggregate Source Information System (ASIS) data and County Pit Map indicate that most gravel operations in the vicinity of the Project are north of U.S. Highway 10.[229] The nearest gravel pits are about 0.5 mile southwest of the East Block.[230] The County Pit Map shows a cluster of gravel pits just east of the City of Becker and about 0.6-mile northeast of the East Block.[231] Neither of these data sources show gravel mining operations near the West Block.

The Applicants reviewed several years of aerial imagery to identify gravel mining operations in the area. This review showed areas within the existing fence line of the SGP where gravel may be mined. One of these areas is within the western edge of the East Block, near a coal ash pond associated with the existing SGP; these potential gravel pits are not shown in the ASIS data or on the County Pit Map and they are not commercial gravel pits but are used exclusively by Xcel Energy.[232]

[228] MNDOTs Aggregate Source Information System (ASIS) data and County Pit Map. Aggregate Sources (state.mn.us).
[229] Ibid.
[230] Ibid.
[231] Ibid.
[232] SPA, at p. 126.

### Impacts and Mitigation

The location within the SGP where aerial photography indicated the potential gravel operation is slated for use as a temporary laydown area during construction. If necessary, this laydown area will be graded prior to construction to create a flat and stable workspace for staging and parking. No other mining resources are located within or directly adjacent to the solar farm. Construction and operation of the solar farm would not impact commercial mining operations and therefore no mitigative measures are proposed.

### West HVTL Project

There are no gravel pits within or adjacent to the proposed West Route, the nearest gravel pit to the West Route is about 0.5 mile to the south, on the south side of the Mississippi River.[233] The County Pit Map shows a cluster of gravel pits just east of the City of Becker and about 2.2 miles east of the West Route. The Applicant's review of aerial imagery did not identify any additional commercial gravel pits near the West Route.[234]

### Impacts and Mitigation

No impacts to existing aggregate mining operations are anticipated as a result of the West route. No mitigative measures are proposed.

### East HVTL Project

There are no gravel pits within or adjacent to the proposed East Route, the nearest gravel pit to the East Route is about 1.3 miles to the south/southeast.[235] The County Pit Map shows a cluster of gravel pits just east of the City of Becker and about 1.3 miles northeast of the East Route.[236]

There are two potential areas within the existing fence line of the SGP identified through aerial photographs where gravel could potentially be mined; both areas are within the East Route, near a coal ash pond associated with the existing SGP. These potential gravel pits are not shown in the ASIS data or on the County Pit Map and are not commercial gravel pits but are used exclusively by Xcel Energy.

### Impacts and Mitigation

No impacts to existing commercial aggregate mining operations are anticipated as a result of the East Route. No mitigative measures are proposed.

## 5.6.4 Recreation and Tourism

[233] MNDOTs Aggregate Source Information System (ASIS) data and County Pit Map. Aggregate Sources (state.mn.us).
[234] SPA, at p. 126.
[235] MNDOTs Aggregate Source Information System (ASIS) data and County Pit Map. Aggregate Sources (state.mn.us).
[236] Ibid.

Large electric power facilities (such as, solar farms and transmission lines) have the potential to impact public use and enjoyment of the area's recreational and tourism opportunities, both short term and long term. In the short term by increases in noise, dust, and impeding public access during construction. Long term through the introduction of a physical, permanent presence which could negatively impact aesthetics or otherwise limit use of the land.

### Solar Project

Recreational activities in the vicinity of the Project include snowmobile trails and the Mississippi River (**Figure 11**). These features offer recreation opportunities that attract residents and tourists.

There are no MNDNR SNAs, state trails, WMAs, state parks, or migratory waterfowl feeding and resting areas within one mile of the solar farm. The nearest MNDNR WMA is the Kelly-Meyer WMA, located 2.4 miles south of the solar farm, and the nearest state park is the Lake Maria State Park, located 3.3 miles south of the solar farm (**Figure 11**).

The Mississippi River is located approximately 200 feet south of the solar farm at its closest point (West Block) and is a State Water Trail with a public water access site located approximately 0.5 mile southeast of the West Block. The nearest Aquatic Management Area (AMA) is the Silver Creek AMA, located approximately 0.5 mile south of the West Block, on the south side of the Mississippi River.

Snowmobile trails are mapped by MNDNR and managed locally by each county and their respective snowmobile clubs. There is one snowmobile trail system within the Project area. The Sherburne County Snowmobile Trail #209[237] follows a field road along the northern edge of the West Block Boundary for 1.3 miles before it bisects the northeastern portion of the Project area for 0.25 mile. The route then turns south and then follows the eastern boundary of the West Block for 0.75 mile. The snowmobile trail also follows the railroad track that borders the northeast boundary of the East Block, before turning south along the field road for 0.75 mile along the edge of the boundary and then turning east/southeast following the edge of the boundary for approximately 1.2 miles before it leaves the East Block boundary.

The West and East Blocks are both within 1 mile of the City of Becker municipal boundary, with a small portion of the East Block within the municipal boundary. The City of Big Lake is located about 1 mile east of the East Block. There are additional recreational opportunities associated with these municipalities, such as various community festivals and events.

There are no city or county parks within one mile of the solar farm.

[237] Interactive Snowmobile Trails | Minnesota DNR (state.mn.us).

Tourism in the Project area centers around outdoor recreational opportunities and various community festivals and events.

The City of Big Lake, which is about 1 mile east of the East Block of the solar farm, hosts various community events throughout the year.[238] The Big Lake Block Party is held during August each year at McPete's Sports Bar & Lanes and offers family friendly activities like mini-golf and bowling and various food and beverage options. Big Lake Spud Fest is held each year during the month of June and offers carnival rides, food vendors, a parade, and various other community events.[239] Both of these events are held within the city limits of Big Lake.

The Sherburne History Center regularly hosts several public events including book clubs, history classes, tours of its museum exhibits.[240] The history center is open year-round Tuesday through Saturday and is closed Sunday and Monday and on major holidays. The Sherburne History Center is about 1.5 miles east of the West Block of the Solar Project and the West Collector Substation.

Within the City of Becker there is the Pebble Creek Golf Club, located along Sherburne Avenue in the northeast portion of the city.[241] Concert at the Creek is held annually in July and features live music and food and beverage offerings. The Pebble Creek Grill is open year-round and offers casual dining options. The Golf Club also has banquet and conference facilities available to rent for weddings and other private events. The Pebble Creek Golf Club is about 1.5 miles north of the East Block and 2.2 miles east of the West Block.

### Impacts and Mitigation

Construction and operation of the solar farm will not impact public participation in the regional community cultural events, as the solar farm is predominantly outside of municipal areas where these opportunities exist. In terms of aesthetic impacts, the presence of the solar farm will not be dissimilar to the other man-made features such as the existing transmission lines, railroads, highways, municipal developments, Sherburne County Substation and the SGP in this area. No impacts on recreation or tourism is anticipated and no mitigation measures are proposed.

### West HVTL Project

The description of the area's recreational and tourism opportunities discussed for the solar farm are relevant to all portions (solar farm, west and east transmission lines) of the Project.

[238] Big Lake Chamber of Commerce.
[239] biglakespudfest.com.
[240] Sherburne History Center – 10775 27th Ave SE, Becker MN.
[241] Pebble Creek Golf Club.

### Impacts and Mitigation

As with the solar farm, elements of the West Route (structures and conductors) are anticipated to blend into the built environment surrounding the SGP. The City of Big Lake, and the events held within is about six miles east of the West Route. The Sherburne History Center is about 0.8-mile northeast of the West Route. The Pebble Creek Golf Club is about 1.1 miles east of the West Route.

Because the West Route is not anticipated to impact recreational or tourism opportunities, no mitigative measures are proposed.

### East HVTL Project

The description of the area's recreational and tourism opportunities discussed for the solar farm are relevant to all portions (solar farm, west and east transmission lines) of the Project.

### Impacts and Mitigation

As with the solar farm, elements of the West Route (structures and conductors) are anticipated to blend into the built environment surrounding the SGP. The City of Big Lake, and the events held within the city, is about four miles east of the East Route. The Sherburne History Center is about 2.6 miles north of the East Route. The Pebble Creek Golf Club is about 1.6 miles north of the East Route.

Because the East Route is not anticipated to impact recreational or tourism opportunities, no mitigative measures are proposed.

## 5.7 Archaeological and Historic Resources

Cultural resources, including archaeological and historic artifacts and features, contribute to the record of human occupation and alteration of the landscape. Archaeological resources include historic and prehistoric artifacts, structural ruins or earthworks and are often partially or completely below ground. Historic resources include extant structures, such as building and bridges, as well as districts and landscapes.

Construction and operation of large electric power facilities has the potential to impact archaeological and historic resources. Archaeological resources could be impacted by the disruption or removal of subsurface archaeological materials, structural remains, or earthworks during construction. Historic architectural resources may be impacted by the siting and routing facilities within the established viewshed of an historic property, which could affect the integrity of the viewshed in a way that decreases the historic value of the resource.

In Minnesota, there are three primary laws regarding the protection of archaeological and historic resources:

• **Minnesota Historic Sites Act.** This act establishes the State Historic Sites Network and the State Register of Historic Places and requires that state agencies consult with the Minnesota Historical Society before undertaking or licensing projects that may affect properties on the network or on the State or National Registers of Historic Places (Minnesota Statutes, section 138.661-138.669).

• **Minnesota Field Archaeology Act.** This act establishes the office of the State Archaeologist; requires licenses to engage in archaeology on nonfederal public land; establishes ownership, custody and use of objects and data recovered during survey; and requires state agencies to submit development plans to the State Archaeologist, the Minnesota Historical Society and the Minnesota Indian Affairs Council for review when there are known or suspected archaeological sites in the area (Minnesota Statutes, section 138.31-138.42).

• **Minnesota Private Cemeteries Act.** A portion of this legislation protects all human burials or skeletal remains on public or private land (Minnesota Statutes, section 307.08).

At a federal level, compliance with Section 106 of the National Historic Preservation Act (NHPA) is required for all projects under federal jurisdiction. The purpose of Section 106 is to compel federal agencies to consider the effects of a project on archaeological and historic resources and applies to resources that are listed on, or eligible for listing on the National Register of Historic Places (NRHP). However, at this time, no National Environmental Policy Act (NEPA) or federal Section 106 nexus has been identified for this Project.

The following subsections present an overview of previously recorded archaeological and historic architectural resources in and within one mile of the Project, and discuss how the Project (solar farm, West and East Routes) may affect these cultural resources and what measures are available to mitigate identified potential impacts.

### 5.7.1 Previously Recorded Archaeological and Historic Architectural Resources

The Applicants conducted background research on known cultural resources; data regarding known cultural resources information resulting from previous professional cultural resources surveys and reported archaeological sites and historic architectural resources were received from the various agencies and reviewed. This work employed the expertise of consultants (Westwood and Tetra Tech) doing Phase 1a and Phase 1 cultural resource surveys. These studies were used to identify types of archaeological sites that may be encountered and landforms or geographic features that have a higher potential for containing significant cultural resources. The results of the Phase Ia literature reviews and the Phase I surveys are summarized below.

### Solar Project

The archaeological and historic architectural resources review extended to within one mile of the Project and within the site and each route's width (**Table 30**).[242]

**Table 30. Summary of Previously Recorded Archaeological and Historic Architectural Resources[243]**

| Cultural Resources Categories | Within 1 Mile of Solar Farm Boundary[1] | | Within Solar Farm Boundary | |
|---|---|---|---|---|
| | East Block | West Block | East Block | West Block |
| Total Archaeological Sites | 3 | 2 | 0 | 0 |
| Total Eligible for NRHP | 0 | 0 | 0 | 0 |
| Number of Historic Architectural resources | 13 | 5 | 0 | 0 |
| Total Eligible for NRHP | 3 | 1 | 0 | 0 |
| **Total Previously Recorded Cultural Resources** | **16** | **7** | **0** | **0** |
| **Total NRHP-eligible Resources** | **3** | **1** | **0** | **0** |

Note: NRHP = National Register of Historic Places

[1] The number of NRHP-eligible resources shown is a subset of the total number of archaeological sites or historic architectural resources.

Because the West and East Blocks of the solar farm are geographically distinct, some previously recorded archaeological sites and historic architectural resources are within one mile of both blocks. The Phase Ia literature reviews (**Table 30**) include a complete count for each block.

Westwood and Tetra Tech also conducted Phase I surveys of the solar farm site to identify any previously undocumented archaeological resources. The Applicants note that the Phase I surveys were completed for the solar farm site, except the two proposed temporary laydown areas outside the solar farm Footprint. Both laydown areas are on Xcel Energy land, one in cultivated cropland and the other within the SGP. These areas will be surveyed prior to the start of construction; following the survey, a Phase I report will be submitted to SHPO.[244]

No previously recorded archaeological sites were identified within the West Block. However, two previously recorded archaeological sites were identified within one mile of the West Block. One of these sites is a "site lead" for a ghost town named Freemont City. Site leads are reported sites that have not been verified or their precise location is unknown. The other site is a Precontact- Woodland

[242] SPA, at pp. 127-129, and Appendix J.
[243] Ibid, Table 5.4-1.
[244] SPA, at p. 128.

habitation site. According to information obtained from OSA and SHPO, neither of these resources were evaluated for listing in the National Register of Historic Places (NRHP).[245]

No previously recorded archaeological sites were identified within the East Block. However, three previously recorded archaeological sites were identified within one mile of the East Block. The sites consist of two precontact lithic scatters and recording of a single precontact artifact in an area of heavy disturbance. According to information obtained from OSA and SHPO, none of these resources were evaluated for listing in the NRHP.[246]

No previously recorded historic architectural resources were recorded within the West Block. However, five previously recorded historic architectural resources were identified within one mile of the West Block. The previously recorded historic architectural resources consist of one halfway house, the Ed Johnson Farm, the W. G. White Farmhouse, District School No. 23, and Minnesota Highway 10 (Elk River to St. Cloud). Minnesota Highway 10 (Elk River to St. Cloud) is also within one mile of the East Block. Of these five previously recorded historic architectural resources, four have not been evaluated for listing in the NRHP. Minnesota Highway 10 (Elk River to St. Cloud) has been determined eligible for listing in the NRHP.[247]

No previously recorded historic architectural resources were recorded within the East Block. Thirteen previously recorded historic architectural resources were identified within one mile of the East Block. The previously recorded historic architectural resources consist of five residences, four farmsteads (one of which has been removed), one bridge, the Great Northern Railway Branch Line (Big Lake Township Segment), Northern Pacific Railway Branch Line (Big Lake Township Segment), and Minnesota Highway 10 (Elk River to St. Cloud). Ten of the previously recorded historic architectural resources have not been evaluated for listing in the NRHP. The Great Northern Railway Branch Line (Big Lake Township Segment), Northern Pacific Railway Branch Line (Big Lake Township Segment), and Minnesota Highway 10 (Elk River to St. Cloud) have been determined to be eligible for listing in the NRHP.[248]

Tetra Tech conducted a Phase I survey of the West Block, while Westwood conducted a Phase I survey of the East Block. Both Phase I surveys included systematic pedestrian survey along transects spaced 15 meters (50 feet) apart in areas where ground visibility exceeded 25 percent. No cultural resources were identified in the West or East Blocks survey.[249]

[245] SPA, at pp. 127-129.
[246] Ibid.
[247] Ibid.
[248] SPA, at pp. 127-129.
[249] SPA, at Appendix J.

### Impacts and Mitigation

No archaeological or historic sites, or historic architectural resources were identified within the solar farm footprint because of Phase Ia literature review or Phase I survey. The three NRHP- listed resources that are within one mile of the solar farm were determined to be eligible for listing in the NRHP based on their historic association with transportation. Construction and operation of the solar farm would not adversely affect the ability of these resources to convey their historic association with transportation or affect the NRHP eligibility of these resources. The construction and operation of the solar farm will not impact historic properties listed in, eligible for, or potentially eligible for listing in the NRHP.

The primary means of mitigating impacts to cultural resources is prudent siting and routing by avoiding known archaeological and history resources. Avoidance of resources may include minor adjustments to the project design and the designation of environmentally sensitive areas that would be left undisturbed by the Project. If archaeological resources are anticipated or known to exist within a specific part of a route, impacts to these resources can typically be mitigated by measures developed in consultation with the Minnesota State Historic Preservation Office (SHPO) prior to construction, and by training of construction workers in the recognition and managing of archaeological resources.

Before construction of the solar farm commences, the Applicants have stated that they will prepare an Unanticipated Discoveries Plan that will outline the steps to be taken if previously unrecorded cultural resources or human remains are encountered during construction.[250] If archaeological resources are discovered during construction, ground-disturbing activity will be halted in that location, SHPO will be notified, and appropriate measures will be developed in conjunction with SHPO to assess and protect the resource. Additionally, if unanticipated human remains or burial resources are discovered during construction, they will be reported to the State Archaeologist per Minn. Stat. §307.08 and construction will cease in that area until adequate mitigation measures have been developed.

### West HVTL Project

The archaeological and historic architectural resources review extended to within one mile of the Project and within the site and each route's width (**Table 31**).[251]

Tetra Tech was engaged to conduct a Phase Ia literature review to identify previously recorded archaeological and historic architectural resources within and within one mile of the proposed West Route. The Phase Ia literature review included review of the online portal maintained by the OSA and

[250] SPA, at p. 132.
[251] SPA, at pp. 129-131, and Appendix J.

**Table 31. Summary of Previously Recorded Archaeological and Historic Architectural Resources[252]**

| Cultural Resources Categories | Within 1 Mile of West Route | Within West Route |
|---|---|---|
| Total Archaeological Sites | 2 | 0 |
| Total Eligible for NRHP [1] | 0 | 0 |
| Number of Historic Architectural resources | 1 | 0 |
| Total Eligible for NRHP [1] | 1 | 0 |
| **Total Previously Recorded Cultural Resources** | **3** | **0** |
| **Total NRHP-eligible Resources** | **1** | **0** |

[1] The number of NRHP-eligible resources shown is a subset of the total number of archaeological sites or historic architectural resources.

a request for documentation on file at the Minnesota SHPO including site maps, archaeological site forms, burial files, historic structure inventories, and survey reports. Tetra Tech also conducted a Phase I survey to identify any previously undocumented archaeological resources.[253]

No previously recorded archaeological sites were identified within the West Route because of the Phase Ia literature review. Two previously recorded archaeological sites lie within one mile of the West Route. The sites consist of one Precontact artifact scatter and one Precontact - Woodland habitation site (this site is also within one mile of the West Block of the solar farm and the East Route). Neither site has been evaluated for listing in the NRHP.[254]

No previously recorded historic architectural resources were identified within the West Route, but one previously recorded historic architectural resource was identified within one mile of West Route. The previously recorded historic architectural resources is Minnesota Highway 10 (Elk River to St. Cloud), which has been determined to be eligible for listing in the NRHP.[255]

Tetra Tech conducted a Phase I survey for the West Route. The Phase I survey included systematic pedestrian survey along transects spaced 15 meters (50 feet) apart in areas where ground visibility exceeded 25 percent. No cultural resources were identified within the West Route survey.

### Impacts and Mitigation

No archaeological or historic sites, or historic architectural resources were identified within the West Route during the Phase Ia literature review or Phase I survey. The NRHP-listed resource that is within one mile of the West Route was determined to be eligible for listing in the NRHP based on its historic association with transportation. Construction and operation of the West Route will not adversely

[252] Ibid, Table 5.4-2.
[253] SPA, at pp. 129-131, and Appendix J.
[254] Ibid.
[255] Ibid.

affect the ability of this resource to convey its historic association with transportation or affect the NRHP eligibility of the resource. The construction and operation of the West Route will not impact historic properties listed in, eligible for, or potentially eligible for listing in the NRHP.

As stated for the solar farm, the primary means of mitigating impacts to cultural resources is prudent siting and routing by avoiding known archaeological and history resources; also, as for the solar farm, the Applicants have stated that they will prepare an Unanticipated Discoveries Plan prior to commencing construction on the West Route.

### East HVTL Project

The archaeological and historic architectural resources review extended to within one mile of the Project and within the site and each route's width (**Table 32**).[256]

**Table 32. Summary of Previously Recorded Archaeological and Historic Architectural Resources[257]**

| Cultural Resources Categories | Within 1 Mile of East Route | Within East Route |
|---|---|---|
| Total Archaeological Sites | 3 | 0 |
| Total Eligible for NRHP [1] | 0 | 0 |
| Number of Historic Architectural resources | 6 | 0 |
| Total Eligible for NRHP [1] | 3 | 0 |
| **Total Previously Recorded Cultural Resources** | **9** | **0** |
| **Total NRHP-eligible Resources** | **3** | **0** |

[1] The number of NRHP-eligible resources shown is a subset of the total number of archaeological sites or historic architectural resources.

No previously recorded archaeological sites were identified within the East Route during the Phase Ia literature review. Three previously recorded archaeological sites lie within one mile of the East Route. The sites consist of two Precontact lithic scatters and one Precontact – Woodland habitation site (this site is also within one mile of the West Block of the Solar Project and the West Route). The lithic scatters are recommended as not eligible for NRHP listing as both sites possess low research potential; the habitation site has not been evaluated for listing in the NRHP.[258]

No previously recorded historic architectural resources were identified within the East Route. Six previously recorded historic architectural resources were identified within one mile of East Route. The previously recorded historic architectural resources consist of one residence, two farmsteads (one of which has been removed), the Great Northern Railway Branch Line (Big Lake Township Segment),

[256] SPA, at pp. 129-131, and Appendix J.
[257] Ibid, Table 5.4-3.
[258] SPA, at pp. 131-134, and Appendix J.

Northern Pacific Railway Branch Line (Big Lake Township Segment), and Minnesota Highway 10 (Elk River to St. Cloud). Three of the previously recorded historic architectural resources have not been evaluated for listing in the NRHP. The Great Northern Railway Branch Line (Big Lake Township Segment), Northern Pacific Railway Branch Line (Big Lake Township Segment), and Minnesota Highway 10 (Elk River to St. Cloud) have been determined to be eligible for listing in the NRHP.[259]

Westwood conducted a Phase I survey for the East Route. The Phase I survey included systematic pedestrian survey along transects spaced 15 meters (50 feet) apart in areas where ground visibility exceeded 25 percent. The portion of the East Route that is within the existing SGP was visually examined and determined to be heavily disturbed making the presence of intact archaeological deposits unlikely.[260]

#### Impacts and Mitigation

No archaeological or historic sites, or historic architectural resources were identified within the East Route during the Phase Ia literature review or Phase I survey. The three NRHP-listed resources that are within one mile of the East Route were determined to be eligible for listing in the NRHP based on their historic association with transportation. Construction and operation of the East Route will not adversely affect the ability of these resources to convey their historic association with transportation or affect the NRHP eligibility of these resources. The construction and operation of the East Route will not impact historic properties listed in, eligible for, or potentially eligible for listing in the NRHP.

As stated for the solar farm, the primary means of mitigating impacts to cultural resources is prudent siting and routing by avoiding known archaeological and history resources; also, as for the solar farm, the Applicants have stated that they will prepare an Unanticipated Discoveries Plan prior to commencing construction on the East Route.

## 5.8 Natural Environment

Construction and operation of large electric power facilities has the potential to impact the natural environment. These impacts are dependent upon many factors, such as the type of facility and how it is designed, constructed, and maintained. Other factors such as the environmental setting must also be considered. Impacts can and do vary significantly both within, and across, projects.

### 5.8.1 Surface Waters

Solar farm and transmission line projects have the potential to impact water resources and floodplains. These projects could directly impact water resources and floodplains if these features cannot be

[259] SPA, at pp. 131-134, and Appendix J.
[260] Ibid.

avoided through project design. Large electric power facilities the potential to adversely impact surface waters though construction activities which move, remove, or otherwise handle vegetative cover and soils. Changes in vegetative cover and soils can change runoff and water flow patterns.

Watercourses (rivers, streams, creeks, and drain ditches) are surface water features that consist structurally of a bed and bank, which creates a channel which can have both flowing and non-flowing water or may be dry depending on the time of year and recent precipitation events. Generally, watercourses have permanent inundation, which are fed by surface and/or ground water sources.

Water bodies (lakes, ponds, and larger wetlands) are characterized by a distinct basin area comprising the extent of the feature, and there is not a noticeable flow of water or channel through the water body. Water bodies are generally permanently inundated but may include areas of exposed substrate when the necessary hydrology to maintain inundation is lacking.

There are several federal and state laws that regulate watercourses and water bodies. The Clean Water Act (CWA) establishes the structure for regulating the discharge of materials into waters of the United States and for developing water quality standards for surface waters (33 U.S.C. 1344 and 1311et seq). The CWA could potentially regulate several types of activities and their impacts associated with these large projects.

Under Section 303(d) of the Clean Water Act, states are required to assess all waters of the state to determine if they meet water quality standards, list waters that do not meet standards and update the list biannually and conduct total maximum daily load studies to set pollutant-reduction goals needed to restore waters to the extent that they meet water quality standards for designated uses. The list, known as the 303(d) list, is based on violations of water quality standards. The MPCA has jurisdiction over determining 303(d) waters in the State of Minnesota.

Watercourses and water bodies may be regulated under both Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.) and Section 404 of the CWA (33 U.S.C. 1344). The Rivers and Harbors Act regulates activities such as excavating and dredging in, placing structures and materials on, or altering the course of Section 10-designated waterways (33 U.S.C. 403). Section 404 of the CWA prohibits discharge of dredged or fill materials without a permit. It extends to more waterbodies than the Rivers and Harbors Act, namely all waters of the United States, including navigable waters, interstate waters and wetlands (33 CFR 320.1(d); 33 CFR 328.3). The U.S. Army Corps of Engineers (USACE) holds both Section 10 and Section 404 permitting authority.

Many activities regulated under either Section 10 or Section 404 must obtain a state Section 401 water quality certification to ensure that the project would comply with state water quality standards. Section 401 of the CWA is administered by the EPA; in Minnesota, the EPA has delegated Section 401 certification to MPCA.

When stormwater drains off a construction site, it carries sediment and other pollutants that can harm nearby surface waters. The federal government requires National Pollutant Discharge Elimination System (NPDES) permit coverage of construction sites that disturb one or more acres. The NPDES Stormwater Program is a comprehensive national program for addressing polluted runoff. In Minnesota, the Minnesota Pollution Control Agency (MPCA) administers this federal program as well as the related State Disposal System (SDS) permit program. The states combined NPDES/SDS construction stormwater permit fulfills federal and state requirements by requiring permittees to control runoff. Regulated parties must develop a complete and accurate Stormwater Pollution Prevention Plan (SWPPP) as part of the NPDES/SDS program.

Floodplains are flat, or nearly flat, land adjacent to a river or stream that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which includes areas covered by the flood, but which do not experience a strong current. Floodplains prevent flood damage by detaining debris, sediment, water, and ice. The Federal Emergency Management Agency (FEMA) delineates floodplains and determines flood risks in areas susceptible to flooding. The base flood that FEMA uses, known as the 100-year flood, has a one percent chance of occurring during each year.

At the state level, the DNR oversees the administration of the state floodplain management program by promoting and ensuring sound land use development in floodplain areas in order to promote the health and safety of the public, minimize loss of life, and reduce economic losses caused by flood damages. The DNR also oversees the national flood insurance program for the state of Minnesota. Floodplains are also regulated at the local level.

### Solar Project

The solar farm is located in the Upper Mississippi-Crow-Rum Watershed Basin.[261] There are no lakes, rivers, watercourses, or water basins in the West or East Blocks of the solar farm (**Figures 12a** and **Figure 12b**). The nearest PWI waterbodies are the Mississippi River, located approximately 0.1 mile to the south at its nearest point to the solar farm (West Block), and the Elk River, located approximately 0.5 mile to the north at its nearest point to the solar farm (East Block). The surface waters within the solar farm footprint are limited to two PWI wetlands in the East Block

The Mississippi River and Elk River are listed by the MPCA as impaired waters; both are within one mile of the solar farm. The majority of impairments to adjacent surface waters are caused by agricultural sources (fecal coliform, dissolved oxygen, turbidity, excess nutrients/eutrophication, aquatic life impairments).

There are no FEMA-designated floodplains within the solar farm footprint

[261] Minnesota's watershed basins, Minnesota's watershed basins | Minnesota DNR (state.mn.us).

## Impacts and Mitigation

Since there are no lakes, rivers, watercourses, or water basins located within the solar farm site, direct impacts to such features have been avoided through site selection. Potential indirect impacts though construction activities which move, remove, or otherwise handle vegetative cover and soils can occur in association to large infrastructure projects. Additionally, changes in vegetative cover and soils can change runoff and water flow patterns.

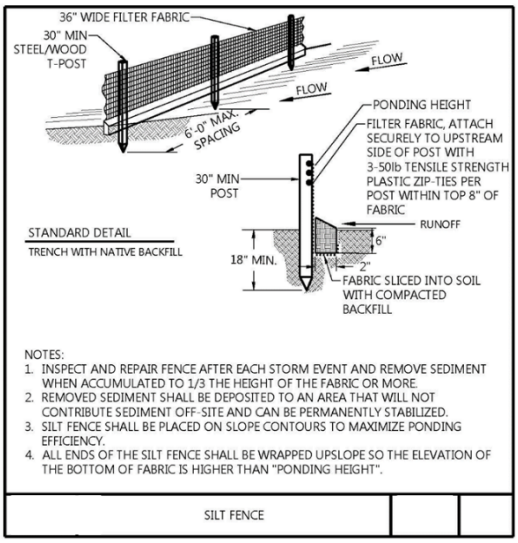
When stormwater drains off a construction site, it carries sediment and other pollutants that can harm nearby surface waters. If the Commission issues the respective permits (LEPGP Site Permit and two HVTL Route Permits) for the Project, the Permittee would be required to obtain a MPCA construction stormwater permit/SWPPP for the Project prior to construction (**Appendix C**). The SWPPP must include a description of all erosion prevention and sediment control BMPs (silt fencing/erosion control devices [**Diagram 23**], revegetation plans, and management of exposed soils, etc.) to be utilized on the site to control sediment and other pollutant discharges from the site.[262]

Additionally, the design of the solar farm includes stormwater basins to collect and hold surface runoff.

## West HVTL Project

The West Route is located in the Upper Mississippi-Crow-Rum Watershed Basin.[263] There are no lakes, rivers, watercourses, or water basins in the West Route (**Figure 12c**). The nearest PWI waterbody is the Mississippi River, located approximately 0.15 mile to the south at its nearest point to the West Route. There are no surface waters within the West Route.

**Diagram 23. Silt Fencing**




[262] Guidance for construction stormwater, Guidance for construction stormwater | Minnesota Pollution Control Agency (state.mn.us).

[263] Minnesota's watershed basins, Minnesota's watershed basins | Minnesota DNR (state.mn.us).

The West Route does not cross any waterbodies or surface waters. The Mississippi River is listed by the MPCA as an impaired water, and it is within one mile of the West Route.

There are no FEMA-designated floodplains within the West Route.

#### Impacts and Mitigation

The West Route will avoid impacts to surface waters and floodplains. As described for the solar farm, the Permittee would be required to develop and submit a SWPPP that covers the HVTL route to MPCA for review and approval.

#### East HVTL Project

The East Route is located in the Upper Mississippi-Crow-Rum Watershed Basin.[264] There are no lakes, rivers, watercourses, or water basins in the East Route (**Figure 12c**). The nearest PWI waterbodies are the Mississippi River, located approximately 0.3 mile to the south at its nearest point to the East Route, and the Elk River, located approximately 1.0 mile to the northeast at its nearest point to the east. There are no surface waters within the East Route.

As described for the solar farm, the Mississippi River and Elk River are listed by the MPCA as an impaired water; both are within one mile of the East Route.

Based on the FEMA records, the East Route is not located in a designated flood hazard area.

#### Impacts and Mitigation

The East Route will avoid impacts to surface waters and floodplains. As described for the solar farm, the Permittee would be required to develop and submit a SWPPP that covers the HVTL route to MPCA for review and approval.

### 5.8.2 Wetlands

Construction and operation of large electric power facilities has the potential to impact wetlands. Wetlands are areas with hydric (wetland) soils, hydrophilic (water-loving) vegetation, and wetland hydrology (inundated or saturated during much of the growing season). Wetland types include marshes, swamps, bogs, and fens. Wetlands vary widely due to differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors.[265]

Wetlands are important to the health of waterways and communities that are downstream. Wetlands can be one source of hydrology in downstream watercourses and water bodies, detain floodwaters,

[264] Minnesota's watershed basins, Minnesota's watershed basins | Minnesota DNR (state.mn.us).
[265] EPA. Wetlands - Wetland Types. https://www.epa.gov/wetlands/classification-and-types-wetlands#marshes.

recharge groundwater supplies, remove pollution, and provide fish and wildlife habitat. Wetland health also has economic impacts because of their key role in fishing, hunting, agriculture, and recreation.

These large infrastructure projects could temporarily or permanently impact wetlands if these features cannot be avoided through project design. During construction, temporary disturbance of soils and vegetative cover could cause sediment to reach wetlands which could in turn affect wetland functionality. If permanent facilities or impervious surfaces are placed in wetlands this would result in a total loss of wetland functionality and potentially affect water resources downstream.

### Solar Project

The Applicants assessed the potential for wetlands within the solar farm footprint through desktop reviews of available resource (i.e., National Wetlands Inventory (NWI) data, aerial photography, hydric soils maps, LiDAR, and digital elevation models); this was followed by a formal wetland delineation within the solar farm footprint.[266] The wetland delineation identified 10 wetlands in the West Block and five wetlands in the East Block. Wetland complexes consisted of small and large isolated wetlands scattered throughout the solar farm site. Wetlands within West Block are primarily located within the northwest corner of the site and are associated with adjacent waterbodies, in addition to few small, isolated wetlands. Wetlands within the East Block were identified in the center of the solar farm site and primarily consist of isolated basins.[267] There are 3.6 acres of delineated wetlands in the West Block and 35.6 acres of delineated wetlands in the East Block (**Figures 12a** and **Figure 12b**).

The MNDNR PWI was also reviewed to identify PWI wetlands within the solar farm site. There are four PWI wetlands within the solar farm footprint: two in the West Block and two in the East Block. PWI wetlands within the West Block are located in the northwest corner and are associated with adjacent PWI wetlands that are generally outside the solar farm footprint. PWI wetlands within the East Block are located within the center of the solar farm site and are associated with isolated basins.[268]

### Impacts and Mitigation

The solar farm has been designed to avoid any direct impacts to all identified wetlands; the delineated wetlands that are also classified as PWI wetlands will be avoided by construction. There are delineated wetlands within the solar farm footprint that are currently farmed wetlands; the Applicants will also avoid impacts to these delineated wetlands and revegetate them with a wet seed mix see VMP)[269].

Potential indirect impacts will be minimized as described in the surface water discussion (Section 5.8.1) through the development and submittal of a SWPPP to the MPCA for review and approval.

[266] SPA, at pp. 150-151.
[267] Ibid.
[268] Ibid.
[269] SPA, at Appendix G.

### West HVTL Project

There are no NWI-mapped or delineated wetlands identified within the West Route (**Figure 12c**). There are also no PWI wetlands within the West Route.

### Impacts and Mitigation

No wetlands were identified in the West Route; as such, no mitigation is proposed.

### East HVTL Project

There are two NWI-mapped wetlands within the East Route totaling 13.2 acres and associated with ash ponds (**Figure 12c**). These two wetlands were not delineated. There are also no PWI wetlands within the East Route.

### Impacts and Mitigation

The East Route anticipated alignment avoids crossing any NWI-mapped wetlands; as such, no mitigation is proposed.

## 5.8.3 Groundwater

Ground water in Minnesota is largely a function of local geologic conditions that determine the type and properties of aquifers. The Minnesota DNR divides the state into six ground water provinces based on bedrock and glacial geology.[270] Most groundwater originates from rain and melting snow and ice that infiltrate into the ground; it is the source of water for springs and wells. It is relied on as a source for drinking water, irrigation, and industrial use. Groundwater can be sourced from shallow surficial aquifers or from deeper confined aquifers. Activities that reduce the quantity of available water or introduce contaminants into these aquifers can affect groundwater resources and the people and industries that rely on them.

The EPA defines a sole source aquifer (SSA) or principal source aquifer area as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer, where contamination of the aquifer could create a significant hazard to public health, and where there are no alternative water sources that could reasonably be expected to replace the water supplied by the aquifer.[271]

Under the Safe Drinking Water Act (SDWA), each state is required to develop and implement a Wellhead Protection Program to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. Public and non-public community water supply source-water protection in Minnesota is administered by the MDH through the Wellhead Protection program. Wellhead Protection Program Areas (WHPA) for public and community water-

[270] DNR. *Minnesota Groundwater Provinces* (https://www.dnr.state.mn.us/groundwater/provinces/index.html).
[271] https://www.epa.gov/dwssa/overview-drinking-water-sole-source-aquifer-program#What_Is_SSA.

supply wells are delineated based on a zone of capture for 10-year groundwater time-of-travel to the well and are available through a database and mapping layer maintained by MDH.[272]

The DNR defines an area as sensitive if natural geologic factors create a significant risk of groundwater degradation through the migration of waterborne contaminants. The near-surface sensitivity assessment estimates the time required for water to travel from the land surface, through unsaturated sediment, and finally to the water table. Transmission rates are based on the soil type and the texture of surficial geologic units; the travel time varies from hours to approximately a year. The pollution sensitivity of buried sand and gravel aquifers and of the first buried bedrock surface represents the approximate time it takes for water to move from land surface to the target (residence time).[273]

Relatively high sensitivity does not mean that water quality has been or will be degraded. If there are no contaminant sources, pollution will not occur. Low sensitivity does not guarantee protection. Leakage from an unsealed well for example, may bypass the natural protection, allowing contamination to directly enter an aquifer.

The County Well Index (CWI) is the most complete record of well construction and location in Minnesota and is kept up-to-date and maintained by the Minnesota Geological Survey, in cooperation with the MDH.[274]

This section assesses the potential for construction and operation of the Project to affect the quantity of available water or to introduce pollutants that would degrade the quality of groundwater resources.

### Solar Project

The Project is within the Metro Province, which is characterized by sand aquifers in generally thick sandy and clayey glacial drift overlying Precambrian sandstone and Paleozoic sandstone, limestone, and dolostone aquifers. In this province, groundwater is typically derived from limited extent surficial and buried sand aquifers.[275]

The Applicants conducted a review for SSA, wells listed on the CWI, and MDH WHPAs.[276] A search of the CWI identified 39 verified and unverified wells within the Project area (**Figure 8a** and **Figure 8b**). A search for WHPAs indicated there are none in the Project area. The closest WHPA is located west of the West Block, in the town of Clear Lake.

[272] https://www.pca.state.mn.us/water/wellhead-and-source-water-protection-programs.
[273] https://www.dnr.state.mn.us/waters/groundwater_section/mapping/sensitivity.html.
[274] https://www.mngs.umn.edu/cwi.html.
[275] DNR. *Minnesota Groundwater Provinces* (https://www.dnr.state.mn.us/groundwater/provinces/index.html).
[276] SPA, at pp. 137-139.

## Impacts and Mitigation

Potential impacts due to the construction and operation of the solar farm to available geologic resources are likely to be limited. Due to the thickness of surficial materials (approximately 87 feet), excavation or blasting of bedrock is not anticipated. Impacts to geologic resources are not anticipated and mitigation is not expected to be necessary. Project infrastructure is not likely to affect the use of existing water wells because the breadth of work does not entail digging deeper than 15 feet for the racking piers.

In the unlikely case that any dewatering is required during construction, water will be discharged to the surrounding surface, thereby allowing it to infiltrate back into the ground to minimize potential impacts. If dewatering is necessary, the Permittee would be required to obtain a Water Appropriation Permit from MNDNR (**Appendix C**).

Impacts to groundwater resources, including aquifers and the Mississippi River, are not anticipated as water supply needs will be limited. Based on the small proportion of increased impervious surface area that will be created by solar farm components (access roads, inverter skids, and collector substations – 78.4 acres in total), the solar farm is anticipated to have minimal impacts on regional groundwater recharge. The foundations of the tracking rack system will be via driven steel pier and will not require concrete; some concrete pads/foundations may be required (Inverters). Similarly, the exterior agricultural fence may require concrete foundations in some locations. If concrete is needed, it will be locally sourced; an on-site concrete batch plant will not be required for the Project.

In accordance with the lease agreements with the landowners, the landowners will be required to remove irrigation equipment and seal/cap existing wells prior to construction. Doing so will avoid impacts to or from this infrastructure.[277]

A National Pollutant Discharge Elimination System permit application to discharge stormwater from construction facilities will be acquired by Permittee from the MPCA. BMPs will be used during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion, whether the erosion is caused by water or wind. Practices may include containment of excavated material, protection of exposed soil, stabilization of restored material, and treating stockpiles to control fugitive dust. A SWPPP will be developed for the Project prior to construction that will include BMPs such as silt fencing (or other erosion control devices), revegetation plans, and management of exposed soils to prevent erosion. Because the Project will disturb more than 50 acres, the Permittee would be required to submit the SWPPP to MPCA for review and approval prior to construction and to obtain coverage under the General Construction Stormwater Permit.

[277] SPA, at pp. 137 -139.

#### West HVTL Project

Due to its proximity to the solar farm, the West Route also occurs in the Metro Province, which is characterized by sand aquifers in generally thick sandy and clayey glacial drift overlying Precambrian sandstone and Paleozoic sandstone, limestone, and dolostone aquifers. There are no EPA-designated SSAs within the West Route. Based on review of the CWI data, there are 15 verified wells within the proposed West Route (**Figure 8c**). There are no WHPAs within the West Route; the closest WHPA is located just east of the West Route, in the town of Becker.

#### Impacts and Mitigation

Potential impacts are not anticipated to the bedrock during construction or operation of the West Route, as bedrock is at depths greater than proposed structure foundation depths of 12 to 58 feet deep. Similarly, no potential impacts to groundwater resources are foreseen as there are no SSAs or wellhead protection areas within the West Route anticipated alignment. None of the unverified wells are located within the West Route anticipated alignment. If shallow depths to groundwater resources are identified during geotechnical investigations, specialty structures requiring wider, but shallower, excavation for foundations may be used.

#### East HVTL Project

Due to its proximity to the solar farm, the East Route also occurs in the Metro Province, which is characterized by sand aquifers in generally thick sandy and clayey glacial drift overlying Precambrian sandstone and Paleozoic sandstone, limestone, and dolostone aquifers. There are no EPA-designated SSAs within the East Route. There are seven verified and unverified wells within the East Route. There are no WHPAs within the East Route; the closest WHPA is located north of the East Route, in the town of Becker.

#### Impacts and Mitigation

Potential impacts are not anticipated to the bedrock during construction or operation of the East Route, as bedrock is at depths greater than proposed structure foundation depths of 18 to 48 feet deep. Similarly, no potential impacts to groundwater resources are foreseen as there are no SSAs or wellhead protection areas within the East Route anticipated alignment. There is one unverified well are located within the East Route anticipated alignment (**Figure 8c**); the location of which will be verified prior to submittal of the Plan and Profile. If shallow depths to groundwater resources are identified during geotechnical investigations, specialty structures requiring wider, but shallower, excavation for foundations may be used.

### 5.8.4 Soils and Prime Farmland

Large electric power facilities have the potential to impact soils during the construction and decommissioning process. Construction may require some amount of grading to provide a level surface for safe operation of construction equipment; potential soil impacts may result from the excavation, stockpiling, and redistribution of soils during installation of project components. Localized

soil erosion, compaction, and topsoil and subsoil mixing could affect revegetation within temporary work areas.

Soil varies considerably in its physical and chemical characteristics, these characteristics strongly influence the suitability and limitations that soil has for construction, reclamation, and restoration.

Since the Applicants have stated that they are committed to design and implementation of a VMP at the Sherco Solar Project that meets the standards established in BWSR's *Habitat Friendly Solar Program*, a thorough understanding of the soil conditions on site is critical. The Habitat Friendly Solar Program supports the establishment of habitat for pollinators, songbirds, and other species in addition to co-benefits such as water management, and soil health. Support is provided through a combination of technical resources, collaboration with conservation partners and project assessment forms.[278]

Soil characteristics most applicable for an assessment of the potential to impact soils during construction and operation, and thereby influencing restoration/revegetation efforts include compaction potential, wind and water erodibility, and hydric rating.

Compaction Potential. Soils prone to compaction and rutting are subject to dramatic and adverse changes in soil porosity and structure because of mechanical deformation caused loading by equipment during construction. Compaction and rutting are related to moisture content and texture and are worse when medium and fine textured soils are subject to heavy equipment traffic when wet.

Soil texture affects water infiltration and percolation, drought tolerance, compaction, rutting, and revegetation among other things. Soil texture is described by the soil textural family, which indicates the range of soil particle sizes averaged for the whole soil.

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils. Construction equipment traveling over wet soils could disrupt the soil structure, reduce pore space, increase runoff potential, and cause rutting. The degree of compaction depends on moisture content and soil texture. Fine-textured soils with poor internal drainage that are moist or saturated during construction are the most susceptible to compaction and rutting.

Soils classified as having somewhat poor to very poor drainage classes and surface textures of clay loam and finer are considered to have a high potential for compaction. Compaction-prone soils may require additional mitigation measures during construction to minimize compaction and/or during restoration.

[278] Minnesota Habitat Friendly Solar Program | MN Board of Water, Soil Resources (state.mn.us).

Erodibility. Soil drainage indicates the wetness in the soil profile along with the speed at which internal water moves. Soil Drainage affects constructability, erosion by wind and water, and revegetation success. Soils categorized as wind erodible may require additional mitigation measures to minimize the likelihood of soil migration outside of workspaces. Susceptibility to wind erosion is less affected by slope angles and is more directly influenced by physical soil factors including moisture, texture, calcium carbonate content, and organic matter; and landform and landscape conditions including soil roughness factors, unsheltered distance, and vegetative cover. Wind Erodibility Groups (WEGs) are a direct indicator of the inherent susceptibility of soils to wind erosion. WEGs may range from 1 to 8, with 1 being the highest potential for wind erosion, and 8 the lowest. Soils with WEGs of 1 or 2 are considered highly erodible due to wind.

Soils categorized as water erodible may require additional mitigation measures to minimize the likelihood of soil migration outside of workspaces. Soils most susceptible to water erosion are typified by bare or sparse vegetative cover, non-cohesive soil particles, low infiltration rates, and/or moderate to steep slopes. Soils more typically resistant to water erosion include those that occupy low relief areas, are well vegetated, and have high infiltration capacity and internal permeability. The soil erodibility factor (K-factor) is a quantitative description of the inherent erodibility of a particular soil; it is a measure of the susceptibility of soil particles to detachment and transport by rainfall and runoff.

The factor reflects the fact that different soils erode at different rates when the other factors that affect erosion (infiltration rate, permeability, total water capacity, dispersion, rain splash, and abrasion) are the same. Texture is the principal factor affecting K value, but structure, organic matter, and permeability also contribute. K factor values range from 0.02 to 0.69. Soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent are considered highly erodible by water.

Hydric rating. Hydric soil means a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper horizon. This definition includes soils that developed under anaerobic conditions in the upper part but no longer experience these conditions due to hydrologic alteration such as those hydric soils that have been artificially drained or protected (tiled, ditched); their presence can indicate wetland environments if vegetation and other hydrologic factors are present.

Soils with revegetation concerns can indicate a need for additional mitigation measures during restoration to ensure restoration/revegetation of workspaces is successful. The vegetation potential of soils is based on several characteristics including topsoil thickness, soil texture, available water capacity, susceptibility to flooding, and slope. Other considerations included whether the soils are natural, human transported, or disturbed. Some soils have characteristics that cause a high seed mortality; these areas may need additional management and may be difficult to revegetate. The

clearing and grading of soils with poor revegetation potential could result in a lack of adequate vegetation following construction and restoration of ROWs, which could lead to increased erosion, a reduction in wildlife habitat, and adverse visual impacts. The *land capability classification* is a system of grouping soils primarily based on their capability to produce common cultivated crops and pasture plants without deteriorating over a long period of time; this may indicate the degree of effort needed to reestablish the desired vegetative profile for a given plot. The capability class ranges from 1 to 8, with 1 having the fewest limitations and 8 having very severe limitations that restrict their use for crops and pasture plants. Soils with a non-irrigated land capability classification of 4 or greater are characterized as having poor revegetation potential.

The Applicants assessed the soil characteristics within the Project area (solar farm, West and East HVTL Routes) using the Soil Survey Geographic database.[279][280] The SSURGO database is a digital version of the original county soil surveys developed by NRCS for use with GIS. It provides the most detailed level of soils information for natural resource planning and management. Soil maps are linked in the SSURGO database to information about the component soils and their properties.

A detailed listing for the relevant soil map units and soil characteristics broken out by soil map unit name within each Project area is listed on **Table 33**.

Prime Farmland

No large electric power generating plant site may be permitted where the developed portion of the plant site, excluding water storage reservoirs and cooling ponds, includes more than 0.5 acres of prime farmland per megawatt of net generating capacity, unless there is no feasible and prudent alternative. Economic considerations alone do not justify the use of more prime farmland.[281]

"Prime farmland" means those soils that meet the specifications of Code of Federal Regulations 1980, title 7, section 657.5, paragraph (a). These provisions do not apply to areas located within home rule charter or statutory cities; areas located within two miles of home rule charter or statutory cities of the first, second, and third class; or areas designated for orderly annexation under Minnesota Statutes, section 414.0325.

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to

[279] SPA, at p. 140.
[280] Description of SSURGO Database | NRCS Soils (usda.gov).
[281] Minn. Rules 7850.4400, Subpart 4.

**Table 33. Soil Map Units and Characteristics for the Sherco Solar Project[282]**

| Map Unit Symbol | Map Unit Name | Acres | Farmland Classification | Drainage Class | Surface Texture | WEG | Kw | Slope Range | Hydric Rating | Non-Irrigated LCC |
|---|---|---|---|---|---|---|---|---|---|---|
| **Solar Farm** | | | | | | | | | | |
| 260 | Duelm loamy sand, 0 to 2 percent slopes | 2.8 | Not prime farmland | Moderately well drained | Loamy sand | 2 | .17 | 0-5 | No | 4s |
| D67A | Hubbard loamy sand, 0 to 2 percent slopes | 52.4 | Not prime farmland | Excessively drained | Loamy sand | 2 | .02 | 0-5 | No | 4s |
| D67B | Hubbard loamy sand, 1 to 6 percent slopes | 173.4 | Not prime farmland | Excessively drained | Loamy sand | 2 | .02 | 0-5 | No | 4s |
| D67C | Hubbard loamy sand, 2 to 12 percent slopes | 192.5 | Not prime farmland | Excessively drained | Loamy sand | 2 | .02 | >5-8 | No | 6s |
| D62A | Hubbard-Mosford complex, Mississippi River Valley, 0 to 3 percent slopes | 2,938.5 | Not prime farmland | Excessively drained | Loamy sand | 2 | .02 | 0-5 | No | 4s |
| 261 | Isan sandy loam, depressional, 0 to 1 percent slopes | 19.3 | Not prime farmland | Very poorly drained | Sandy loam | 3 | .20 | 0-5 | Yes | 6w |
| D20A | Isan-Isan, frequently ponded, complex, 0 to 2 percent slopes | 1.3 | Not prime farmland | Poorly drained | Sandy loam | 3 | .20 | 0-5 | Yes | 4w |
| 768 | Mosford sandy loam, 0 to 2 percent slopes | 5.8 | Farmland statewide importance | Somewhat excessively drained | Sandy loam | 3 | .20 | 0-5 | No | 3s |
| 708 | Rushlake coarse sand, 1 to 4 percent slopes | 2.1 | Not prime farmland | Moderately well drained | Coarse sand | 1 | .02 | 0-5 | No | 4s |
| 258E | Sandberg loamy coarse sand, 6 to 30 percent slopes | 3.0 | Not prime farmland | Excessively drained | Loamy coarse sand | 2 | .15 | >15-30 | No | 7s |
| 258B | Sandberg loamy sand, 1 to 6 percent slopes | 47.5 | Not prime farmland | Excessively drained | Loamy sand | 2 | .10 | 0-5 | No | 4s |
| 258C | Sandberg loamy sand, 2 to 12 percent slopes | 11.9 | Not prime farmland | Excessively drained | Loamy sand | 2 | .10 | >8-15 | No | 6s |
| 1223 | Sandberg-Arvilla complex, 0 to 3 percent slopes | 9.1 | Not prime farmland | Excessively drained | Loamy coarse sand | 2 | .05 | 0-5 | No | 4s |
| 1288 | Seelyeville-Markey complex, ponded, 0 to 1 percent slopes | 16.3 | Not prime farmland | Very poorly drained | Muck | 8 | N/A | 0-5 | Yes | 8w |
| 1028 | Udorthents-Pits, gravel, complex | 3.7 | Not prime farmland | N/A | N/A | N/A | N/A | >5-8 | N/A | N/A |
| | | **3,479.5** | | | | | | | | |
| **West HVTL Project Right-of-Way** | | | | | | | | | | |
| 341 | Arvilla sandy loam, 0 to 2 percent slopes | 3.8 | Farmland statewide importance | Somewhat excessively drained | Sandy loam | 3 | .20 | 0-5 | No | 3s |
| D67B | Hubbard loamy sand, 1 to 6 percent slopes | 0.8 | Not prime farmland | Excessively drained | Loamy sand | 2 | .02 | 0-5 | No | 4s |
| D62A | Hubbard-Mosford complex, Mississippi River Valley, 0 to 3 percent slopes | 40.7 | Not prime farmland | Excessively drained | Loamy sand | 2 | .02 | 0-5 | No | 4s |
| 1015 | Udipsamments, cut and fill land | 12.6 | Not prime farmland | N/A | N/A | N/A | N/A | 0-5 | N/A | N/A |
| | | **58.0** | | | | | | | | |
| **East HVTL Project Right-of-Way** | | | | | | | | | | |
| D67B | Hubbard loamy sand, 1 to 6 percent slopes | 0.1 | Not prime farmland | Excessively drained | Loamy sand | 2 | .02 | 0-5 | No | 4s |
| D62A | Hubbard-Mosford complex, Mississippi River Valley, 0 to 3 percent slopes | 18.4 | Not prime farmland | Excessively drained | Loamy sand | 2 | .02 | 0-5 | No | 4s |
| 1015 | Udipsamments, cut and fill land | 12.0 | Not prime farmland | N/A | N/A | N/A | N/A | 0-5 | N/A | N/A |
| 1356 | Water, miscellaneous | 0.0 | Not prime farmland | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | | **30.6** | | | | | | | | |

Soil Survey Staff, Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA). Web Soil Survey. Available online at https://websoilsurvey.sc.egov.usda.gov/. Accessed January 2021.

[282] SPA, at Appendix K.

economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt, and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.[283]

### Solar Project

None of the soils within the solar farm are considered prime farmland (**Figure 13**). Less than one percent of soils are considered farmland of statewide importance, compaction prone, or water erodible. Approximately 1 percent of the solar farm is underlain by hydric soils or soils containing hydric inclusions.

Nearly all soils within the solar farm are considered wind erodible and present potential revegetation concerns, indicating that additional mitigation measures may be required to minimize the likelihood of soil migration outside of workspaces and to ensure revegetation is successful.

A listing for the relevant soil characteristics within the solar farm is listed on **Table 34**.

**Table 34. Summary of Soil Characteristics within the Solar Farm[284]**

| Soil Characteristics | Solar Farm | |
|---|---|---|
| | Acres | Percent |
| Solar Project Area | 3,479.5 | |
| Prime Farmland [1] | 0.0 | 0.0% |
| Farmland of Statewide Importance [2] | 5.8 | 0.2% |
| Compaction-Prone [3] | 16.3 | 0.5% |
| Wind Erodible [4] | 3,433.2 | 98.7% |
| Water Erodible [5] | 3.0 | 0.1% |
| Hydric [6] | 36.8 | 1.1% |
| Revegetation Concerns [7] | 3,470.0 | 99.7% |

Note: Soils may have more than one characteristic.

1 Includes soils that meet the prime farmland or prime farmland if a limiting factor is mitigated.
2 Includes soils classified as farmland of statewide importance by SSURGO.
3 Includes soils in somewhat poor to very poor drainage classes with surface textures of clay loam and finer.
4 Includes soils in WEG designation of 1 or 2.
5 Includes soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.
6 Includes soils that are classified as hydric by SSURGO.
7 Includes soils with a non-irrigated land capability classification of 4 or greater.

[283] https://www.law.cornell.edu/cfr/text/7/657.5.
[284] SPA, at p. 143, Table 5.5-2.

### Impacts and Mitigation

Impacts to soils will occur during the construction and decommissioning stages of the solar farm. Construction may require some amount of grading to provide a level surface for the solar arrays. Because the solar farm site is relatively level, existing agricultural fields, the need for grading is anticipated to be minimal. Areas of the site to be graded will have topsoil and organic matter stripped and segregated from the subsoil. Topsoil shall have temporary and permanent stabilization measures established in accordance with the Project's SWPPP, the VMP[285] and the AIMP[286]. Internal roads will be constructed of inorganic fill (road aggregate base) to match the surrounding existing ground elevations to allow existing drainage patterns to persist. Once the necessary grading is complete, subsoil will be placed followed by topsoil, blending the grade into existing topography.

Construction of the solar arrays will commence once grading activities are complete; the racking system supports will be constructed using steel piles driven into the ground. Soil disturbance would be restricted to the hydraulic ram/ screw machinery, about the size of a small tractor, temporarily disturbing soil at each pile insertion location and while driving between drilling locations.

The below-ground DC and AC collection systems will be installed in trenches or ploughed into place at a depth of at least four feet below grade. During trench excavation the topsoil and subsoil will be removed and stockpiled separately. Once the cables are laid in the trench, the area will be backfilled with subsoil followed by topsoil.

Construction work within the collector substation sites will include site preparation and installation of substructures and electrical equipment. Installation of concrete foundations for equipment will require the use of trenching machines, concrete trucks and pumpers, vibrators, forklifts, boom trucks, and large cranes. The limit of disturbance will be within the footprint of the collector substations for both the foundation equipment and the concrete delivery trucks. All topsoil from the West and East Collector Substation footprints will be removed to a pre-established suitable location for storage.

Dust control measures, including water trucks, will be implemented during construction.

The Applicants have committed to the development and implementation of a VMP that will result in revegetation of the site that will meet the standards established in the BWSR Habitat Friendly Solar Program; the VMP will be developed in coordination with Minnesota Departments of Commerce, Natural Resources, Agriculture, Pollution Control and Board of Water and Soil Resources and serve as a guide for site preparation, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation.

[285] SPA, at Appendix G.
[286] SPA, at Appendix F.

### West HVTL Project

None of the soils within the West Route are considered prime farmland (**Figure 17**). Additionally, none of the soils within the West Route are considered compaction-prone, water erodible or are underlain by hydric soils. Approximately 7 percent of soils are considered farmland of statewide importance.

Approximately 72 percent of soils in the West Route are considered wind erodible and present revegetation concerns, indicating that additional mitigation measures may be required to minimize the likelihood of soil migration outside of workspaces and to ensure revegetation of workspaces is successful.

A listing for the relevant soil characteristics within the West Route is listed on **Table 35**.

**Table 35. Summary of Soil Characteristics Along the West Route**[287]

| Soil Characteristics | West Route | |
|---|---|---|
| | Acres | Percent |
| Total Right-of-Way Acres | 58.0 | |
| Prime Farmland [1] | 0.0 | 0.0% |
| Farmland of Statewide Importance [2] | 3.8 | 6.5% |
| Compaction-Prone [3] | 0.0 | 0.0% |
| Wind Erodible [4] | 41.5 | 71.6% |
| Water Erodible [5] | 0.0 | 0.0% |
| Hydric [6] | 0.0 | 0.0% |
| Revegetation Concerns [7] | 41.5 | 71.6% |

Note: Soils may have more than one characteristic.

1 Includes soils that meet the prime farmland or prime farmland if a limiting factor is mitigated.
2 Includes soils classified as farmland of statewide importance by SSURGO.
3 Includes soils in somewhat poor to very poor drainage classes with surface textures of clay loam and finer.
4 Includes soils in WEG designation of 1 or 2.
5 Includes soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.
6 Includes soils that are classified as hydric by SSURGO.
7 Includes soils with a non-irrigated land capability classification of 4 or greater.

### Impacts and Mitigation

Impacts to soils will occur during the construction of the West Route; a small portion of land will be temporarily taken out of agricultural production for temporary workspace associated with erecting structures along the ROW. During construction of the West Route, soil compaction and localized soil erosion may occur during clearing and grading of work areas; potential soil impacts may result from the excavation, stockpiling, and redistribution of soils. The Permittee will implement measures to reduce soil compaction and to implement soil decompaction during restoration of workspaces.

[287] SPA, at p. 143, Table 5.5-3.

Impacts to soils would be temporary and minor and would be mitigated through the proper use and installation of BMPs, such as minimizing the number of vehicles and protection and maintenance of topsoil, during ROW clearing and tie line construction. The Permittee will be required to develop a SWPPP that complies with the MPCA rules and guidelines; implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion during construction.

Landowners will be compensated accordingly for any localized crop damage and soil compaction that may occur.

### East HVTL Project

None of the soils within the East Route are considered prime farmland (**Figure 17**); none of the soils within the West Route are considered farmland of statewide importance, compaction-prone, water erodible or are underlain by hydric soils.

Approximately 60 percent of soils in the East Route are considered wind erodible and present revegetation concerns, indicating that additional mitigation measures may be required to minimize the likelihood of soil migration outside of workspaces and to ensure revegetation of workspaces is successful.

A listing for the relevant soil characteristics within the East Route is listed on **Table 36**.

### Impacts and Mitigation

Impacts to soils will occur during the construction of the East Route; soil compaction and localized soil erosion may occur during clearing and grading of work areas. Potential soil impacts may result from the excavation, stockpiling, and redistribution of soils. The Permittee will implement measures to reduce soil compaction and to implement soil decompaction during restoration of workspaces. Impacts to soils would be temporary and minor and would be mitigated through the proper use and installation of BMPs, such as minimizing the number of vehicles and protection and maintenance of topsoil, during ROW clearing and tie line construction. The Permittee will be required to develop a SWPPP that complies with MPCA rules and guidelines; implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion during construction.

**Table 36. Summary of Soil Characteristics Along the East Route[288]**

| Soil Characteristics | East Route | |
|---|---|---|
| | Acres | Percent |
| Total Right-of-Way Acres | 30.6 | |
| Prime Farmland [1] | 0.0 | 0.0% |
| Farmland of Statewide Importance [2] | 0.0 | 0.0% |
| Compaction-Prone [3] | 0.0 | 0.0% |
| Wind Erodible [4] | 18.5 | 60.1% |
| Water Erodible [5] | 0.0 | 0.0% |
| Hydric [6] | 0.0 | 0.0% |
| Revegetation Concerns [7] | 18.5 | 60.1% |

Note: Soils may have more than one characteristic.

1 Includes soils that meet the prime farmland or prime farmland if a limiting factor is mitigated.

2 Includes soils classified as farmland of statewide importance by SSURGO.

3 Includes soils in somewhat poor to very poor drainage classes with surface textures of clay loam and finer.

4 Includes soils in WEG designation of 1 or 2.

5 Includes soils with a slope greater than 15 percent or soils with a K value of greater than 0.35 and slopes greater than 5 percent.

6 Includes soils that are classified as hydric by SSURGO.

7 Includes soils with a non-irrigated land capability classification of 4 or greater.

### 5.8.5 Flora

Large electric power facilities have the potential to impact flora through the removal or disturbance of vegetation during construction and during maintenance activities. Additionally, flora may be impacted by the possible introduction of invasive species, or by changes in habitat (soil disturbances, water flows) that adversely impact plant growth.

The Project is located in the Anoka Sand Plain Subsection of the Eastern Broadleaf Forest Province.[289] The Anoka Sand Plain Subsection is bordered by the Mississippi River on its western boundary and the Anoka Sand Plain on the eastern and northern edges. The Anoka Sand Plain Subsection consists of a flat, sandy lake plain and terraces along the Mississippi River. Pre-settlement vegetation in the Anoka Sand Plain Subsection consisted predominantly of oak barrens and openings, with characteristic trees being bur oak and northern pin oak.[290] Sod and vegetable crops are prominent in the present day vegetative landcover; with crops/grass/shrubs covering 60 percent of the landscape.

#### Solar Project

Based on the USGS NLCD data, the solar farm site includes predominately agricultural land of cultivated crop land and hay/pasture at 96.8 percent (**Table 17**). Developed, upland forest, and herbaceous land

[288] SPA, at p. 144, Table 5.5-4.

[289] Eastern Broadleaf Forest Province | Minnesota DNR (state.mn.us).

[290] Ibid.

cover within the solar farm footprint total 2.4 percent; forested land consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. The small areas of woody wetlands and shrub/scrub land (1.1 acres each) within the solar farm footprint are within the East Block and are associated with the small areas of open water that are also present within this portion of the solar farm. Emergent herbaceous wetlands within the solar farm footprint are predominantly within the East Block of the boundary, again associated with the areas of open water present in this portion of the solar farm.

### Impacts and Mitigation

Agricultural land will be converted from an agricultural use to solar energy production for the life of the Project; 20 acres of agricultural land used for temporary laydown areas outside the solar farm fence that will only be used during construction. These areas will be returned to their pre-construction land use after construction.

Agricultural land within the solar farm footprint (outside of the substations, inverter skids and access roads, which will be converted to developed land and impervious surfaces, totaling 78.4 acres) will be converted to native prairie cover with the goal of operating a certified pollinator-friendly solar facility, based on BWSR's Minnesota Habitat Friendly Solar Program guidance.[291] In addition, the anticipated benefits of implementation of the VMP, besides promoting pollinator habitat, include preservation of the soils, establishment of stable ground cover which will reduce erosion, reduce runoff, and improve infiltration.

Some tree clearing will be required in the interior portions of the solar blocks; however, trees around the perimeter will remain.

### West HVTL Project

Based on the USGS NLCD data, the West Route includes predominately agricultural land of cultivated crop land and hay/pasture at 70.0 percent (**Table 18**). Developed land (28.0 percent) and herbaceous land (2.0 percent) are the next most abundant categories. Barren land comprises less than one half of one percent of the right-of-way acreage. The NLCD data does not identify any forested areas along the West Route ROW; a review of aerial imagery conducted by the Applicants identified shelterbelts between agricultural fields, near farmsteads, and along roadways within or adjacent to the West Route.

### Impacts and Mitigation

Construction of the West Route will result in short-term adverse impacts on existing vegetation, including localized physical disturbance and soil compaction. Construction activities, such as site preparation and installation of structures, are anticipated to impact approximately 0.1 to 0.5 acres of

[291] SPA, at Appendix G Vegetation Management Plan.

vegetation per structure. Construction activities involving establishment and use of access roads, staging, and stringing areas would also have short-term impacts on vegetation by concentrating surface disturbance and equipment use.

Construction will result in long-term impacts on vegetation by permanently removing vegetation at each structure and within portions of the ROW that are currently dominated by forest or other woody vegetation; permanent conversion of forested areas and shrub lands to low-stature vegetation by clearing woody vegetation throughout the entire ROW where present. Impacts to woody-dominated vegetation can be minimized through prudent alignment routing to avoid areas where this vegetation type occurs.

Construction of the West Route could lead to the introduction or spread of invasive species and noxious weeds through ground disturbance that leaves soils exposed for extended periods, introduction of topsoil contaminated with weed seeds, vehicles importing weed seed from a contaminated site to an uncontaminated site, and conversion of landscape type, particularly from forested to open settings.

Impacts to flora can also be mitigated by a number of strategies, including:

- placement of the alignment and of specific structures to avoid trees and other tall-growing species (utilization/sharing of existing road ROWs to the maximum level available).
- spanning low growing plant communities.
- constructing during fall and winter months to limit plant damage.
- leaving or replanting compatible plants at the edge of the transmission line ROW.
- replanting on the transmission line ROW with low growing, native species.
- avoiding the introduction of invasive species – on equipment or through seeds or mulches.
- Revegetating disturbed areas using weed-free seed mixes and using weed-free straw and hay for erosion control.
- Removal of invasive species via herbicide and manual means consistent with easement conditions and landowner restrictions.
- Cleaning and inspection construction vehicles to remove dirt, mud, plant, and debris from vehicles prior to arriving at and leaving from construction sites.
- Minimizing disturbance to native plant communities.
- Limiting traffic through and access to weed-infested areas.
- limiting vehicle traffic to roads along the right-of-way.

Mitigation and restoration measures for impacts to flora are standard Commission route permit conditions.

### East HVTL Project

Based on the USGS NLCD data, the West Route includes predominately agricultural land of cultivated crop land and hay/pasture at 76.2 percent and developed at 21.9 percent (**Table 19**). Developed lands

are roads that are either crossed by or co-located with the East Route anticipated alignment or associated with the SGP. The NLCD data overestimates the amount of cultivated cropland within the East Route; areas within the SGP are classified as cultivated crops when aerial photography confirms they should be classified as developed.

#### Impacts and Mitigation

Because the East Route is primarily within the SGP, the area is heavily developed and sparsely vegetated or maintained by Xcel Energy (mowed areas). Within the SGP, minor tree trimming, or clearing may be required, depending on existing vegetation height.

Construction of the East Route will result in short-term adverse impacts on existing vegetation, including localized physical disturbance and soil compaction. Construction activities, such as site preparation and installation of structures, are anticipated to impact approximately 0.1 to 0.5 acres of vegetation per structure. Construction activities involving establishment and use of access roads, staging, and stringing areas would also have short-term impacts on vegetation by concentrating surface disturbance and equipment use.

Construction would also result in long-term impacts on vegetation by permanently removing vegetation at each structure and within portions of the right-of-way that are currently dominated by forest or other woody vegetation; permanently convert forested areas and shrub lands to low-stature vegetation by clearing woody vegetation throughout the entire ROW where present. Impacts to woody-dominated vegetation can be minimized through prudent alignment routing to avoid areas where this vegetation type occurs.

Construction of the East Route could lead to the introduction or spread of invasive species and noxious weeds. Construction activities that could potentially lead to the introduction of invasive species include ground disturbance that leaves soils exposed for extended periods, introduction of topsoil contaminated with weed seeds, vehicles importing weed seed from a contaminated site to an uncontaminated site, and conversion of landscape type, particularly from forested to open settings

Impacts to flora can also be mitigated through the same strategies as outlined for the West Route.

### 5.8.6 Wildlife

Wildlife can potentially be impacted by large energy projects. Wildlife such as birds, mammals, fish, reptiles, amphibians and insects, can be permanent or migratory. Many species may utilize the available habitat in and adjacent to a given project's area for forage, breeding and shelter.

#### Solar Project

The wildlife species that inhabit the solar farm site are typical of those found in agricultural areas.

The most common species within the site tend to be generalists and are able to utilize rural, urban or agricultural habitats. The predominance of non-native cover types is typically used by common wildlife species that are accustomed to agricultural habitats. Examples of such species would include deer, squirrel, raccoons, mice, voles, common perching birds, red-tail hawks, reptiles, and amphibians. It is anticipated that these species' use of the current habitat available in the proposed solar farm site is largely limited to occasional foraging in the fields and shelter within wooded areas that may surround the fields.

Species adapted to agricultural landscapes that likely occur at the solar farm site are listed in **Table 37**.

**Table 37. Wildlife Species Common to the Solar Project Area**[292]

| Common Name | Scientific Name |
|---|---|
| ***Mammals*** | |
| Red fox | *Vulpes vulpes* |
| Virginia opossum | *Didelphis virginiana* |
| Striped skunk | *Mephitis* |
| White-tailed deer | *Odocoileus virginianus* |
| Eastern cottontail | *Sylvilagus floridanus* |
| Coyote | *Canis latrans* |
| ***Birds*** | |
| Wild turkey | *Meleagris gallopavo* |
| Mourning dove | *Zenaida macroura* |
| American crow | *Corvus brachyrhynchos* |
| Eastern kingbird | *Tyrannus tyrannus* |
| Field sparrow | *Spizella pusilla* |
| ***Reptiles and Amphibians*** | |
| American toad | *Anaxyrus americanus* |
| Common garter snake | *Thamnophis sirtalis* |
| Source: MNDNR, 2021c | |

The solar farm site is located within the Mississippi Flyway, one of the primary north-south migration routes between migratory bird nesting and wintering habitat. The Project is also located within the Prairie Hardwood Transition Bird Conservation Region.[293] The U.S. Fish and Wildlife Service (USFWS) identified 30 species of birds within Prairie Hardwood Transition BCR as Birds of Conservation Concern (BCC)[294]; BCC are avian species that represent the agency's highest conservation priorities. Some of the BCC species that may be found in Sherburne County include the bald eagle (*Halieetus*

[292] SPA, at p. 157, Table 5.5-5.
[293] BCR Map - NABCI (nabci-us.org).
[294] BCC2021.indd (fws.gov).

*leucocephalus*), American bittern (*Botaurus lentiginosus*), red-headed woodpecker (*Melanerpes erythrocephalus*), bobolink (*Dolichonyx oryzivorus*), brown thrasher (*Toxostoma rufum*), marsh wren (*Cistothorus palustris*), pied-billed grebe (*Podilymbus Podiceps*), and willow flycatcher (*Empidonax traillii)*.[295]

Migratory birds are protected by the Migratory Bird Treaty Act (MBTA) of 1918. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory bird and their eggs, parts, and nests; further, the Bald and Golden Eagle Protection Act (16 USC 668-668d) prohibits taking or possession of and commerce in bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), either alive or dead, or any egg, nest, or part of eagles.

Key bird habitats in the United States are designated by the National Audubon Society as Important Bird Areas (IBAs); in Minnesota, 57 IBAs have been identified.[296] The goal of IBAs is to ensure that bird populations persist by identifying and conserving significant habitats. The nearest IBA to the solar farm site, the *Lake Maria State Park - Henry Larson County Forest IBA*,[297] is approximately 1.6 miles south of the site. The Lake Maria State Park - Henry Larson County Forest IBA is a state priority IBA that supports 230 avian species with an emphasis on the bottomland forest and upland deciduous habitat types.

Land uses at the solar farm site are primarily agricultural (cultivated or hay/pasture; 96.8 percent), with some small amounts of developed areas (2.2 percent), open water (0.3 percent), wetland (0.3 percent), forested land (0.1 percent), herbaceous (0.1 percent), barren (<0.1 percent) and shrubland (<0.1 percent). The forested land that is present consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. As a result, few migratory bird species that use trees or forested areas as habitat are anticipated to be present, such as Nashville warbler, black-billed cuckoo, and red-headed woodpecker.

Wetlands and waterbodies within the proposed solar farm site are limited to four PWI wetlands (two in the West Block and two in the East Block; few waterbirds[298] are anticipated to use the solar farm site for nesting. Species of migratory birds associated with grasslands are also expected to be limited or absent. Overall, few if any BCC are likely to use the solar farm site as nesting habitat; the agricultural fields are likely used for foraging habitat and migratory stopover habitat.

Habitat fragmentation is also a concern regarding wildlife; certain species are impacted when larger areas of habitat are divided into smaller areas with associated reductions in habitat connectivity. At present, the solar farm site is highly fragmented given that 99 percent is used for agriculture or is

[295] U.S. Fish & Wildlife Service - Migratory Bird Program | Conserving America's Birds (fws.gov).
[296] Minnesota Important Bird Areas | Audubon.
[297] Lake Maria State Park | Minnesota DNR.
[298] Admin What are Waterbirds? (wetlands.org).

developed, therefore it is doubtful that species sensitive to habitat fragmentation occur in the proposed site.

There are no lakes or rivers located within the solar farm site; no fish are present. The open water at the site is limited to four PWI wetlands. There is limited foraging habitat for bats within the site associated with wetlands. Some pollinator insects would be expected at the site including native bees, butterflies, and moths.

### Impacts and Mitigation

Given that the proposed site is comprised primarily of agricultural lands, occurrence of wildlife within the solar farm is limited to those species well adapted to human disturbance and agricultural land cover; impacts to the current wildlife inhabiting the area is expected to be temporary and minimal.

Wildlife that resides within the construction zone will likely be temporarily displaced to adjacent habitats during the construction process. The wildlife species found in the proposed site do not generally require specialized habitats and will be able to find suitable habitat nearby. Comparable habitat is near the site, and it is likely that these animals would only be displaced a short distance.

The Applicants have stated that they will implement several construction BMPs that are designed to minimize potential wildlife impacts, including: wildlife training for construction personnel, posted speed limits, spill prevention measures, and general construction housekeeping such as trash removal and maintaining a clean work area.[299] Additional BMPs will be implemented for state-listed species (loggerhead shrike and Blanding's turtle); these include removing trees outside of the loggerhead shrike nesting season (April 1 – July 31) and implementing wildlife-friendly erosion control blankets. Plastic erosion control netting is frequently used for erosion control during construction and landscape projects and can negatively impact terrestrial and aquatic wildlife populations as well as get snag in maintenance machinery, resulting in costly repairs and delays. Wildlife entanglement in and death from plastic netting and other man-made plastic materials has been documented in birds, fish, mammals and reptiles.[300]

Permanent security fencing, compliant with the DNR guidance,[301] will be installed along the perimeter of the solar farm. Fencing will be secured to posts which will be directly embedded in the soil or set in concrete foundations as required for structural integrity. Fencing around the facilities may disturb wildlife movement corridors. Although a variety of birds and small mammals, are likely to still be able to gain access to the developed area of the site to use the habitats under and around the solar arrays, access will be limited for larger wildlife.

[299] SPA, at pp. 160-161.
[300] MNDNR. *Wildlife Friendly Erosion Control Fact Sheet.* 2013, http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf.
[301] https://files.dnr.state.mn.us/publications/ewr/commercial_solar_siting_guidance.pdf.

Overall, construction of the solar farm is expected to have minimal impacts on individuals of common wildlife species, and no impact on populations of these species.

Once restoration of the land is established after construction, in accordance with the VMP, the current non-native habitats that are used by habitat generalists will be replaced by a sustainable, diverse, perennial pollinator friendly ground cover throughout the solar farm that may be attractive to some species and less attractive to species that use the open farm and pasturelands. This change in ecology may provide higher quality wildlife habitat for a more diverse range of wildlife, including grassland birds, rodents, reptiles, and insects than the current land use provides. In sum, 2,946 acres would be restored as native prairie, including a seed mix with native grasses and wildflowers, thereby potentially benefitting, and increasing the overall populations of wildlife species in the area, including birds, small mammals, reptiles, and pollinator insects.

During operations, any potential impacts on wildlife are also expected to be minimal and insignificant. These impacts may be related to vehicle traffic and parking or mowing. Additionally, the West and East Collector Substations will introduce an electrocution risk; these facilities will be constructed and operated according to Avian Power Line Interaction Committee (APLIC) [302] recommended guidance to reduce the potential for avian electrocutions.

A National Fish and Wildlife Forensics Laboratory report has identified some avian risks associated with PV facilities.[303] Some birds in the study suffered impact trauma, and related predation. Preliminary findings, based on limited data, suspect the danger is the possible appearance of the facility as a large body of water. Migrating birds may attempt to land, consequently incurring the trauma.

### West HVTL Project

The wildlife species that inhabit the West Route are typical of those found in agricultural areas and would be like those described above for the solar farm.

As with the solar farm site, the West Route is located within the Mississippi Flyway and the Prairie Hardwood Transition BCR; and does not cross any IBAs. The Lake Maria State Park - Henry Larson County Forest IBA is the closest IBA, located approximately 1.5 miles south of the West Route.

Land uses in the West Route ROW are primarily agricultural (cultivated or hay/pasture, 70 percent) and developed (28.0 percent), with some small amounts of herbaceous (2.0 percent), and barren land (< 0.1 percent). Aerial imagery indicates areas of treed land in the form of shelterbelts between agricultural fields, near farmsteads, and along roadways in the northern portion of the West Route.

[302] https://www.aplic.org.
[303] USFWS Forensics Lab, *Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis*, 2014, http://www.ourenergypolicy.org/wp-content/uploads/2014/04/avian-mortality.pdf.

There are also scattered trees or smaller wooded patches in the southern portion of the West Route within the SGP. There are no wetlands or waterbodies located within the West Route; wetland or waterbirds would not be expected to use the West Route for nesting. Overall, given the highly fragmented nature of the West Route, and its proximity to developed land/existing infrastructure, few BCC are likely to use the West Route as habitat. Habitat in the West Route is highly fragmented given 98 percent is used for agriculture or is developed.

Wildlife species, including mammals, reptiles, and amphibians, are similar to those indicated for the solar farm (**Table 37**). There are no lakes or rivers located in the West Route (no fish are present). There are also no wetlands located in the West Route. Pollinator insects would be expected to be present in the West Route, including native bees, butterflies, and moths.

No known bald eagle nests are located within one mile of the West Route anticipated alignment.

### Impacts and Mitigation

Potential impacts to wildlife species, and the BMPs to avoid or minimize these effects, include those described above for the solar farm, but also include impacts due to electrocution and collision with transmission line conductors.

Electrocution occurs when an arc is created by contact between a bird and energized lines or an energized line and grounded structure equipment. Electrocution occurs more frequently with larger bird species, such as hawks, because they have wider wingspans that are more likely to create contact with the conductors. To avoid and minimize potential electrocution of avian species, the Applicants indicate that they will construct the HVTL in accordance with the Avian Power Line Interaction Committee's safety recommendations. These recommendations minimize electrocution risk by providing adequate clearance from energized conductors to grounded surfaces and to other conductors.

Independent of the risk of electrocution, birds may be injured by colliding with transmission line structures and conductors. The risk of collision is influenced by several factors including habitat, flyways, foraging areas, and bird size. Waterfowl, especially larger waterfowl such as swans and geese, are more likely to collide with transmission lines. The frequency of collisions increases when a transmission line is placed between agricultural fields that serve as feeding areas and wetlands or open water, which serve as resting areas. In these areas, it is likely that waterfowl and other birds would be traveling between different habitats, increasing the likelihood of a collision. The Applicants state that they will coordinate with USFWS and MNDNR as needed to identify avian movement pathways and migration flyways that may be crossed by the West Route anticipated alignment and to discuss areas

along the transmission line that may need to be marked with avian flight diverters to minimize impacts to birds.[304] Diverters enable birds to better see conductors during flight and avoid collisions with them.

#### East HVTL Project

The wildlife species that inhabit the East Route are typical of those found in agricultural areas and would be like those described above for the solar farm.

As with the solar farm site, the East Route is located within the Mississippi Flyway and the Prairie Hardwood Transition BCR; and does not cross any IBAs. The Lake Maria State Park - Henry Larson County Forest IBA is the closest IBA, located approximately 1.6 miles south of the West Route.

Land uses in the East Route anticipated alignment are primarily agricultural (cultivated or hay/pasture, 76 percent) and developed (21.9 percent), with some small amounts of open water (2.1 percent). Given the highly fragmented nature of the habitat in the East Route, and its proximity to developed land/existing infrastructure, few if any BCC are likely to use the East Route as habitat.

Habitat within the East Route is highly fragmented, given that 98 percent is used for agriculture or is developed. If species of habitat fragmentation concern are present in the East Route, they have adapted to the fragmentation and current land uses

Wildlife species, including mammals, reptiles, and amphibians, are similar to those indicated for the solar farm (**Table 37**). There are no lakes or rivers located in the East Route (no fish are present). There are also no wetlands located in the East Route. Pollinator insects would be expected to be present in the East Route, including native bees, butterflies, and moths.

No known bald eagle nests are located within one mile of the West Route anticipated alignment.

#### Impacts and Mitigation

Potential impacts to wildlife species, and the BMPs to avoid or minimize these effects, include those described above for the solar farm; as in the West Route the potential impacts and mitigations associated with electrocution and collision with transmission line conductors exist for the East Route.

### 5.8.7 Rare and Unique Resources

Construction of large energy producing facilities have the potential to negatively impact individual plants and animals or might alter their habitat so that it becomes unsuitable for them. For example, trees used by rare birds for nesting might be cut down, soil disturbance from construction activities

[304] SPA, at p. 161.

may destroy rare plant species or communities, or soil erosion may degrade rivers and wetlands that provide required habitat.

Endangered species are species whose continued existence is in jeopardy. Threatened species are likely to become endangered. Species of special concern have some problems related to their abundance or distribution, although more study is required.

The DNR Division of Ecological and Water Resources manages the Natural Heritage Information System (NHIS) which provides information on Minnesota's rare and sensitive species. The NHIS is continually updated as new information becomes available and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities and other natural features. Its purpose is to foster better understanding and conservation of these features.[305]

The USFWS Information for Planning and Conservation (IPaC) website is a project planning tool which aids in the streamlining the USFWS environmental review process. IPaC is available to everyone, whether private citizens or public employees, who need information to assist in determining how their activities may impact sensitive natural resources, and who would like to obtain suggestions for ways to address these impacts. IPaC is also designed to assist the USFWS who is charged with evaluating such impacts.[306]

In addition to rare and sensitive species, the DNR also maps Sites of Biological Significance (SOBS), rare and unique plant communities (prairie) and higher quality examples of more common plant communities (wet meadow).[307] The Minnesota Biological Survey (DNR) designates and assigns rankings to SOBS, based on landscape context, native plant community, and occurrence of rare species populations.[308] There are four biodiversity significance ranks: outstanding, high, moderate, and below.

Native prairies are typically untilled plant communities that are comprised primarily of native grasses and sedges along with a variety of broad-leaved forbs and scattered shrubs. Approximately 250,000 acres of native prairies ranked good to excellent remain in Minnesota.[309]

Native Plant Communities (NPCs) are assemblages of native plants that have not been substantially impacted by non-native species or human activities. NPCs are formed and classified by hydrology, soils, landforms, vegetation, and natural disturbance regimes such as floods, wildfires, and droughts. NPCs are named by their dominant or characteristic species and/or natural features.[310]

[305] https://www.dnr.state.mn.us/nhnrp/nhis.html.
[306] https://ecos.fws.gov/ipac/.
[307] https://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html.
[308] https://www.dnr.state.mn.us/mbs/index.html.
[309] https://www.dnr.state.mn.us/rys/pg/dryprairie.html.
[310] https://www.dnr.state.mn.us/npc/index.html.

Some areas of the state have not been surveyed extensively or recently, so the NHIS database cannot be relied upon as a sole information source for rare species. Nevertheless, the NHIS database provides a starting point for anticipating potential impacts to rare and unique natural species and communities.

Critical habitat is specific geographical areas designated by the USFWS with biological and physical features that are essential to the recovery of the species. Critical habitat may be occupied or unoccupied at the time of designation. Critical habitat is protected against destruction or adverse modification under Section 7 of the ESA during actions that are funded, permitted, or implemented by a federal agency.[311]

The Wildlife Action Network is comprised of areas with high concentrations or persistent or viable populations of Species of Greatest Conservation Need (SGCN), in addition to SOBS, Lakes of Biological Significance, and streams with exceptional indices of biological integrity. Minnesota's State Wildlife Action Plan proactively addresses the state's conservation needs and catalyzes actions to prevent species from becoming listed under the state endangered species program or the ESA.[312] The SWAP also entailed revisions to the state's list of SGCN. SGCN are native animals with rare, declining, or vulnerable populations and species for which the state has a stewardship responsibility (MNDNR, 2016b).

Additionally, the MNDNR issued guidance for commercial solar sites entitled Commercial Solar Siting Guidance[313] that recommends identification of high value resources during Project development. This guidance is specific to solar projects.

**Table 38**[314] includes all species within the solar farm site and West and East Routes and within one mile of each project. Because most species are within one mile of each project, species descriptions are included below.

Federally Listed Threatened and Endangered Species

According to the review of the USFWS IPaC, one species listed as threatened under the federal Endangered Species Act (ESA) may occur in Sherburne County, Minnesota: northern long-eared bat (NLEB).

[311] https://www.fws.gov/endangered/what-we-do/critical-habitats.html.
[312] MNWAP Wildlife Action Network - Resources - Minnesota Geospatial Commons.
[313] Commercial Solar Siting Guidance - Minnesota Department of Natural Resources (state.mn.us).
[314] SPA, at pp. 164-165, Table 5.6-1.

**Table 38. Federal and State-Listed Species Documented within One Mile of the Solar Project, West Route, and East Route**

| Solar Project (Block) | West Route | East Route | Common Name | Scientific Name | Habitat | Status[1] | | Source |
|---|---|---|---|---|---|---|---|---|
| | | | | | | State[2] | Federal[3] | |
| ***Mammals*** | | | | | | | | |
| West East | Yes | Yes | Northern Long-eared Bat (NLEB)[4] | *Myotis septentrionalis* | In winter, hibernates in caves and mines. In fall, swarms in forested areas surrounding hibernation sites. During late spring and summer, forages and roosts in upland forests (USFWS, 2018a) | SC | T | USFWS |
| ***Mussels*** | | | | | | | | |
| West East | Yes | Yes | Black Sandshell | *Ligumia recta* | Riffle and run areas of medium to large rivers in areas dominated by sand or gravel (MNDNR, 2021d). | SC | None | NHIS |
| West | Yes | Yes | Creek Heelsplitter | *Lasmigona compressa* | Creeks, small rivers, and the upstream portions of large rivers. Its preferred substrates are sand, fine gravel, and mud (Clarke, 1985). | SC | None | NHIS |
| ***Birds*** | | | | | | | | |
| West East | Yes | Yes | Loggerhead Shrike | *Lanius ludovicianus* | Upland grasslands and sometimes in agricultural areas where short grass vegetation and perching sites such as hedgerows, shrubs, and small trees are found (MNDNR, 2021e) | E | None | NHIS |
| East | Yes | Yes | Peregrine Falcon | *Falco peregrinus* | Presently, they nest primarily on buildings and bridges in urban settings and also use historic eyries, including along the Mississippi River in the rugged bluff country of the southeastern part of the state. | SC | None | NHIS |
| East | No | No | Red- shouldered Hawk | *Buteo lineatus* | Large tracts of mature deciduous forest with scattered wetland openings (MNDNR, 2021g; nesting sites include high, think canopies and trees with large diameters (McLeod and Anderson, 1996) | SC | None | NHIS |
| ***Plants*** | | | | | | | | |
| East | Yes | Yes | Rock Sandwort | *Minuartia dawsonensis* | Dry, sedimentary bedrock outcrops; grows in crevices and in very shallow accumulations of organic matter over exposed bedrock (MNDNR,2021h). | T | None | NHIS |
| West | Yes | Yes | Seaside Three-awn | *Aristida tuberculosa* | Exclusively in dry and loose sand in sand savannas,sand prairies, and dunes, where vegetation is sparse(MNDNR, 2021i) | T | None | NHIS |
| ***Reptile*** | | | | | | | | |
| West | Yes | Yes | Blanding's Turtle[5] | *Emydoidea blandingii* | Wetland complexes and adjacent sandy uplands(MNDNR, 2021j) | T | None | MN DNR |
| None | Yes | No | Gopher snake | *Pituophiscatenifer* | Well-drained, loose sandy and gravel soils; dry sandprairies and bluff prairies are prime habitat (MNDNR, 2021l) | SC | None | NHIS |

### Northern Long-eared Bat

The northern long-eared bat is a federally listed threatened species known to occur in HVTL project area.[315] The northern long-eared bat roosts in both live trees and snags. A habitat generalist, roost tree selection appears to be opportunistic; the species uses a variety of tree sizes and species, typically greater or equal to three inches diameter at breast height. Northern long-eared bats are generally associated with forested habitats, including mesic hardwood, floodplain, and fire-dependent forests, particularly those near water sources. Northern long-eared bats overwinter in small crevices or cracks in hibernacula (caves and mines). Migration to summer habitat occurs between early April and mid-May.[316][317][318]

On January 14, 2016, the USFWS published the final 4(d) rule identifying prohibitions that focus on protecting the bat's sensitive life stages (i.e., hibernation and raising young) in areas affected by White Nose Syndrome. Per the Final rule for the NLEB, incidental take due to tree removal is prohibited as follows:

- If it occurs within 0.25 mile of a documented hibernaculum, or
- If it involves a documented maternity roost tree or other trees within 150 feet of the documented maternity roost tree during June or July.

In addition, all takes within known hibernacula is prohibited (USFWS, 2016a).

State Listed Species

The species designated as state-threatened, endangered, or special concern with documented occurrences within 1 mile of the solar farm, West Route, and East Route are shown in **Table 38**.

### Black Sandshell

Black sandshell inhabit the riffle and run areas of medium to large rivers with sand or gravel substrates. Like other species of freshwater mussels, the black sandshell has a complex reproductive cycle. Fish hosts of the species' glochidial larvae include largemouth bass, bluegill, white crappie, and sauger.

[315] USFWS Website, Endangered Species in Minnesota, County Distribution. https://www.fws.gov/midwest/endangered/lists/minnesot-cty.html.
[316] Wisconsin Department of Natural Resources. 2013. Wisconsin Northern Long-Eared Bat Species Guidance. Bureau of Natural Heritage Conservation, Wisconsin Department of Natural Resources, Madison, Wisconsin. PUB-ER-700. https://dnr.wi.gov/files/PDF/pubs/er/ER0700.pdf
[317] USFWS Website, Midwest Region Endangered Species. Northern Long-Eared Bat. https://www.fws.gov/MIDWEST/ENDANGERED/mammals/nleb/index.html
[318] DNR Website. Northern Long eared Bat, https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AMACC01150

### Creek Heelsplitter

The creek heelsplitter typically occurs in creeks, small rivers, and the upstream portions of large rivers. Its preferred substrates are sand, fine gravel, and mud. Host fish species for the creek heelsplitter are yellow perch, black crappie*, slimy sculpin, and the spotfin shiner*.

### Loggerhead Shrike

Loggerhead shrike occur in grasslands, agricultural fields, and upland prairies with suitable perches for hunting for prey and scattered shrubs and trees for nesting. Farms with fence lines, shelterbelts, and hedgerows may be particularly suitable. Loggerhead shrike nest within narrow windbreaks and hedgerows or in isolated trees near grasslands, pastures, and agricultural fields. The diet of loggerhead shrike includes large insects and small mammals, birds, and reptiles; prey is often impaled on barbed wire or a thorny shrub prior to consumption.

### Peregrine Falcon

In the past, peregrine falcons in Minnesota nested on cliff ledges along rivers or lakes. Presently, they nest primarily on buildings and bridges in urban settings and also use historic eyries on cliffs along Lake Superior and several lakes in the Boundary Waters Canoe Area Wilderness and along the Mississippi River in the rugged bluff country of the southeastern part of state. Because peregrine falcons specialize in direct aerial pursuit of avian prey, they prefer open non-forested areas for hunting. Many peregrine falcons migrate thousands of miles to spend the winter in Mexico and Central and South America but some overwinter in the United States, including Minnesota. They return to their northern breeding grounds in late April to early May. Young are raised in eyries (indentations scraped into the soil of rocky cliff ledges) or on flat surfaces of buildings or bridges. There is a known nest box for peregrine falcons at the SGP.

### Red-shouldered Hawk

Red-shouldered hawks are most commonly found in large tracts of mature deciduous forest with scattered wetland openings. Suitable habitat typically occurs in uplands with diverse topography characterized by numerous small hills, ridges, and depressional wetlands or small lakes. Red-shouldered hawks also frequent mature floodplain forests. Researchers have found that nesting sites include high, thick canopies and trees with large diameters. Red-shouldered hawks overwinter in lowland areas near water in the central and southern United States and Central America. They nest halfway up tall trees, well below the canopy. Nest sites are often re-used in subsequent years.

### Seaside Three-awn

In Minnesota, seaside three-awn occurs exclusively in dry and loose sand in sand savannas, sand prairies, and dunes, where vegetation is sparse. The plants typically grow in full sunlight, though there may be scattered oak trees or oak groves in the vicinity, especially bur oak, northern pin oak, or black oak. Seaside three-awn is a wind-pollinated annual, with a need for open and sparsely vegetated habitats, where there is dry and shifting sand.

### Rock Sandwort

Rock sandwort is a small plant that grows on outcrops of sedimentary bedrock exposures in the southeastern region of the state. Occurrences are typically found in crevices and in very shallow accumulations of organic matter over the exposed bedrock. Outcrops where rock sandwort are found are generally horizontal in nature; plants do not grow on the vertical walls of cliffs. Occasionally in the southeast, rock sandwort is also found in upland prairies on sands derived from the bedrock.

### Blanding's Turtle

Wetland complexes and adjacent sandy uplands are necessary to support viable populations of Blanding's turtles. Calm, shallow waters, including wetlands associated with rivers and streams with rich aquatic vegetation are especially preferred. In Minnesota, this species appears adaptable, utilizing a wide variety of wetland types and riverine habitats in different regions of the state. In central Minnesota, shrub wetlands are utilized throughout the summer and serve as over-wintering sites. In southeastern Minnesota, open marshes and bottomland wetlands provide summer and winter habitat. Ephemeral wetlands are utilized in spring and early summer, while deeper marshes and backwater pools are utilized in both the summer and winter. Blanding's turtles typically overwinter in muddy bottoms of deep marshes, backwater pools, ponds, and streams. They emerge from overwintering sites in late March to early April. Small, temporary wetlands are frequently used by Blanding's turtles in spring and early summer, when these habitats provide basking sites and mating opportunities. Shallow pools provide ideal amphibian and invertebrate breeding habitat, that in-turn provide an important food source for turtles. Aquatic vegetation, macro-invertebrates, and small fish may also be eaten. Nesting occurs in sparsely vegetated uplands with well-drained, sandy soils.

### Gopher Snake

The gopher snake prefers areas of well-drained, loose sandy and gravel soils. Dry sand prairies and bluff prairies are prime habitat. Hibernation sites include rodent burrows and rock fissures in bluffs and outcrops. Females will nest in old mammal burrows or excavate a nest chamber in sandy soils. Most of the Minnesota records of this species are from counties along the Minnesota, Mississippi, and St. Croix rivers. The gopher snake is a permanent resident, emerging from hibernation in the spring for breeding. The gopher snake feeds on a variety of small animals, including gophers, mice, voles, ground squirrels, tree squirrels, frogs, and ground nesting birds. Gopher snakes will try to escape when encountered, but if cornered, they will hiss, vibrate their tail, and strike. The vibrating tail can make a sound resembling that of a rattlesnake, especially if the snake is in dry leaves, but the gopher snake is a nonvenomous species.

### Solar Project

Based on the Applicants' review of IPaC and NHIS data and coordination with MNDNR, there is one federally-listed species (northern long-eared bat; also state-listed special concern), four state-listed threatened or endangered species (loggerhead shrike, rock sandwort, seaside three-awn, and Blanding's turtle),and four state-listed special concern species (black sandshell, creek heelsplitter, peregrine falcon, and red-shouldered hawk) identified within one mile of the solar farm site (**Table 38**).

The solar farm site is primarily agricultural lands with only a small area of forested habitat (<0.2 percent), which consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. Higher quality habitat exists in areas adjacent to the Solar Project Area and (riparian areas associated with the Mississippi River and various lakes).

During their active season (April 1 through October 31), NLEB may roost in trees in the vicinity surrounding the solar farm.

Habitat for state-listed species is limited in the solar farm site to potential habitat for loggerhead shrike (state-listed endangered) and Blanding's turtle (state-listed threatened). Habitat for the loggerhead shrike is likely present within the solar farm site, given the predominance of agriculture along with the isolated rows of trees along the edges of agricultural fields and roads. The Blanding's turtles may occur in wetland complexes and sandy adjacent uplands near the solar site.

The solar farm site lacks suitable habitat for black sandshell and creek heelsplitter (mussels that require rivers), peregrine falcon (known to nest in a nest box at the SGP), red-shouldered hawk (large tracts of deciduous forest that occur along the Mississippi River), Rock Sandwort (bedrock outcrops), and seaside three-awn (sand savannas).

Based on the Applicants' review of the MNDNR's data, there are no NPCs or mapped native prairie within the solar farm site.

Based on the Applicants' review of the MNDNR's data, there are no SOBS within the solar farm site; one SOBS rated "below" (East Clear Lake 21), is located directly adjacent to the north boundary of the West Block.

There is no MNDNR-mapped native prairie in the solar farm site.

The solar farm site does not intersect any habitats within the Wildlife Action Network including SOBS, lakes of biological significance, or streams with exceptional indices of biological integrity. Based on the Applicants' review of the MNDNR's NHIS, one SGCN has been documented within the solar farm site, the loggerhead shrike.

Large block habitats[319] are grassland habitats of greater than 40 acres. The solar farm site has highly fragmented habitat with 98.9 percent used for agriculture or is developed. The solar farm site contains no large block habitats.

[319] Commercial Solar Siting Guidance Minnesota Department of Natural Resources May 2016.

There are no public conservation and recreation lands within the solar farm site (besides snowmobiles trails, which are not managed for public use and don't contain high quality habitat).

There are no properties in government programs or with conservation easements (Native Prairie Bank, Reinvest in Minnesota, Forest Legacy easements, or USFWS conservation easements) within the solar farm site.

### Impacts and Mitigation

Construction of the solar farm will include tree clearing on the interior of the site (wind rows between agricultural fields). Based on the Applicants' review of the NLEB NHIS records, it was determined that there are no documented NLEB maternity roost trees within 150 feet of the solar farm site or documented hibernacula within 0.25 mile of the site. Although there are no records of NLEB, the species may still be present in the Project area. The Permittee will be responsible to obtain any federal permits (USFWS, Section 7 consultation) associated the NLEB prior to construction. Additionally, the Applicants have stated that they will avoid tree clearing during the NLEB pup season (June and July).

One state-endangered species (loggerhead shrike), and two state- threatened species (rock sandwort and seaside-three awn) were documented within one mile of the solar farm site (**Table 38**).

Tree-nesting birds such as the loggerhead shrike may be affected during tree clearing if nests with eggs or chicks are present in the trees that are cleared. Loggerhead shrike in the area are acclimated to human activity and equipment because of the predominant agricultural land-use at the site and surrounding areas. The Applicants have stated[320] that they will implement the BMPs for the loggerhead shrike recommended pre-application discussions with the MNDNR[321] concerning the Project. Specifically, any tree/shrub removal will be conducted outside of the species nesting season (April 1 to July 31). Any loggerhead shrike sightings will be reported to the MNDNR.

Overall, impacts on loggerhead shrike due to the construction and operation of the solar farm are anticipated to be negatable.

Suitable habitat for the rock sandwort (bedrock outcrops) and seaside three-awn (sand savannas, sand prairies, dunes) is not present within the solar farm site; impacts to these species are not probable.

As suitable habitat may be present for the Blanding's turtle in the vicinity of the solar farm site, the Applicants have stated[322] that they will implement the BMPs outlined in the MNDNR's consultation, which include:

[320] SPA, at pp. 174-175.
[321] SPA, at Appendix C.
[322] SPA, at pp. 174-175.

- Avoid wetland impacts during hibernation season, between October 15th and April 15th, unless the area is unsuitable for hibernation:
    - less than 14 inches deep,
    - anoxic conditions, or
    - not a suitable substrate.
- Provide the Blanding's turtle flyer to all contractors working in the area.
- The use of erosion control blanket shall be limited to 'bio-netting' or 'natural-netting' types, and specifically not products containing plastic mesh netting or other plastic components.
    - Also, be aware that hydro-mulch products may contain small synthetic (plastic) fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into Public Waters. As such, please review mulch products and not allow any materials with synthetic (plastic) fiber additives in areas that drain to Public Waters.
- Monitor for turtles during construction and report any sightings to the DNR Nongame Specialist.
- If turtles are in imminent danger, they must be moved by hand out of harm's way, otherwise they are to be left undisturbed.

The Applicants review of the MNDNR's NHIS records identified four records of state species of special concern within one mile of the solar farm site: black sandshell, creek heelsplitter, peregrine falcon, and red-shouldered hawk (**Table 38**). impacts to these special concern species is not anticipated as suitable aquatic habitat (the Mississippi River) required by the black sandshell and creek heelsplitter is not present within the solar farm site, and suitable nesting habitat for the peregrine falcon and red-shouldered hawk (cliffs, urban buildings and bridges, large tracts of deciduous forest), and is also not present at the site.

Development and implementation of the VMP, creating a sustainable, diverse, perennial pollinator friendly ground cover throughout the solar, will provide beneficial habitat within the footprint of the solar farm.

### West HVTL Project

Based on the Applicants' review of IPaC and NHIS data and coordination with MNDNR, there is one federally listed species (northern long-eared bat; also state-listed special concern), four state-listed threatened or endangered species (loggerhead shrike, rock sandwort, seaside three-awn, and Blanding's turtle), and four state-listed special concern species (black sandshell, creek heelsplitter, peregrine falcon, and gopher snake) identified within one mile of the West Route (**Table 38**).

The West Route is primarily agricultural lands or developed areas within the SGP. Based on aerial imagery, there are small area of forested habitat that consists of shelterbelts between agricultural fields, near farmsteads, along roadways, and clumps of trees along the margins of small waterbodies. High quality habitat exists in areas adjacent to the Sherburne County Substation (riparian areas associated with the Mississippi River).

During their active season (April 1 through October 31), NLEB may roost in the trees within the West Route.

Suitable habitat for the state-listed species is limited to potential habitat for loggerhead shrike (state-listed endangered). Habitat for the loggerhead shrike is likely present within the West Route, given the predominance of agriculture, along the tree rows at the edges of agricultural fields and roads.

The West Route lacks suitable habitat for black sandshell and creek heelsplitter (mussels that require rivers), peregrine falcon (known to nest in a nest box at the SGP), Rock Sandwort (bedrock outcrops), seaside three-awn (sand savannas), Blanding's turtle (wetland complexes with adjacent sandy uplands), and gopher snake (dry sand and bluff prairies).

No sites that have been specially designated such as SOBS, NPCs, native prairie, railroad right-of-way prairie, WMAs, SNAs, and state parks, are present within the West Route.

### Impacts and Mitigation

Potential impacts to wildlife species (NLEB, Loggerhead shrike, and Blanding's turtle) and the BMPs to avoid or minimize these effects along the West Route, include those described above for the solar farm.

Suitable habitat for the rock sandwort (bedrock outcrops) and seaside three-awn (sand savannas, sand prairies, dunes) is not present within the West Route; therefore, impacts to these species are not anticipated.

Suitable aquatic habitat required by the black sandshell and creek heelsplitter is not present within the West Route. Suitable habitat for the gopher snake (dry sand and bluff prairies) and suitable nesting habitat for the peregrine falcon is also not present in the West Route; therefore, impacts to these species are not anticipated.

### East HVTL Project

Based on the Applicants' review of IPaC and NHIS data and coordination with MNDNR, there is one federally listed species (northern long-eared bat; also, state-listed special concern), four state-listed threatened or endangered species (loggerhead shrike, rock sandwort, seaside three-awn, and Blanding's turtle), and three state-listed special concern species (black sandshell, creek heelsplitter, and peregrine falcon) identified within one mile of the East Route (**Table 38**).

The East Route is primarily agricultural lands or developed areas within the SGP. Based on aerial imagery, there are trees associated with shelterbelts along roadways and within the GP. Higher quality habitat exists in areas adjacent to the Sherburne County Substation (riparian areas associated with the Mississippi River).

During their active season (April 1 through October 31), NLEB may roost in the trees within the East Route.

Suitable habitat for the state-listed species is limited to potential habitat for loggerhead shrike (state-listed endangered). Habitat for the loggerhead shrike is likely present within the East Route, given the predominance of agriculture, along the tree rows at the edges of agricultural fields and roads.

The East Route lacks suitable habitat for black sandshell and creek heelsplitter (mussels that require rivers), peregrine falcon (known to nest in a nest box at the SGP), Rock Sandwort (bedrock outcrops), seaside three-awn (sand savannas), Blanding's turtle (wetland complexes with adjacent sandy uplands), and gopher snake (dry sand and bluff prairies).

No sites that have been specially designated such as SOBS, NPCs, native prairie, railroad right-of-way prairie, WMAs, SNAs, and state parks, are present within the West Route.

### Impacts and Mitigation

Potential impacts to wildlife species (NLEB, Loggerhead shrike, and Blanding's turtle) and the BMPs to avoid or minimize these effects along the East Route, include those described above for the solar farm.

Suitable habitat for the rock sandwort (bedrock outcrops) and seaside three-awn (sand savannas, sand prairies, dunes) is not present within the West Route; therefore, impacts to these species are not anticipated.

Suitable aquatic habitat required by the black sandshell and creek heelsplitter is not present within the West Route. Suitable habitat for the gopher snake (dry sand and bluff prairies) and suitable nesting habitat for the peregrine falcon is also not present in the West Route; therefore, impacts to these species are not anticipated.

## 5.9 Alternative 1 Comparison

Alternative 1 would remove 3 parcels from the Project's West Block totaling approximately 120.3 acres. Two additional parcels totaling approximately 126.4 acres would be removed from the East Block. In total, Alternative 1 would reduce the Project area from 3,483.6 acres to 3,237.0 acres.

The parcels are identified as 20-134-1100, 20-134-1400, 20-134-4100, 05-005-2400, and 05-005-3000 (**Figure 2**).

No changes to the proposed transmission routes (West or East HVTL projects) are necessary to accommodate Alternative 1.

The temporary and permanent impacts anticipated for the approximately 200.0 acres associated with the proposed solar farm would be avoided due to the reduction in the solar farm footprint. The resulting Project would utilize less of the available interconnection capacity at the SGP and would provide less power to the electric grid as compared to the 460 MW Project.[323] The resulting Project would power approximately 8,000 fewer homes annually and would result in 22,000 metric tons of fewer emissions reductions as compared to the Project contemplated in the Site Permit Application.[324]

Alternative 1 would lead to approximately $12,000,000 less of participating landowner payments over the life of the Project.[325] A reduction in capacity would also lead to reductions in production tax payments of approximately $2,436,000 over the life of the Project and a reduction in property tax payments of $1,656,935 over the life of the Project;[326] this would lead to reductions in revenue for many local taxing jurisdictions including Sherburne County, Becker Township and Clear Lake Township.

## 5.10 Alternative 2 Comparison

The Alternative 2 is located approximately 0.5 mile south of the City of Clear Lake, Minnesota (**Figure 3**). This site would replace the reduction in lands considered in Alternative 1 to maintain the proposed nameplate capacity of the Project.

Given the proximity (approximately 2 miles) and current land use (agriculture) of the Alternative 2 site and the West Block of the proposed solar farm, it is not surprising that the environmental setting (both built and natural) is similar between the two sites; little distinction exists between the two sites. As such, the potential impacts and mitigative measures discussed in Section 5 are also applicable to the Alternative 2 site; the following discussion highlights those areas where site specific features may differ.

### Land Requirements (Size) and Ownership

Alternative 2 would add an additional 246.8 acres to the Project to accommodate the solar array footprint, and an additional 37.4 acres to accommodate the 1.9-mile corridor of underground collection cable. The total Project area from the reduced West Block, reduced East Block, and additional lands considered in Alternative 2 would be approximately 3,521.3 acres, an increase of 37.7 acres from the initially proposed 3,483.6 Project size. A preliminary site layout of Alternative 2 is provided in **Appendix D**. The energy produced by the Alternative would be transported via medium voltage 34.5 kV underground collection lines to the West Block substation; and existing collector easement agreements with the landowners for the corridor dictate that the medium voltage corridor

[323] Xcel Energy Memorandum Communication, December 22, 2021.
[324] Ibid.
[325] Xcel Energy Memorandum Communication, December 22, 2021.
[326] Ibid.

be installed underground either by cable plowing, or alternatively open trenching, depending on engineering considerations encountered along the route.

No changes to the proposed transmission routes would be necessary to accommodate Alternative 2.

Participating parcels and ownership for the additional lands contemplated in Alternative 2 are identified in **Table 39**.

**Table 39. Participating Parcels for Alternative 2 (aka Clear Lake Site)**[327]

| PARCEL_ID | OWNER | Type |
|---|---|---|
| 20-119-2100 | GRAY HOWARD & ORETA REV TRUST | Array Area |
| 20-119-2200 | GRAY HOWARD & ORETA REV TRUST | Array Area |
| 20-119-2400 | GRAY HOWARD & ORETA REV TRUST | Array Area |
| 20-119-2400 | GRAY HOWARD & ORETA REV TRUST | Array Area |
| 20-119-2400 | GRAY HOWARD & ORETA REV TRUST | Array Area |
| 20-118-3300 | GRAY HOWARD B REVOCABLE TRUST | Array Area |
| 20-119-4000 | BECK STEVEN - TRUSTEE | Underground Collection Line |
| 20-120-3400 | BECK STEVEN - TRUSTEE | Underground Collection Line |
| 20-121-2100 | GOENNER GLENN A & PATRICIA A TRUST | Underground Collection Line |
| 20-119-3100 | MCDONALD J&HILL H JR & K-TRUSTEES | Underground Collection Line |
| 20-120-4000 | PETERSON BEVERLY A LLC | Underground Collection Line |

### Permanent and Temporary Impacts

In total and not considering reductions to the East and West Block, the additional lands added as part of Alternative 2 would convert 210.0 acres to solar energy production and temporarily impact an additional 14.7 acres during construction. This acreage would replace 200.0 acres of permanent impact from the parcels removed from the Project East and West Block. The additional lands considered in Alternative 2 cause a net increase of 14.7 acres of temporary impacts during construction, and a net increase of 10.0 acres permanently impacted and converted to a solar energy production facility (a total net increase of ~24.7 acres of permanent and temporary impact) when considering the entirety of the Project. **Table 40** lists temporary and permanent impacts associated solely with the additional Alternative 2 footprint.

### Wetlands and Waterbodies

A wetland delineation was completed by the Applicants in the additional area that would be impacted as part of Alternative 2, and a wetland boundary concurrence has been obtained via the Wetland Conservation Act Technical Evaluation Panel. Four wetland features were identified within the Alternative 2 site. While the solar array layout (Appendix D) was designed to avoid wetland impacts,

[327] Xcel Energy Memorandum Communication, December 22, 2021.

**Table 40. Estimated Acreages for new Project Footprint Only[328]**

| Project Facilities | Acres |
|---|---|
| Access Roads | 5.6 |
| Inverters | <0.1 |
| Underground Collection Line (Outside of Fence- otherwise included with solar panels) [1] | 10.9 |
| Laydown Areas (outside fence – for construction only) [2] | 3.8 |
| Solar Panels | 202.6[3] |
| Stormwater Basins | 1.8 |
| **Project Total** | **224.7** |

[1] The impacts associated with underground collection are temporary during construction, and existing land use will remain in place following construction.
[2] The laydown areas are temporary impacts to be used only during construction.
[3] The impacts associated with solar panels include the open grass area between every row of panels

the underground collection line would cross a designated DNR public waterbody (DNR Hydro ID 52733), whose boundary was confirmed during the field wetland delineation. It is anticipated that the approximately 165-foot feature would be directionally bored under to install the electrical collector cable, and a DNR crossing license would be required for the crossing.

No other wetland or waterbodies are anticipated to be impacted by construction activities associated with Alternative 2.

### Cultural Resources

Tetra Tech conducted a Phase Ia literature review to identify previously recorded archaeological and historic architectural resources which included the area within one mile of the additional lands added as part of Alternative 2. Tetra Tech also conducted Phase I surveys of the area containing the additional lands to identify any previously undocumented archaeological resources. The pedestrian survey failed to identify any cultural resources within the Alternative 2 project site. No known archaeological resources are anticipated to be impacted by the additional lands added as part of Alternative 2. No further work was recommended by the Applicants' consultant. On August 11, 2021, the SHPO concurred with the results of the Tetra Tech report.

### Viewshed

The additional solar arrays added as part of Alternative 2 would be visible from adjacent roadways and parcels but given their relatively low profile and the fact that all the facilities will be fenced for security, they will not be visible from long distances. Additionally, the layout for Alternative 2 has been designed

[328] Xcel Energy Memorandum Communication, December 22, 2021.

to avoid tree clearing on the perimeter of the site footprint (**Appendix D**). There are 6 homes that are across 80th Avenue from Alternative 2, and the homes are approximately 250 to 350 feet from the site.

### Economic Considerations

Implementation of Alternative 2 would result in increased Project costs to the Applicants. The primary cost increase associated with Alternative 2 is the installation of the 1.9-mile underground collection line. It is anticipated that 2 collector circuits will be required from the Alternative 2 site to the West Block substation.

Due to the fact the additional circuits must also cross a large portion of the West Block to reach the West Substation, it is anticipated that a 4- to 5-mile-long underground collection corridor would be necessary to connect the Alternative 2 site to the West Block Collector Substation. Conservatively assuming 4 miles of underground collection for 2 circuits, costs are anticipated to be 2.18 million dollars added to the total Project cost from underground collection installation and associated land acquisition. Other equipment costs for procurement of the modules, inverters, access roads, and fencing would be anticipated to be materially similar for the parcels considered for elimination as the total power producing equipment necessary to meet the nameplate capacity would remain unchanged. Some more minor cost increases would also be realized due to the distance of Alternative 2 from the East and West Block; this would lead to an increase in costs associated with transportation and management of a new non- contiguous area from the primary Project Blocks.

The City of Becker in its comments supporting Alternative 2 over the proposed solar farm layout, have stated that permitting a large solar facility immediately abutting the City, on land it believes will be served by core municipal infrastructure (infrastructure to which the state and City have both dedicated significant public resources) would frustrate the principle of "highest and best use" used in land-use planning and policies.[329] Continuing, the estimated tax revenue generated by the Sherco Solar Project ($83,472.00) when compared with the impact that the City will face if the identified parcels become unavailable for economic development are stark; the City estimates annual tax revenue of $1,088,212.14 if the land is annexed and developed.[330]

## 5.11 Unavoidable Impacts

Where feasible, the EA suggests mitigation measures to be incorporated into the planning, design, and construction of the proposed Project to substantially eliminate the adverse impacts. In other areas of consideration, adverse impacts can be reduced but not eliminated and are therefore determined to be unavoidable. Most unavoidable adverse impacts would occur during the construction phase of the proposed Project and would be temporary.

[329] City of Becker White Paper, February 7, 2022. eDocket No. 20222-182514-03, 06, 09, 12, 15, and 18.
[330] Ibid.

Unavoidable impacts related to the Project that would last only as long as the construction period include:

- noise emitted from vehicles and equipment during construction that will be audible to neighboring landowners.
- increased traffic on roads that bisect the Project area.
- minor air quality impacts due to fugitive dust.
- potential for soil erosion; and
- disturbance to and displacement of some species of wildlife.

Unavoidable impacts related to the Project that would last as long as the life of the Project would include:

- changes to existing aesthetics of landscape (from agrarian to solar facility), which will be visible from local roadways and parcels. The transmission projects would introduce new transmission line structures and conductors into the area, given the existing transmission line infrastructure these changes in viewsheds would be incremental.

- changes in land use and vegetation within the solar farm from agricultural land of predominately corn and beans to a solar energy production facility with native prairie beneficial habitat underneath and around the solar farm footprint.

## 5.12 Irreversible Commitment of Resources

A commitment of resources is irreversible when its primary or secondary impacts limit the future option for a resource. An irretrievable commitment refers to the use or consumption of resources that is neither renewable nor recoverable for later use by future generations. The commitment of resources refers primarily to the use of nonrenewable resources such as fossil fuels, water, and other materials (aggregate minerals, steel/metals, etc.).

Construction activities would require the use of fossil fuels for electricity (portable generators) and for the operation of vehicles and equipment. Use of raw building materials for construction would be an irretrievable commitment of resources from which these materials are produced, excluding those materials that may be recycled at the end of the Project life cycle. The use of water for dust abatement during construction activities would be irreversible. Commitment of labor and fiscal resources to develop and build the Project is considered irretrievable.

The commitment of land for a transmission line ROW is likely an irreversible commitment. In general, lands in the ROW for large infrastructure projects such as railroads, highways, and transmission lines remain committed to these projects for a relatively long period of time. Even in instances where a ROW is abandoned the land within the ROW is typically repurposed for a different infrastructure use,

such as a rails-to-trails program, and is not returned to a previous land use. This said, transmission line ROW can be returned to a previous use (row crop, pasture) by the removal of structures and structure foundations to a depth that supports this use.

There are few commitments of resources associated with the Project that are irretrievable. These commitments include the steel, concrete, rare earths, and hydrocarbon resources committed to the Project, though it is possible that some of these components could be recycled at some point in the future. Labor and fiscal resources required for the Project are also irretrievable commitments

## 5.13 Cumulative Effects

Cumulative potential effects are impacts on the environment that result from "the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation haves been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects."[331]

Consideration of cumulative potential effects is intended to aid decision-makers so that they do not make decisions about a specific project in a vacuum. Effects that may be minimal in the context of a single project may accumulate and become significant when all projects are considered.

A review for planned projects (federal, state, or local unit of governments) in the solar farm area or along the transmission routes, that may affect or be affected by the proposed Project was conducted.

### *City of Becker Sewer and Water Extension*

The City of Becker is planning an extension of sewer and water services along and under 115th Avenue SE (CSAH 53) which will then extend east along River Road SE (CR 8) and then turn south along 125th Ave. Xcel Energy is the landowner of the planned route for most of this work and an easement needed for this extension has not yet been requested by the city. As the Applicants have stated in the SPA, the Sherco Solar project design was adjusted to be set back from 115th Avenue to allow for this easement along the east boundary of the West Block. Additionally, Phase 2 of the sewer and water extension intersects the temporary laydown yard associated with the West Block. No conflicts with solar project permanent infrastructure are anticipated. It is anticipated that Phase 1 may begin as early as 2022, with Phase 2 commencing following the completion of Phase 1, potentially in 2023 or 2024. However, the exact timing of the infrastructure extension is still in process, and coordination with the City is ongoing. It is anticipated that the Sherco Solar Project temporary laydown yard will likely be removed prior to the implementation of Phase 2. Given the close coordination between the

[331] Minnesota Rules, part 4410.0200, subpart 11a.

City and Xcel Energy, it is anticipated that any conflicts between the two projects can be resolved as timelines for the sewer and water extension are better established.

The West HVTL is sited on the North side of River Road SE and the sewer and water improvements primarily along the South side of River Road SE. The HVTL is anticipated to cross the second phase (12" main) of the sewer and water improvement where the West HVTL crosses 115th Avenue. The West HVTL will then cross the first phase (12" main) twice at the intersection of River Rd SE at 125th Ave. The HVTL will again cross the first phase (16" main) nearer to the SGP as it heads south. It is anticipated that Phase 1 of the sewer and water improvements will likely be complete prior to construction of the West HVTL, and subsequently the West HVTL will be complete prior to implementation of Phase 2. Xcel Energy will continue to coordinate with the city to determine the timing of these improvements to resolve any potential conflicts during construction should construction timelines shift.

#### *125th Avenue Southeast/Country Road 25 Improvements*

The City of Becker is planning improvements to the ingress and egress to Highway 10 and 125th Avenue SE. Notably, as stated in the RPA, the City of Becker and Sherburne County have informed the Applicants of potential future road improvements to this segment of the highway between 115th and 125th Avenues SE (County Roads 53 and 52, respectively), which are currently being studied by the City and County. The improvements are not anticipated to be located within the Sherco Solar Project boundary or the West or East HVTL routes. The timeline for the improvements remains unknown, but planning is underway. Given the unknown construction timing for these improvements, and the ongoing coordination between the Applicants and City staff regarding the Project, no conflicts are anticipated. As noted in the SPA, efforts were made by the Project to adjust the West HVTL route to avoid potential future impact areas.

#### *Data Center*

The Applicants are aware of planning efforts for a data center located east of the Sherco Solar Project's West Block on 300 acres of property owned by Xcel Energy. The data center is not proposed within the Sherco Solar Project area or West or East HVTL routes. Although plans have not been finalized for the data center, the Applicants understand that local units of government are actively working with various public and private parties to bring the data center to the area. Given the long lead times for planning of such capital projects, it is unlikely that there would be a conflict with construction of the Sherco Solar Project, but the Applicants will continue to coordinate with applicable entities regarding the data center.

#### *Economic Development of 5 Acre RD Offutt Company Parcel*

As stated in Xcel Energy's October 1, 2021, correspondence posted the docket, the Applicants can relocate Project infrastructure from this parcel and would release the land from the solar lease between Xcel Energy and RD Offut should the City and RD Offutt come to an agreement to sell the land to the City or the project proposer. This land is currently fallow, and outside of RD Offutt's farming

operational footprint. Other conflicts between the Sherco Solar Project and this economic development opportunity are not anticipated, and the Applicants will continue to work with the City to establish an understanding of construction timelines should this opportunity progress.

# 6 Application of Siting Factors (Factors Considered)

The Commission is charged with locating large electric power facilities in a manner that is "compatible with environmental preservation and the efficient use of resources" and that minimizes "adverse human and environmental impact(s)" while ensuring electric power reliability (Minnesota Statutes, section 216E.02). Minnesota Statute, section 216E.03, subdivision 7(b) identifies considerations that the Commission must take into account when designating LEPGP sites.

Minnesota Rules, part 7850.4100 lists 14 factors for the Commission to consider in its route permitting decisions, including impacts on human settlements, impacts on land-based economies, and impacts on the natural environment:

A. Effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services.
B. Effects on public health and safety.
C. Effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining.
D. Effects on archaeological and historic resources.
E. Effects on the natural environment, including effects on air and water quality resources and flora and fauna.
F. Effects on rare and unique natural resources.
G. Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity.
H. Use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries.
I. Use of existing large electric power generating plant sites.
J. Use of existing transportation, pipeline, and electrical transmission systems or rights-of-way.
K. Electrical system reliability.
L. Costs of constructing, operating, and maintaining the facility which are dependent on design and route.
M. Adverse human and natural environmental effects which cannot be avoided.
N. Irreversible and irretrievable commitments of resources.

This Section discusses the site alternatives (proposed Project, Alternative 1 and Alternative 2) and their merits relative to the *Factors Considered* for siting LEPGP. Factors M and N—the unavoidable and irreversible impacts of the project—were discussed in Section 5.10 and 5.11.

Since the Project purpose is to help off-set the capacity loss associated with the cession of unit 2 at the SGP, factor I-the use of existing large electric power generating plant sites, is not relevant to this project and is not discussed further here.

Factor G ("mitigate adverse environmental impacts") has several parts and speaks generally to environmental impacts. For purposes of discussion here, and with respect to factor G, it is assumed that all the site alternatives are equal regarding maximizing energy efficiencies and accommodating expansion capacity. With respect to environmental impacts, the examination of such impacts suggested by routing factor G is included in the discussion of other factors and elements that more specifically address an environmental impact (as in factor E, effects on flora and fauna).

Finally, since no alternatives to the HVTL portion of the Project were scoped, factors H and I are not relevant to this project and are not discussed further. Factor H relates to the use or paralleling of existing rights-of-way (also includes items that do not have a ROW—survey lines, natural division lines, and agricultural field boundaries). Factor J relates to the use of existing transportation, pipeline, and electrical transmission ROW.

## 6.1 Relative Merits

Generally, an Environmental Assessment will review the Factors Considered to help establish the relative merits of a proposed project against any alternative sites or routes that have been reviewed in the EA.

This review looks not only at the Factors, but also the Elements that make up those Factors (Factor: human settlement; Elements: displacement, noise, aesthetics, cultural values, recreation, and public services). Except for the City of Becker's stated potential economic impact, adherence to best management practices during construction and operation, and to the general permit conditions found in Commission issued site permits (**Appendix B**) it is anticipated that minimal negative impacts would result from the development of the proposed Project or any of the alternatives.

### 6.1.1 Factor: Effects on Human Settlement

***Elements: Noise, displacement, cultural values, public services, transportation, recreation, property values, electronic interference, emergency services, zoning/land use***

For all of the siting options and the associated HVTLs, impacts related to noise, cultural values, public services, transportation, recreation, electronic interference, emergency services, and property values are anticipated to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template. Displacement of residences or business properties is not anticipated in any of the siting options.

***Element: Aesthetics***

Aesthetic impacts from development of the solar farm at either the Project site or at the Alternative 2 site are anticipated to be minimal; the solar arrays will be visible from adjacent roads ways and parcels but given their low profile will not be visible from long distances. Additionally, the Applicants have stated that efforts will be made to preserve perimeter trees (screening) and the sites will be fenced.

Further aesthetic mitigation can be achieved through special permit conditions, such as requiring the electric collection system to use the below ground option as opposed to the above-ground option.

Aesthetics impacts from the short span of the 345 kV transmission lines connecting the project substations to the Sherburne County Substation should be minimal, as the lines would represent only an incremental addition to the existing overhead infrastructure.

***Element: Consistency with Local Land Use and Planning***

The Project is located within three zoning jurisdictions: SherburneCounty, Becker Township, and the City of Becker. All three zoning authorities have a solar energy ordinance. Clear Lake Township (Alternative 2) relies on Sherburne County ordinance. The development of large solar energy systems within the general agricultural district is a conditionally permitted use in all three jurisdictions.

As has been noted, the City of Becker has identified a conflict between the proposed Project solar farm site and its plans for development surrounding the Becker Business Park. As such, the City supports either Alternative 1 or Alternative 2 over the Project as proposed.[332]

### 6.1.2 Factor: Effects on Public Health and Safety

***Elements: EMF/Electric Fields, air quality***

Based on the predicted EMF levels for the Project, no adverse health impacts from electric or magnetic fields are anticipated for persons living or working near any of the components of the proposed Project site or its alternatives.

For all of the siting options, potential air quality impacts associated with the Project come from two primary sources: ozone & nitrogen oxide emissions from operating the HVTL and short-term emissions from construction activities. Emissions from operating any of the proposed lines are anticipated to have negligible impacts on air quality. Air emissions during construction would primarily consist of emissions from construction equipment and would include carbon dioxide, NOX, and particulate matter (PM); dust generated from earth disturbing activities would also give rise to PM. Any emissions

[332] City of Becker White Paper, February 7, 2022. eDocket No. 20222-182514-03, 06, 09, 12, 15, and 18.

from construction would be similar to those from agricultural activities common in the Project area and would only occur for short periods of time in localized areas.

Where work areas overlap public areas, such as along roadways, construction activities may present potential impacts to public health and safety. These are anticipated to be minimal with use of standard construction techniques, traffic control measures during deliveries, and the general conditions identified in the Site Permit Template. Operation of the facility, (as proposed or any of the alternatives) is not anticipated to be a public health or safety concern, especially considering the secured access.

### 6.1.3 Factor: Effects on Land-Based Economies

***Elements: Forestry, Tourism and Mining***
Impacts to forestry, tourism and mining are avoided at the proposed Project site and the alternatives; therefore, any potential impacts are anticipated to be negligible with the use of standard construction techniques and the general conditions in the Site Permit Template.

***Element: Agriculture***
Both the proposed solar farm site and the approximately 225-acre Alternative 2 site are primarily agriculture (cultivated crop land); there will be direct impacts to agriculture through the approximately 2,913 acres of cultivated crop land within the proposed solar farm site and a net increase of approximately 10 additional acres of agricultural lands if Alternative 2 is adopted. Alternative 1 would eliminate approximately 200 acres of permanent impact by removal of parcels from the Project's proposed site.

In either scenario there will not be a significant impact on agricultural land-based economies, as these acreages constitute only 2.8 percent of the agricultural land in Sherburne County.

### 6.1.4 Factor: Effects on Archaeological and Historic Resources

For all of the siting options and the associated HVTLs, impacts are anticipated to be negligible with use of standard construction techniques and the general conditions identified in the Site and Route Permit Templates. No known archaeological or historical sites were identified within the footprint of the proposed site or Alternative 2 site and the one-mile buffer surrounding these properties.

The procedures outlined in the Permit Templates provide an outline of the process for resolution should any previously unknown archaeological resource or human remains be encountered.

### 6.1.5 Factor: Effects on Natural Environment

***Element: Air***

For all of the siting options and the associated HVTLs, impacts to air quality are anticipated to be negligible with the use of standard construction techniques and the general conditions in the Site and Route Permit Templates.

***Element: Surface Water***

For all of the siting options and the associated HVTLs, impacts to surface waters are anticipated to be minimal with the use of standard construction techniques and the general conditions identified in the Site Permit Template, and the nominal open water space identified at these sites.

***Element: Wetlands***

For all of the siting options and the associated HVTLs, impacts to wetlands are expected to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template.

***Element: Soils and Groundwater***

For all of the siting options and the associated HVTLs, impacts to soils and groundwater are anticipated to be minimal with the use of standard construction techniques and the general conditions in the Site Permit Template.

***Element: Vegetation***

For all of the siting options and the associated HVTLs, impacts to non-cropland vegetation are anticipated to be minimal with the use of standard construction techniques, restoration efforts, development and compliance with the AIMP and VMP, and the general conditions in the Site and Route Permit Templates.

***Element: Wildlife***

For all of the siting options and the associated HVTLs, impacts to wildlife are anticipated to be minimal to moderate (and temporary) with the use of standard construction techniques and the general conditions in the Site and Route Permit Templates.

In addition to the general conditions in the Permit Templates provided by Commission staff in this record, development and compliance with the AIMP and VMP will establish a sustainable, diverse, perennial pollinator friendly ground cover throughout the sites.

### 6.1.6 Factor: Effects on Rare and Unique Natural Resources

For all of the siting options and the associated HVTLs, no direct impacts to any rare and unique natural resources are anticipated; any indirect impacts should be minimal with standard construction techniques and the general conditions in the Site and Route Permit Templates.

### 6.1.7 Factor: Project Design

***Element: Design Options to Maximize Energy Efficiencies***

The Project uses a single-axis tracker and module layout designed to maximize exposure to the sun and use of the available land. The locations of the inverters and the layout of the electrical collection system have been designed to avoid energy losses.

***Element: Design Options to Accommodate Potential Expansion***

Replacing a portion of the existing coal generation from Unit 2 with new solar capacity that can reutilize the interconnection service at the SGP is one way to effectively preserve that resource. This existing interconnection capacity must be repowered or retired under the Midcontinent Independent System Operator generating facility replacement process.

The HVTLs will be built double-circuit-capable, meaning the structure sizes and conductor configuration will be designed to be able to accommodate a double circuit configuration later allowing for potential future generation and full utilization of the interconnection. It is most efficient to develop the double circuit capable structures at the time of construction for the single circuit. Any future double circuit line would be subject to a separate filing with the Commission.

***Element: Design Options to Mitigate Adverse Environmental Effects***

A description of mitigative measures that could be used to avoid and minimize impacts is thoroughly addressed in the descriptions of impacts in previous sections of this document. To the extent that special conditions may be appropriate for particular Elements, those mitigative measures are identified in the individual resource subsections.

### 6.1.8 Factor: Use of Existing Large Electric Power Generating Plant Sites

While the Project uses the interconnection at the SGP site, it does not make use of the existing SGP site, outside of some laydown areas.

### 6.1.9 Factor: Use of existing transmission systems or rights-of-way

Both HVTLs were designed to maximize the paralleling of existing roads, survey boundaries, field lines, natural division lines, and existing transmission lines.

### 6.1.10 Factor: Electrical System Reliability

The Project will be available at least 98 percent of the time, consistent with other utility scale solar projects.

### 6.1.11 Factor: Design-Dependent Costs

The centralization of the energy production in one location creates efficiencies for construction, infrastructure, transmission and interconnection costs.

### 6.1.12 Factor: Irreversible and Irretrievable Commitments of Resources

See discussion in Section 5.11-*Irreversible Commitment of Resources*.

### 6.1.13 Factor: Unavoidable Impacts

See discussion in 5.10-*Unavoidable Impacts*.

# FIGURES

# Appendix A EIS Scoping Decision

# Appendix B Detailed Site Layout

# Appendix C LEPGP Site and HVTL Route Permit Templates

# Appendix D Alternative 2 Layout

# Appendix E Appendix F EMF Background Paper