Application to the Minnesota Public Utilities Commission

for a Site Permit for a Large Electric Generating Facility

Alternative Permitting Process

Lake Wilson Solar Energy Center

MPUC Docket No. IP-7070/GS-21-792

February 9, 2023

Lake Wilson

SOLAR ENERGY CENTER

Project Name: Lake Wilson Solar Energy Center

Project Location: Murray County, MN

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1.0 Introduction

Lake Wilson Solar Energy LLC (Lake Wilson Solar, Applicant, or Permittee) is a Delaware limited liability company and a wholly owned subsidiary of Invenergy Solar Development North America LLC (Invenergy Solar Development), and an affiliate of Invenergy LLC (Invenergy).

Lake Wilson Solar is proposing to construct and operate the Lake Wilson Solar Energy Center (Project), an up to 150 megawatt alternating current (MWac) photovoltaic (PV) solar energy generating facility (Solar Facility), and associated operation and maintenance (O&M) facility, collector lines, access roads, gen-tie line (Project Gen-Tie Line), substation (Project Substation), and an up to 95 MWac / 380-megawatt hour (MWh) battery energy storage system (BESS). The Project is planned to be constructed in Leeds Township, Murray County, Minnesota (**Figure 1**).

The Project is proposed to be built within an approximate 2,621-acre area of privately owned land under contract (Project Area). Of the 2,621 acres, approximately 1,526 acres are currently designated to host proposed Project infrastructure. The Project will interconnect to the existing Northern States Power Company, d/b/a Xcel Energy (hereinafter referred to as Xcel Energy) Fenton - Chanarambie 115 kilovolt (kV) high voltage transmission line (HVTL) that transects the Project Area (see **Figure 2**). The proposed Project Area was chosen due to willing landowners, community interest in the Project, the lack of farmsteads, rural residences, and human settlement impacts, the lack of other environmental constraints (e.g., no native prairie, no listed species and no cultural sites), adequate roads for access, flat terrain with minimal flood risk, and an interconnection location with available capacity and minimal needed upgrades to the transmission system. The Project is being developed, designed, and permitted to meet or exceed applicable state and local requirements to the extent practicable, including the prime farmland rule (discussed below).

Construction of the Project requires a Site Permit (SP) from the Minnesota Public Utilities Commission (Commission or MPUC). On November 16, 2021, Lake Wilson Solar provided the Commission notice that it is seeking approval for its SP Application (Application) under the alternative review process provided in Minn. Stat. §216E.04, Subd. 2(8) and Minn. Admin. R. 7850.2800-7850.3900.[1] Lake Wilson Solar respectfully submits this application to the Commission for a SP under the alternative permitting process. A Commission SP supersedes all local land use, zoning, and building regulations (Minn. Stat. §216E.10, Subd. 1).

The Project is also a large energy facility (LEF) as defined in Minn. Stat. §216B.2421, Subd. 2(1) and a large electric generating facility (LEGF) as defined in Minn. Admin. R. 7849.0010, Subp.

[1] In its notice of intent to seek approval of the Application under the alternative permitting process, Lake Wilson Solar indicated the Project would include an associated BESS of up to 50 MW. This Application includes an associated BESS of up to 95 MW. The Project continues to be a large electric power generating plant that is powered by solar energy pursuant to Minn. Stat. §216E.04, Subd. 2(8). Accordingly, the notice of intent to seek approval under the alternative review process is still valid and applicable to the Project as currently proposed.

13, and therefore requires a Certificate of Need (CN) from the Commission prior to construction. A CN application will be submitted separately to the MPUC in Docket No. IP-7070/CN-21-791 (Section 1.4.2).

On November 4, 2021, Lake Wilson Solar provided a written request to the Minnesota Department of Commerce (DOC), Energy Environmental Review and Analysis unit (EERA), (together DOC EERA), for a solar energy generating system size determination in accordance with Minn. Stat. §216E.021. The size determination request is provided in **Appendix A-1 (public version).**[2] A response from EERA was issued on December 22, 2021 and is provided in **Appendix A-2.**

1.1 Purpose and Need

The Project will provide up to 150 MWac of renewable power capacity and generate approximately 332,800 MWh of renewable energy in its first year of operation.[3] Accounting for module degradation and averaging generation over the anticipated life of the Project (35 years), the Project will generate an average of approximately 313,000 MWh annually. Taking the average generation, the Project will provide enough energy to power approximately 28,000 homes annually and prevent approximately 244,500 short tons of carbon dioxide equivalent annually (EPA, 2022a).[4] Additionally, the Project is designed to provide up to 95 MW of energy storage capacity through a BESS. The impact to the grid from the integration of a BESS will be positive as the BESS can act to shift the output of the Project from the likely peak of solar generation at noon to a potential peak of electrical demand in the early evening. Depending on final design, the system can furnish other grid services such as frequency response and voltage support and could act as an electrical "suspension" to smooth the output of the Project on partly cloudy days.

The Project is consistent with and capable of supporting Minnesota's mandate and goals found in the Renewable Energy Objectives and Governor Walz's "One Minnesota Path to Clean Energy" (to require 100% carbon-free energy by 2050), and applicable energy planning requirements.[5] It will serve consumers' growing demand for renewable energy under various utility-sponsored programs for utilities, independent power purchasers and corporate and industrial (C&I) customers seeking to use renewable energy for business growth. The Project will diversify electricity sources, address environmental concerns, meet anticipated growth in electrification (e.g., vehicles, heating), and address the policy goals, as described above. The Project will also benefit the local community through economic investment, temporary and permanent jobs, property and business taxes, and landowner lease payments, in addition to preserving the underlying participating property.

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[2] The Solar Energy Generating System Size Determination Form contemplated a nameplate generating capacity of the proposed Project of up to 150 MWac which has not changed. Accordingly, the EERA size determination is still valid and applicable.

[3] For calculating the annual generation figures, no module degradation was assumed for the first year of operation. A degradation factor of 0.35% per year was assumed for subsequent years.

[4] This is based upon the U.S. Environmental Protection Agency (EPA) Greenhouse Gas Equivalencies Calculator and 313,000,000 kWh (313,000 MWhs) annual production PVsyst model.

[5] *See* Minn. Stat. §§216B.1691, subd. 2(f), 216C.05, and 216E.02, Subd. 1.

The solar and BESS portions of the Project are planned to operate in tandem as one combined, associated facility. This configuration will reduce the variability of solar energy generation. Lake Wilson Solar is working towards securing a Power Purchase Agreement (PPA), Build Transfer Agreement, Development Transfer Agreement, or other enforceable offtake agreements to sell the electricity, Renewable Energy Certificates and Capacity generated by the Project. The power generated by the Project will be offered to wholesale customers, including Minnesota utilities and cooperatives that have identified a need for additional renewable energy and capacity, and C&I customers that have set clean energy goals.

1.2 Applicant Information

The Permittee for the Site Permit will be:

Lake Wilson Solar Energy LLC
One South Wacker Drive, Suite 1800
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The contact persons regarding this Application are:

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Lake Wilson Solar is a Delaware limited liability company authorized to do business in Minnesota. Lake Wilson Solar is a wholly owned subsidiary of Invenergy Solar Development North America LLC, and an affiliate of Invenergy LLC, a leading sustainable energy and development company.

Invenergy, through its affiliates has developed several large-scale energy facilities across four core technologies: wind (110 projects; 17,600 MW), solar (50 projects; 6,205 MW), natural gas (13 projects; 5,964 MW), and battery storage (18 projects; 486 MW / 1,537 MWh). Invenergy owns approximately half of the indicated portfolio for each respective technology, operating projects it owns as well as third-party owned projects, giving the following total for operated projects: wind (65 projects, 9,965 MW), solar (16 projects, 1,541 MW), Natural gas (12 projects, 5,661 MW), Battery storage (7 projects, 127.5 MW). Invenergy projects are mainly located in the United States,

but Invenergy has a global presence with other projects located in Japan, Poland, Scotland, Mexico, El Salvador, and Uruguay. Invenergy has a proven development track record of 191 large-scale projects with a capacity of over 30,000 MW.

In Minnesota, an affiliate of Invenergy most recently completed development, permitting, and sale of the Freeborn Wind Project located in Freeborn County, MN and Worth County, IA to Xcel Energy in 2019. Invenergy affiliates have also completed multiple projects in the neighboring states of Wisconsin, Iowa, North Dakota, and South Dakota.

1.2.1 Ownership at Time of Filing

Lake Wilson Solar is the owner of the Project at the time of filing of this Application and has secured all necessary land rights for construction and operation of the proposed Project. Lake Wilson Solar will transfer a small parcel of land currently subject to a purchase option agreement with Lake Wilson Solar, to Xcel Energy for use in the construction and operation of a new switchyard (Xcel Switchyard) to connect the Project to the grid via a line tap (Xcel Line Tap). This is the only land parcel that Lake Wilson Solar plans to purchase and transfer to Xcel Energy.

The Project Substation, BESS, and Project Gen-Tie Line will be constructed, owned, and operated by Lake Wilson Solar. The new Xcel Switchyard and Xcel Line Tap will be permitted, constructed, owned, and operated by Xcel Energy.

Land contracts in the form of solar lease and easement and purchase option agreements are in place with twelve private landowners of the Project Area (**Table 1**). The owners of the properties subject to the lease, easement, and collection agreements will continue to own their property and will be able to continue to utilize portions of their property located outside of the fenced project infrastructure area for agricultural purposes during the life of the Project, to the extent that such use does not interfere with Project operations. The owners of the properties subject to the collection easement agreements will continue to own and utilize their property in accordance with their land management plans. All participating landowners currently utilize their land for agriculture. Under the agreements, land used for the Project would be returned to the underlying landowners upon completion of the operational life of the Project.

Table 1: Participating Landowners

No.	Landowner
1	Allan Clauson
2	Allen Vanderwal
3	John and Mary Risacher
4	Greg and Madeline Vanderwal
5	Caboth Family Trust
6	James and Lynn Buldhaupt

No.	Landowner
7	Joyce Risacher
8	Joseph and Sheila Risacher
9	Kevin and Linda Nelson
10	Marvin and Lois Ferguson
11	Gary and Marilyn Carlson
12	Roger Strom

1.2.2 Proposed Ownership after Commercial Operations

Lake Wilson Solar will own, operate, and maintain the Project following the start of commercial operations. While not planned at this time, Lake Wilson Solar reserves the right to sell or assign the Project to another qualified entity at any time before, during or after the Project is constructed. Any sale or assignment of the SP or CN would require approval by the Commission and any future buyer or assignee will be required to meet SP conditions. As indicated above, Xcel Energy will permit, own, and operate the new Xcel Switchyard and associated land.

1.3 Project Schedule

Lake Wilson Solar anticipates receiving Commission approval of the Project in the first or second quarter of 2024. If the Project is authorized as such, construction could commence as early as the summer of 2024, with a commercial operations date (COD) by December 2026. **Table 2** below includes a preliminary schedule for the construction process including an approximate timeline of construction items to meet the COD of December 2025.

Table 2: Preliminary Project Construction Schedule

Activity	Date
Task 1 - PV Construction Plan	
Mobilization/Civil Grading	August 2024
Racking Procurement	October 2024
Begin Racking Installation	April 2025
PV Procurement	February 2025
Begin PV Module Installation	August 2025
Begin PV Commissioning	May 2026
Task 2 - Substation Construction	
Mobilization/Civil Grading	May 2025
Begin Substation Construction	August 2025
In-Service	July 2026
Task 3 - BESS Construction Plan	

Activity	Date
Mobilization/Civil Grading	May 2025
Begin BESS Construction	September 2025
BESS Commissioning	May 2026
Facility Commercial Operations Date	December 2026

1.4 Potentially Required Project Permits, Approvals and Plans

Development of the proposed Project may require various federal, state, and local permits, approvals or plans prior to starting construction as described below. Potential permits, approvals or plans with respect to their prospective applicability and expected timing, are detailed below in **Table 3**.

Table 3: Potential Permits/Approvals/Plans

Agency	Permit/Approval/ Plan	Applicability	Status and Timing
Federal			
U.S. Army Corps of Engineers (USACE)	Section 404 Permit	Dredging or filling jurisdictional Waters of the United States (wetlands/waterways).	To be obtained prior to construction as needed. Project layout currently avoids all jurisdictional waters, therefore a Section 404 permit is not expected to be needed for the project.
U.S. Environmental Protection Agency (U.S. EPA)	Spill Prevention, Control, and Countermeasures Plan	Project facilities with oil storage of more than 1,320 gallons.	To be prepared prior to construction as needed for construction related storage of fuel. To be prepared prior to operation for operation related storage of fuel if storage exceeds applicability thresholds.
State			

Table 3: Potential Permits/Approvals/Plans

Agency	Permit/Approval/ Plan	Applicability	Status and Timing
Minnesota Public Utilities Commission	Certificate of Need	Required for LEFs (electric power generating plant or combination of plants at a single site with a combined capacity of 50 MWs or more and transmission lines directly associated with the plant that are necessary to interconnect the plant to the transmission system).	To be obtained prior to construction, CN Application filed concurrent with the SP Application.
	Site Permit	Required for LEFs 50 MW or greater.	To be obtained prior to construction, SP Application filed concurrent with the CN Application.
Minnesota Pollution Control Agency (MPCA)	Section 401 Water Quality Certification	Required for Section 404 Individual and Nationwide Permits.	To be obtained prior to construction as needed. Project layout currently avoids all jurisdictional waters, therefore a Section 401 permit is not expected to be needed for the project.
	National Pollutant Discharge Elimination System/State Disposal System Construction Stormwater Permit and Stormwater Pollution Prevention Plan	Construction activity that disturbs one or more acre of land.	To be obtained/prepared prior to construction.
MPCA	State Air Registration Permit	Required if back-up generators if selected generators do not qualify for an exemption under Minn. R. 7007.0300, Subp. 1(B)	To be obtained prior to installation of a back-up generator if exemptions do not apply to chosen generators.

Table 3: Potential Permits/Approvals/Plans

Agency	Permit/Approval/ Plan	Applicability	Status and Timing
MPCA	Storage Tank Registration	Required for back-up generator aboveground storage tanks exceeding 500 gallons and underground storage tanks exceeding 110 gallons	To be obtained prior to operation if storage tanks exceeding registration thresholds are installed.
Minnesota Department of Health (MDH)	Well Construction permit	Installation of a water supply well.	To be obtained prior to construction of a well (if needed for O&M building), as needed.
Minnesota Department of Labor and Industry (MDLI)	Request for Electrical Inspection	Necessary to comply with state electrical codes.	Inspection to be conducted after installation of electrical equipment during construction and prior to operation.
Minnesota Department of Natural Resources (MNDNR)	Water Appropriation Permit	Required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year (dewatering).	Temporary Water Appropriation Permit, for Temporary Dewatering: To be obtained, as needed, if water withdrawals exceed 10,000 gallons per day or 1 million gallons per year. Permanent Appropriation Permit, for well at O&M Building: Not expected to be needed, expected water use will be under the threshold
	Public Water Work Permit	Placement of structures in public waters.	To be obtained prior to construction of structures in public waters, as needed. Project layout currently avoids all MNDNR Public Waters, and a Public Water Work Permit is not expected to be needed for the project.
MNDNR, Division of Lands & Minerals	Utility Crossing License	Required to cross state land with utility infrastructure.	To be obtained prior to crossing state land with utility infrastructure, as needed. Project layout currently avoids all State Lands and therefore a Utility Crossing License is not expected to be needed for the project.

Table 3: Potential Permits/Approvals/Plans

Agency	Permit/Approval/ Plan	Applicability	Status and Timing
Minnesota State Historic Preservation Office (SHPO)	Cultural and Historic Resources Review; State and National Register of Historic Sites Review	Projects that require State permits or affect State registered properties or require Section 106 compliance.	Obtain concurrence on Phase I inventory prior to construction.
Minnesota Department of Transportation (MnDOT)	Application for Utility Accommodation on Trunk Highway Right-of-Way	Installing utilities along, across or within trunk highway right-of-way.	To be obtained prior to installation of utilities within MnDOT right-of-way, as needed. Project layout currently avoids all MnDOT Right-of-Way with any utilities, therefore an Application for Utility Accommodation on Trunk Highway Right-of-Way is not expected to be needed for the project.
	Access (Driveway) Permit	Required for construction of a driveway/access road utilizing MnDOT rights-of-way.	To be obtained prior to construction of driveway on MnDOT right-of-way, as needed. Project layout currently avoids all MnDOT Right-of-Way with access roads, therefore no MnDOT Access Driveway permits are expected to be needed for the project.
	Oversize/Overweight Permit	Vehicles delivering equipment, materials and supplies that exceed applicable MnDOT height/length limits and weight limits.	To be obtained prior to equipment deliveries, as needed.
County/Local			
Murray County, MN	Minnesota Wetland Conservation Act (WCA) Approval (in conjunction with Murray County Soil and Water Conservation District)	Activities affecting water resources.	To be obtained prior to construction in jurisdictional waters, if needed. Project layout currently avoids all WCA jurisdictional waters and a WCA permit is not expected to be needed for the project.

Table 3: Potential Permits/Approvals/Plans

Agency	Permit/Approval/ Plan	Applicability	Status and Timing
	Individual Sewage Treatment Systems Permit	Required prior to installation of any individual sewage treatment system in Murray County.	To be obtained prior to construction of septic system, as needed.
	Driveway/Entrance Permit	Required for constructing a new driveway access to county roads.	To be obtained prior to construction of new driveway access, as needed.
	Utility Permit	Required for installation of utility infrastructure in a county road right-of-way.	To be obtained prior to installation, as needed.
	Work in the Right-of-Way Permit	Required to work within public road right-of-way.	To be obtained prior to work within right-of-way, as needed.
	Tile Crossing Permit	Required for boring or open cut of tile for utility crossings.	To be obtained prior to crossing, as needed.
	Overweight Permit	Use of overweight/oversized vehicles on County roadways.	To be obtained prior to equipment deliveries, as needed.

1.4.1 Local Approvals

Pursuant to Minn. Stat. §216E.10, Subd. 1, the SP, for a large electric power generating plant such as the Project, supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

Lake Wilson Solar has consulted with local officials early in the development process and will strive to incorporate feedback and reasonable recommendations of local stakeholders into the final design of the Project. A summary of agency and public outreach is described in **Section 5.0** below.

1.4.2 Certificate of Need

Pursuant to Minn. Stat. §216B.243, all "large energy facilities" (LEF) must receive a CN from the Commission. Since the proposed Project meets the criteria for a LEF (50 MW of generation or greater), a CN is required for the Project. Exemptions are available for solar and wind generation facilities (Minn. Stat. §216B.243, Subd. 8, 2022), such as if the facility is owned and operated by an independent power producer and the electric output of the system is sold to an entity that does

not provide retail service in Minnesota or wholesale electric service to another entity in Minnesota other than an entity that is a federally recognized regional transmission organization or independent system operator. The Project does not qualify for an overall CN exemption at this time. However, if circumstances change and the Project otherwise becomes exempt from CN requirements, Lake Wilson Solar will notify the Commission.

Concurrent with filing of this Application, Lake Wilson Solar will also file a CN application to the MPUC for the Project under Docket Number IP-7070/CN-21-791. On November 16, 2021, Lake Wilson Solar submitted a request to the MPUC for exemption from certain CN application content requirements specific to the operation and regulation of facilities proposed by utilities and non-applicable to independent power producers. The MPUC issued an Order dated January 4, 2022, approving the requested exemptions with modifications as provided by EERA and varied the 30-day requirement of Minn. Admin. R. 7849.0200, Subp. 6 (*See* Docket No. IP-7070/CN-21-791, Doc. ID 20221-181183-01).

No transmission infrastructure exceeding the voltage (200 kV) and length (1,500 feet) requirements of an LEF under Minn. Stat. §216B.2421, Subd. 1, are proposed for the Project or by Xcel Energy for its interconnection infrastructure related to the Project. Therefore, the proposed Project will not trigger the need for a CN from the Commission for planned Project interconnection facilities. As such, the Project also does not require a separate notice plan as defined in Minn. Admin. R. 7829.2550, which is required for a HVTL that requires a CN.

1.4.3 Site Permit

A Site Permit (SP) is required for a solar energy generating system that is greater than 50 MW. The Project falls within this definition and will require a SP from the Commission prior to construction (Minn. Stat. § 216E.03, Subd. 1, (2022). Pursuant to Minn. Stat. §216E.04, Subd. 2(8), Lake Wilson Solar seeks approval of its SP Application under the alternative review process provided under Minn. Stat. §216E.04 and Minn. Admin. R. 7850.2800-7850.3900. Lake Wilson Solar filed a Notice of Intent to Submit a SP Application under the Alternative Permitting Process to the Commission on November 16, 2021 (*See* Docket No. IP-7070/GS-21-792, Doc. ID 202111-179832-01).

1.4.4 Other Potential Permits and Approvals

Lake Wilson Solar will obtain permits and all other approvals that are required for the Project concurrent with or following issuance of the CN and SP and prior to initiating construction on the Project to the extent practicable. Potential permits, approvals and plans, with respect to their prospective applicability and expected timing, are shown in **Table 3** above. Permits and approvals to be applied for and plans to be prepared will be determined based on Lake Wilson Solar's final engineering following issuance of the CN and SP.

1.4.5 Request for Joint Proceeding with Certificate of Need

As described above, Lake Wilson Solar is filing for a CN for the Project in Docket No. IP-7070/CN-21-791. Minn. Stat. §216B.243, Subd. 4 and Minn. Admin. R. 7849.1900, Subp. 4, permit the Commission to hold joint proceedings for a CN and SP in circumstances where a joint hearing is feasible, more efficient, and may further the public interest. As such, Lake Wilson Solar respectfully requests that the Commission order joint proceedings for review of Lake Wilson Solar's CN and SP applications. Holding joint proceedings is in the public interest because it will make it easier for members of the public, regulatory agencies, and other stakeholders to participate in applicable meetings and hearings, provide a comprehensive record regarding potential benefits, impacts and avoidance/minimization measures, and improve administrative efficiency for agency staff reviewing these applications.

2.0 Project Information

The following sections provide a description of the Project Area, Preliminary Development Area and proposed Project infrastructure including land control, Project design, interconnection, prohibited areas, alternatives, and costs.

2.1 Location

Lake Wilson Solar is proposing to construct the Project in Leeds Township in Murray County, Minnesota. **Figure 1** depicts the location and **Table 4** provides the Township, Range, and Sections of areas included within the respective political boundaries.

Table 4: Project Location

Township	Range	Section(s)
106N	42W	15-17, 20-22, 27

Lake Wilson Solar believes that the selected Project Area in Murray County is feasible and prudent for solar development based upon the proximity to existing electric transmission infrastructure, the successful consummation of the interconnection study process in the form of a generator interconnection agreement (GIA), minimal impact to natural resources, sufficient solar resource, strong local support, consistency with existing land uses and local zoning, and, as further discussed in the Prime Farmland Assessment included in **Appendix B**, there being no feasible or prudent alternative to the Project Area with respect to prime farmland.

2.2 Overall Project Description

Lake Wilson Solar is proposing an up to 150 MWac nameplate solar-energy capacity project (Project) paired with an up to 95 MWac BESS. The Project Area encompasses approximately 2,621 acres of privately owned land in a rural agricultural area in southwestern Minnesota. Lake Wilson Solar has secured site control for 100% of the land within the Project Area through lease and easement agreements, and one land purchase option agreement (Figure 2). Of the 2,621 acres, approximately 1,526 acres (Preliminary Development Area) are designated to potentially host solar panels/arrays/modules, single-axis trackers, inverters, collection lines, access roads, fencing, and associated Project facilities (i.e., BESS, Project Substation, Project Gen-Tie Line, and O&M facility). The 1,526-acre Project footprint is larger than what is anticipated to ultimately be required to host 150 MWac of solar generating facilities and associated 95 MWac of BESS facilities. The final Project footprint will be dependent on the permitting process, final field surveys, engineering and geotechnical studies, and equipment selection. Lake Wilson Solar will optimize the Project to the degree practicable to minimize the overall impact of the Project. To allow for optimization, and inadvertent discoveries through the permitting and final design process, Project impacts described in this application are representative of the maximum potential Project footprint and are therefore greater than what is expected to actually occur from the construction and operation of

the Project. Detailed descriptions of Project facilities and design are provided in **Section 3.0** below. Engineering of the Project will continue as more detailed engineering studies, site characterization, and constraints are evaluated and determined.

All electricity generated by the Project's solar arrays will be routed to the Project Substation via underground alternating current (AC) collector cables. The Project Substation will be connected to the new Xcel Switchyard using a short overhead Project Gen-Tie Line and will also route power to the proposed Project BESS. The Xcel Switchyard will serve as the Point of Interconnect (POI) for the Project to the MISO grid system. A GIA for the Project was executed with MISO and allows for a maximum injection of 170 MWac to the grid at the POI, consisting of 150 MWac of solar generation and 20 MWac of energy stored by the BESS and later released to the grid.

2.3 Project, Associated Facilities, and Interconnection Description

2.3.1 Project and Associated Facilities

As further detailed in **Section 3.0** below, the Project and associated facilities and equipment include:

- PV solar modules;
- Inverters;
- Step-up transformers (connecting solar panel inverters to collection lines/Project Substation);
- Electrical wiring (connecting PV solar modules to solar panel inverters);
- Single-Axis Trackers;
- Collection lines (connecting solar panel inverters to Project Substation);
- Security fencing and gates;
- Access roads;
- Stormwater treatment areas (associated with the Project);
- O&M Facility;
- Supervisory Control and Data Acquisition (SCADA) system;
- BESS (including inverters, storage devices, emergency generators, and electrical connection to the Project Substation);
- Project Substation;
- Power transformer(s);
- Overhead 115 kV Project Gen-Tie Line (Project Substation to Xcel Switchyard);
- Switchgear;
- Metering equipment; and
- Ancillary equipment or buildings as necessary.

A BESS is included as an associated facility to provide frequency response, capacity on demand, generation smoothing, shifting and/or firming of the power output from the Project. The proposed

BESS size will have a power output of 95 MWac and will be a 4-hour system, yielding a storage capability of 380 MWh. The BESS itself would not generate energy, but simply store solar-generated electrical energy and release the stored energy to the grid when desired. The BESS would be a key component of the Project, complementing the solar energy production to create a net power generation that is more predictable and cost-effective than power generated by a system without a BESS.

Lake Wilson Solar filed two queue positions with MISO for the Project. A 150 MWac solar queue position was filed in the MISO DPP-2017-AUG study cycle and a 20 MWac BESS queue position was filed in the MISO DPP-2018-APR study cycle. Lake Wilson Solar initially obtained an executed GIA with MISO in September 2021 for the 150 MWac solar queue position. Working with MISO, the GIA was amended and restated in June 2022 to incorporate both the 150 MWac solar and 20 MWac BESS queue positions. Lake Wilson Solar will work with MISO to pursue an additional 75 MWac BESS capacity via MISO's Surplus Interconnection Process.

MISO has made significant progress updating its interconnection process to provide multiple pathways for the interconnection of battery storage facilities, as required by FERC Order 845. One of these pathways, the Surplus Interconnection Process, has specifically enabled more batteries in a hybrid configuration to be interconnected quickly and efficiently in the past year. MISO defines Surplus Interconnection Service as "Interconnection Service that is derived from the unneeded portion of Interconnection Service established in a GIA or in agreement with, or under the tariff of, Transmission Owner prior to integration into MISO, such that if Surplus Interconnection Service is utilized, the total amount of Interconnection Service at the Point of Interconnection would remain the same." Designed to reduce costs for interconnection customers and improve wholesale market competition, the Surplus Interconnection Process allows Lake Wilson Solar to create additional capacity value by leveraging the interconnection facilities and network upgrades necessary to accommodate the solar generation component of the Project. Surplus interconnection requests also proceed through a separate queue process outside of the standard Definitive Planning Phase (DPP), and thus, review can occur on an expedited timeline.

Lake Wilson Solar will seek approval for the additional 75 MWac of BESS capacity via MISO's Surplus Interconnection Process based on: (1) the energy and capacity levels for the Lake Wilson Solar generation assets during the peak and shoulder times that were incorporated into the MISO studies; (2) the energy and capacity value of the BESS during the summer and shoulder peak that are incorporated into the MISO studies; and (3) MISO's methodology for assigning capacity. The solar and BESS portions of the Project will operate in tandem as one combined, associated facility. This interconnection configuration will provide sufficient outlet to maximize the use of all solar energy generation from the Project.

Lake Wilson Solar is seeking Commission approval for up to 150 MWac of solar generation and an associated 95 MWac BESS. 150 MWac of solar generation was part of the 2017 MISO DPP study cycle, and 20 MWac was part of the 2018 MISO DPP study cycle. An additional 75 MWac BESS will be requested under MISO Surplus Interconnection Process. As part of MISO's DPP

process to determine the necessary network upgrades, MISO assumes the solar portion of the Project is capable of dispatching 100% of installed generation capacity during peak scenarios and 50% of installed capacity during shoulder scenarios. Using this methodology, MISO has identified the network upgrades necessary for the 150 MWac solar generation component of the Project. The 20 MWac portion of the BESS was studied at 100% during both peak and shoulder times. This also indicates that the transmission system could accept a Surplus BESS up to 50% of the solar nameplate capacity (in this case 75MWac). This means that the network upgrades can accommodate 170 MWac of power injection from the Project to the grid. The BESS system is intended to maximize the usefulness of the network upgrades by dispatching stored power during times when less solar energy is being produced. For example, if the Project is producing 100 MWac of solar generation, the BESS could dispatch up to an additional 70 MWac of power to fully utilize the 170 MWac of capacity allowed under the GIA. The BESS component also increases the capacity accredited to the Project by MISO.

Due to recent Tariff changes, MISO now accredits solar and storage resources on a seasonal basis. Initially, solar resources will be accredited based on 50% of the resource registered capacity for Fall, Spring, and Summer, and at 5% during Winter months. Once three years of operating history are available, solar resources will be accredited based on the historic output during hours 15, 16, and 17 EST for the relevant spring, summer, and fall months. Winter accreditation will be based on hours 8, 9, 19, and 20 EST for the winter months. The selected hours represent the typical seasonal peak demand hours. A BESS is accredited capacity based generally on its ability to provide the energy equivalent of its claimed capacity for a minimum of at least four (4) continuous hours each day across MISO's peak, taking into consideration the unit's forced outage rate. Prior to the unit being in service long enough to calculate a unit-specific forced outage rate, a class-average forced outage rate will be applied.

Lake Wilson Solar is seeking approval for up to 95 MWac of BESS capacity, of which 75 MWac of BESS capacity will come from the Surplus Interconnection process described above and the remaining 20 MWac will come from the executed GIA. Together, both avenues of BESS approvals would result in a 95 MWac BESS that would function as a single component associated with the Solar Facility.

BESS components would include commercial-scale lithium-ion (or similar technology) batteries, converters or inverters, and pad-mount transformers. The BESS is proposed to be adjacent to the Project Substation and interconnect via underground 34.5 kV lines.

A 95 MWac/380 MWh AC-coupled BESS would consist of rows of enclosures similar to an ISO container or outdoor-rated modular enclosure or similar with a total footprint of approximately 215,000 square feet. These enclosures would be fully outfitted with auxiliary operations and safety systems (such as HVAC, controls, and fire detection and annunciation). Adjacent to the containers would be rows of pad-mount transformers and inverters. The inverters would be connected to the pad-mount transformers, which will then connect to the Project Substation.

A Preliminary Site Plan showing Project facilities and related equipment is included in **Appendix C**. A preliminary BESS layout showing the potential orientation of the BESS is included in **Appendix D**.

2.3.2 Interconnection Description

A separate Route Permit is not required for the Project.[6] The planned Project Gen-Tie Line will be approximately 200-400 feet long and will connect the Project Substation to the new Xcel Switchyard, which facilitates the interconnection to the existing Xcel Energy Fenton - Chanarambie 115 kV HVTL. The anticipated alignment of transmission line facilities is shown on **Figures 3 and 4**. The 115 kV overhead Project Gen-Tie Line will likely exit from the western portion of the Project Substation and route directly to the adjacent new Xcel Switchyard.

The Project Substation is proposed in the southwest part of the Project Area (see **Figures 3 and 4**). The Project Substation will consist of one or more 34.5 to 115 kV power transformers and related equipment. Underground 34.5 kV AC collector lines from the Project inverters will transmit solar generated energy to the Project Substation. The 34.5 kV collector system voltage will then be stepped up to the interconnection voltage of 115 kV by the transformer(s) located at the Project Substation. The power will then be transmitted to the new Xcel Switchyard via the 115 kV overhead Project Gen-Tie Line which will be approximately 200-400 feet long. The Xcel Line Tap will connect the Xcel Switchyard to the existing Fenton - Chanarambie 115 kV HVTL via a double circuit (i.e., one circuit in and one circuit out), and will be approximately 250-300 feet long. Auxiliary power will be routed from the Project Substation to the BESS at 34.5 KV.

The existing Xcel Energy Fenton - Chanarambie 115 kV HVTL travels adjacent to the western portion of the Project Area (**Figures 3 and 4**). Lake Wilson Solar will acquire the land that will host the Xcel Switchyard site (via a signed purchase agreement) and secure any other land rights necessary to facilitate the connection of the Xcel Switchyard to the Xcel Energy Fenton - Chanarambie 115 kV HVTL. Lake Wilson Solar will thereafter transfer ownership of the Xcel Switchyard site to Xcel Energy. Xcel Energy will modify the existing Fenton - Chanarambie 115 kV HVTL, installing new dead-end structures within the HVTL right-of-way to re-direct the circuit in/out of the new Xcel Switchyard and connect the Project to the grid via the Xcel Line Tap. The Xcel Switchyard and Xcel Line Tap will be network facilities permitted, constructed, owned, and operated by Xcel Energy.

[6] The proposed Project will not require a Route Permit because the transmission line is less than 1,500 feet in length and therefore not a "high-voltage transmission line" (Minn. Stat. §216E.01, subd. 4; Minn. Stat. §216E.01).

2.3.3 Size and Capacity

Lake Wilson Solar estimates that up to approximately 1,526 acres of the 2,621-acre Project Area is necessary to accommodate the final design and engineering of the proposed Project (i.e., the Preliminary Development Area). The Preliminary Development Area is generally defined as the area containing all Project facilities located within the Project security fencing (e.g., arrays, inverters, collection lines, etc.) and includes the access roads extending beyond the Project facility fenced area. It also includes the Project Substation, Project BESS, new Xcel Switchyard, Xcel Line Tap and O&M facility (see **Figures 3 and 4 and Appendix C)**.

Lake Wilson Solar has 100% land control for the Project within the Project Area. The Project Area is comprised of private land under solar lease and easement agreements, as well as a portion of land under a purchase option agreement. The Project Area includes land which was secured to provide the acreage needed to complete final design, construction, and operation of the Project.

Lake Wilson Solar filed a solar Size Determination Request for the Project with DOC EERA on November 4, 2021 (see **Appendix A-1**). The DOC EERA provided written response that it determined that the Project is not associated with any other existing or planned solar projects requiring them to be combined into a single project and that due to the Project size (up to 150 MWac), Lake Wilson Solar must submit an application for a SP to the MPUC (see **Appendix A-2**). **Figure 3** depicts the Project interconnection facilities, preliminary facility design and associated infrastructure of the proposed Project. Additional information on the proposed Project facility design and layout can be found in **Section 3.1** and the Preliminary Site Plan in **Appendix C**.

2.4 Prohibited and Exclusion Sites

Minn. Admin. R. 7850.4400, Subp. 1 prohibits large electric power generating plans (LEPGPs) from being located in national parks; national historic sites and landmarks; national historic districts; national wildlife refuges; national monuments; national wild, scenic and recreational riverways; state wild, scenic, and recreational rivers and their land use districts; state parks; nature conservancy preserves; state scientific and natural areas (SNAs); and state and national wilderness areas. None of these prohibited sites are located within or near the Project Area as further discussed below.

In addition, Minn. Admin. R. 7850.4400, Subp. 3 excludes LEPGPs from being located in any of the following areas unless there is no feasible and prudent alternative. These exclusion areas include state registered historic sites; state historic districts; state Wildlife Management Areas (WMAs); county parks; metropolitan parks; designated state and federal recreational trails; designated trout streams; and state water trails. No exclusion sites are located within the Project Area. Several WMAs are within two miles of the of the Project Area and one WMA is adjacent to the Project Area, however, no impacts are proposed to these areas. Further discussions of proposed

mitigative measures for reducing potential impacts to the adjacent WMA can be found in **Section 4.2.9 and 4.5.5**.

2.4.1 Prime Farmland

Subject to certain exceptions, Minn. Admin. R. 7850.4400, Subp. 4 prohibits large energy power generating plants from being sited on more than 0.5-acre of prime farmland per MW of net generating capacity unless there is no feasible and prudent alternative. Given the up to 150 MWac net generating capacity of the Project, the prime farmland exclusion rule would allow use of up to 75 acres of prime farmland for the Project. Approximately 762 acres of prime farmland, 415 acres of prime farmland if drained, and 7 acres of prime farmland if protected from flooding or not frequently flooded during the growing season are located within the Preliminary Development Area (**Figure 10a**).

The prime farmland exclusion rule allows use of a site that exceeds the rule's allowance of 0.5-acre of prime farmland per MW of net generating capacity if there is no feasible or prudent alternative. Lake Wilson Solar completed a detailed evaluation of a potential alternative site in an attempt to find a location for the Project that would utilize fewer acres of prime farmland and presents evidence that Lake Wilson Solar was unable to find a feasible or prudent alternative to the Project and therefore satisfies the prime farmland exclusion rule (see **Section 4.3.1.1** below and **Appendix B**).

2.5 Alternatives Considered but Rejected

In accordance with Minn. Stat. §216E.04, Subd. 2(8), the Project qualifies for the alternative review process under Minn. Admin. R. 7850.2800-7850-3900 because it is a large electric power generating plant that is powered by solar energy. As such, Lake Wilson Solar is not required to analyze alternative sites pursuant to Minn. Admin. R. 7850.3100 unless it rejected alternative sites. Lake Wilson Solar did seek and analyze other areas in Minnesota where the Project could have been sited to be compliant with the prime farmland exclusion rule (see **Section 4.3.1.1** below and **Appendix B)**. However, these areas were determined to not be feasible or prudent for siting the Project and were not carried forward as Project alternatives. No site control leases or easements are held on the areas by Lake Wilson Solar or its affiliates.

Lake Wilson Solar selected the proposed Project Area due to minimal environmental and prime farmland impacts, proximity to the electrical grid and existing transmission infrastructure, willing landowner participation, and available capacity on the grid to which the Project will interconnect. The proposed Project Area has changed a number of times since the Project's inception. The Project was initially planned on a larger footprint that extended to the west of the currently proposed Project Area. In November of 2021, this initial iteration of the Project Area covered

3,318 acres (November 2021 Project Area).[7] As part of the development process, Lake Wilson Solar consulted with Murray County, the MNDNR, and U.S. Fish and Wildlife Service (USFWS) and conducted environmental studies. The studies and consultations identified low-lying areas that presented flooding concerns and a greater concentration of wetlands, waterbodies and other natural resources in the western part of the November 2021 Project Area. The Project Area was redrawn to avoid development in the western portions of the November 2021 Project Area to minimize the Project's impact to the identified resources.

2.6 Cost Analysis

Lake Wilson Solar estimates the total installed capital cost for the entire Project will be approximately $450 to $500 million, as broken down in **Table 5** below. Actual capital costs depend on various factors such as construction labor, Project equipment and materials, electrical and communication systems, taxes/tariffs, final design considerations (e.g., access roads, O&M Facility, etc.), as well as potential ongoing impacts from COVID-19.

Operating costs are estimated to be approximately $2.6 million per year. Primary costs for O&M of the Project are associated with operation labor, vegetation management, snow clearing, solar array and BESS inspection and maintenance, applicable overall facility inspections, and other asset management related items.

Table 5: Estimated Project Costs

Task	Cost
Development, Financing, Engineering, Procurement & Construction (Panels, Panel Racking, Cabling, Batteries, Battery Rack, Inverters, Fencing, Transformers, Construction Contractor/Labor)	$437-483 million
Interconnection	$12-15 million
Project Gen-Tie Line	$1-2 million
Project Total	$450-500 million

2.7 Future Expansion

Lake Wilson Solar has no plans to expand the proposed Project at this time. Lake Wilson Solar executed a GIA with MISO and Northern States Power Company on June 14, 2022, for 170 MWac of solar energy generation and storage (150 MWac and 20 MWac for the J874 and J1045 interconnection studies, respectively). This GIA replaces and supersedes the GIA executed on September 30, 2021.

[7] The November 2021 iteration of the Project Area is shown in the maps accompanying agency coordination letters included in Appendix H-1.

3.0 Engineering and Operational Design

The following describes the Project design, facility equipment, Balance of Plant (BOP) components, O&M Facility, security fencing and access to the Project. The Preliminary Facility Design is shown in **Figure 4** (see also the Preliminary Site Plan in **Appendix C**).

3.1 Design

The Project's primary components include PV solar modules mounted on a single axis tracking system (**Image 1**), centralized inverters, a Project Substation, BESS, Project Gen-Tie Line, electrical collection cables, an O&M facility, fencing, and access roads (**Figure 4** and **Appendix C**). Up to ten weather stations are proposed throughout the Preliminary Development Area. The weather stations would likely be up to 15 feet in height and used to collect relevant weather data that correlates to the plant's performance. A new Xcel Switchyard, as well as a 250-300-foot-long Xcel Line Tap will be permitted, constructed, owned, and operated by Xcel Energy.

Solar energy generation begins with the installed solar modules converting energy from sunlight into direct current (DC) electrical power. Power blocks of tracker rows are electrically connected in series by DC cabling, which terminate at an inverter. Inverters convert the DC power from the modules to 34.5 kV AC power. AC electrical collection cables connect the inverters to the Project Substation where the power is then stepped-up by one or more main power transformers (MPT) from 34.5 kV to 115 kV, which is equal to the voltage of the existing transmission infrastructure associated with the Xcel Energy Fenton - Chanarambie 115 kV HVTL.

Image 1: Typical Solar Tracker Rows and Agricultural Fencing

3.1.1 Photovoltaic Arrays and Solar Field

For descriptive purposes, an individual tracker row is used as a basic unit of the Project. A tracker row is made up of modules mounted on a flat-beam-oriented north-south, with a break in the middle where the gear box is located. Lake Wilson Solar proposes to use modules affixed to tracking mechanisms that would allow the modules to "track" the sun from east to west on a daily basis. The modules and tracking rack system are generally aligned in rows oriented north and south with the PV solar modules 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 modules are rotated by a small motor connected to the tracking rack system to slowly track with the sun throughout the day (**Image 2**). The tracking rack system allows the Project to optimize the angle of the modules in relation to the sun throughout the day, thereby maximizing production of electricity and the capacity value of the Project.

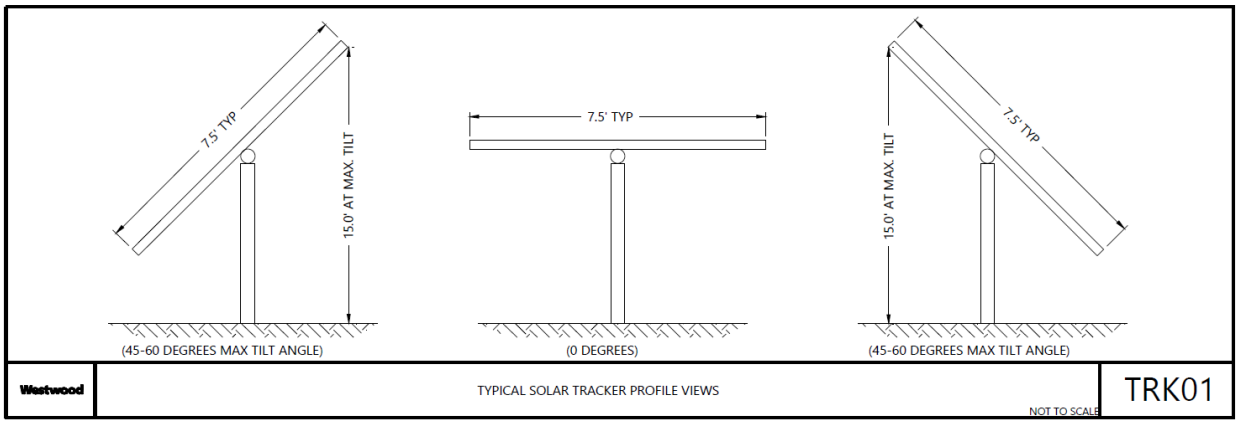

Image 2: Typical Solar Tracker Profile

When the sun is directly overhead, the PV solar modules will be at a zero-degree angle (level to the ground) and approximately four to seven feet off the ground. The tracker rows will follow the sun from a maximum of approximately 60 degrees east to 60 degrees west through the course of the day (the design tilt may vary). At the approximate maximum tilt of 60 degrees, the edge of the modules will be a maximum of 15 feet off the ground, and a minimum of 1 foot off the ground or greater, as determined by site specific constraints. The design will involve no spinning machinery (except for the tracker motor), no thermal cycle, and no water use (except for possible infrequent module washing).

The racking system consists of all the components involved in fastening the modules to the tracker rows, plus the tracker beams, gearboxes, motors, and pier foundations. To the extent practical, the racking system foundations will be driven piers and will not require concrete, as determined in an August 2020 Preliminary Geotechnical Report completed by Terracon Consultants, Inc. Some concrete stabilized foundations may be required depending upon site specific soil conditions, and ancillary equipment and structures may be supported on mat foundations or spread footings.

Driven pier foundations are typically driven 8-15 feet into the ground depending on site specific soils. The depth to which pier foundations will be installed for the Project will be determined in final design.

A specific PV solar module has not yet been selected for the Project. The proposed module at the time of this application submittal is the LONGi LR5 72HBD. Several other manufacturers are under consideration, including modules manufactured by Jinko, Canadian Solar, Hanwha, JA Solar, Risen, Seraphim, Talesun, Hyperion Solar (Runergy), and Trina. It is possible that new solar modules could be introduced to the market prior to construction and those modules could increase the efficiency or cost-effectiveness of the Project (e.g., higher efficiency or higher wattage per module options). As such, it is important to maintain as much flexibility in the individual supplier and technology choice as possible until just before procurement to ensure selection of the best equipment to fit the Project at that time. Selection of newer, higher wattage equipment that may become available before the Project goes to construction could potentially reduce the overall footprint of the Project while increasing efficiency and performance. All modules under consideration are mono- or poly-crystalline models. Lake Wilson Solar will consider the costs and performance of each technology option, as well as environmental and safety standards, when making its final selection. This process has been included in the proposed Project timeline and the final selection should not alter the Project scope, timeframe, or budget.

A specific racking and tracker selection has not been made. The NexTracker Horizon Gen 3 SPT is under consideration, as well as racking and tracker vendors including: the ATI DuraTrack, GameChange Solar's Genius Tracker, PV Hardware's Axone/Monoline, and Soltect's SF7/SF7 Bifacial model. Racking infrastructure and trackers will be selected closer to the procurement stage to ensure performance standards are met.

3.1.2 Project Substation

The Project Substation is proposed in the southwestern part of the Project Area (see **Figure 2**). The Project Substation is estimated to occupy approximately 3.7 acres of land. The Project Substation will consist of high voltage electrical structures (i.e., poles), breakers, one or two MPTs to step-up the power from the 34.5 kV feeders to the grid voltage of 115 kV, metering and related equipment for connecting to the transmission grid, lightning protection, and control equipment according to the specifications of the GIA with MISO and Xcel.

Underground 34.5 kV collector lines from the inverters will deliver solar generated energy to the Project Substation. The 34.5 kV collector system voltage will then be stepped up to the interconnection voltage of 115 kV by one or two MPTs located at the Project Substation and transmitted to the new Xcel Switchyard via a 200-400 feet long overhead 115 kV Project Gen-Tie Line in a single span between dead-end structures (**Image 3**).

Image 3: Typical A-Frame Deadend Structure

The current design includes a set of A-frame dead-end structures (up to 100 feet in height) located within the Project Substation and in the Xcel Switchyard, which will be connected via conductors in a single short span. Final layout and design of these facilities may require use of intermediate tangent structures if the span length is increased from what is expected at this time. In that case, a single dead-end structure will be located within the Project Substation, and additional tangent pole structures will route the Project Gen-Tie Line from the Project Substation to the Xcel Switchyard. The number of poles and length of 115 kV Project Gen-Tie Line are pending final engineering and design. The tangent structures will likely be made of wood or metal and will be up to 100 feet tall (**Image 4**).

The type of conductor will be determined following the completion of detailed electrical design. The new Xcel Switchyard will be connected via an in/out 115 kV transmission Xcel Line Tap to the existing Xcel Energy Fenton - Chanarambie 115 kV HVTL. As discussed above, Lake Wilson Solar will acquire land rights for these facilities, and Xcel Energy will design, permit, construct, own and operate the Xcel Switchyard and the Xcel Line Tap.

The Project Substation location will be graded, the ground surface dressed with crushed rock, and secondary containment areas for the transformer(s) will be installed. The fenced area of the Project Substation footprint will be approximately 320’ x 305’ in size (subject to final Project Substation design and layout). The area within the Project Substation fence will be graveled to minimize vegetation growth and reduce fire risk. The Project Substation will likely be fenced with a 7-foot chain-link fence topped with one foot of barbed wire in accordance with North American Electric Reliability Corporation (NERC) requirements for security and safety purposes. The Project Substation will include a parking area, secured with a lockable gate, and will be accessible to qualified, trained Project operational personnel or those escorted by such personnel at all times using the Project’s access roads.

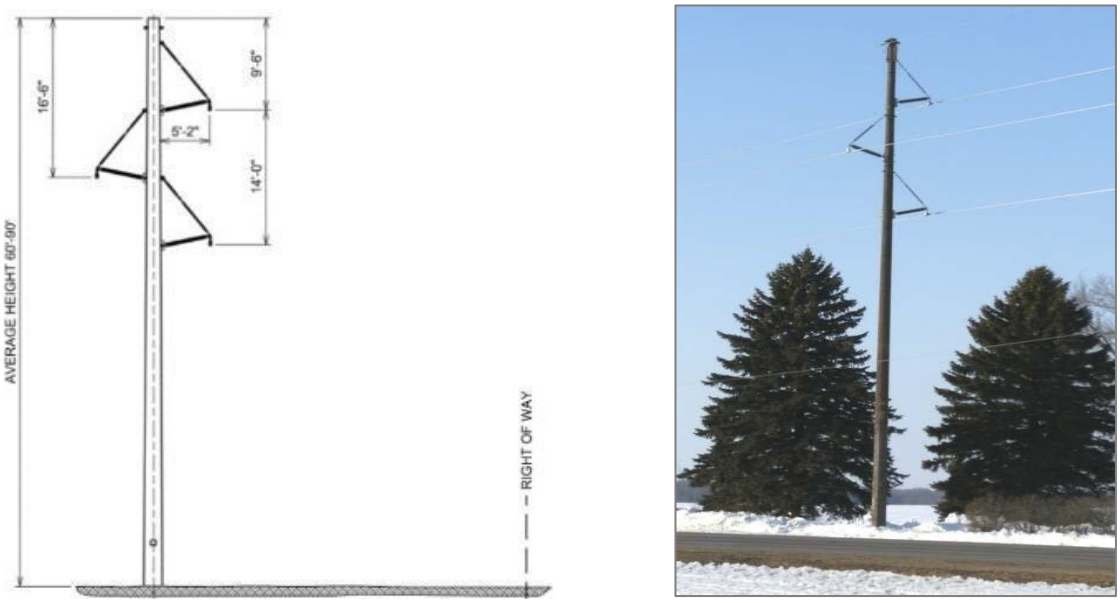

Image 4: Typical Overhead Transmission Line Structure

3.1.3 Xcel Switchyard

The proposed new Xcel Switchyard will be used to interconnect the Project to the existing Xcel Energy Fenton - Chanarambie 115 kV HVTL, which travels north-south along the eastern edge of 70th Avenue, adjacent to the western portion of the Project Area and travels west at the intersection of 70th Avenue and 91st Street (see **Figure 3 and 4**). The Xcel Switchyard and Xcel Line Tap are not part of the Project, but descriptions of this infrastructure are included in this SP Application for the purposes of characterizing the environmental impacts of the Project and the ancillary facilities that will be constructed to connect the Project to the grid. Soil corrections, if determined to be necessary by Xcel Energy, will be made as part of site clearing and preparation prior to construction of the new Xcel Switchyard. Foundations will then be installed, and the new Xcel Switchyard area will be graded, with the ground surface dressed with crushed rock. The new Xcel Switchyard will be fenced-in and protected according to NERC requirements for security and safety purposes.

The Xcel Line Tap will be installed in a new easement area from the existing Xcel Energy Fenton - Chanarambie 115 kV HVTL to the new Xcel Switchyard to interconnect the Project to the grid. The length of each of these new lines going to the Switchyard, will be approximately 250-300 feet and will include installation of either two dead-end pole structures (for single dead-ends) or six dead-ends (for 3-pole dead-ends), depending on Xcel Energy's selected design and required electric conductors. Lake Wilson Solar will acquire land (via a purchase option agreement) needed for the new Xcel Switchyard and for the anticipated in/out Xcel Line Tap to the tap location. Xcel Energy will permit, design/engineer and construct the switching facility following its requirements and standards. Upon completion of these tasks, Lake Wilson Solar will transfer the land interests associated with the new Xcel Switchyard site and transmission line easement to Xcel Energy, who

will then own and operate the new Xcel Switchyard and associated Xcel Line Tap between the Xcel Switchyard and Fenton - Chanarambie 115 kV HVTL.

3.1.4 Battery Energy Storage System (BESS)

The purpose of the proposed BESS is to firm, smooth, or shift energy output generated by the Project as it is distributed to the overall electric grid. The BESS component is in part designed to reduce costs for interconnection customers and improve wholesale market competition, allowing Lake Wilson Solar to create additional energy and capacity value by maximizing the use of interconnection facilities and network upgrades necessary to accommodate the solar generation component of the Project.

The BESS will dispatch stored power during times when less solar energy is being produced. For example, during off-peak times, if the Project is producing 100 MWac of solar generation, the BESS could dispatch up to an additional 70 MWac of power to fully utilize the 170 MWac of capacity allowed under the GIA. A BESS is accredited capacity based generally on its ability to provide the energy equivalent of its claimed capacity for a minimum of at least four continuous hours each day.

Lake Wilson Solar anticipates a centralized, AC-coupled system for the BESS (i.e., all batteries being in one location as opposed to distributed throughout the Project), which would have a footprint of approximately 4 acres by itself, and approximately 6 acres including setbacks and fencing. This type of system allows for more efficient access, monitoring, and maintenance; has more flexible energy and power capacity sizing; and has more flexible dispatch capabilities. The centralized design is also more technologically developed. The preliminary designs for the BESS components incorporate a modular layout based on currently available technology, which provides a conservative analysis of the potential overall size of the BESS. Battery systems produced by several manufacturers are under consideration for the Project, including but not limited to General Electric and Powin. Lake Wilson Solar will analyze current market offerings during final engineering to make a selection on the specific battery system model. Examples of some of the battery systems under consideration and their technical specifications can be found in **Appendix D**.

Image 5: Example of a BESS Containers

The BESS will be configured of battery cells arranged in modules for efficient operations. The batteries will be housed in racks within a series of standard ISO-style steel shipping containers, outdoor-rated modular enclosures, or similar enclosures. Standalone enclosures are necessary, as opposed to a large warehouse or storage building, to ensure people cannot enter into the enclosures with the batteries for safety reasons as described in **Section 3.1.4.1** below. The land will be graded, and the enclosures will be installed on concrete pad/pier or steel beam foundations (see **Image 5**). The BESS will include rows of inverters and medium voltage transformers to transfer the energy to and from the batteries (power conversion system). The BESS yard will be filled with crushed rock yard-stone.

Visually, the impact of the BESS would not be entirely out of character with the rest of the Project as the enclosures are relatively low height. As provided in **Appendix D**, standard battery storage enclosures are typically 20 feet long, 8 feet wide, and 9.5 feet high (20 ft x 8 ft x 9.5 ft). From the BESS container, low voltage DC cables will connect to an inverter, pad-mounted transfer and a feeder cabling to a common bus which will connect directly to the Project Substation. The Project Substation, Xcel Switchyard and Xcel Line Tap will be constructed to connect the Project to the Fenton - Chanarambie 115 kV HVTL. Additionally, stabilized gravel access roads and perimeter fencing will be provided. As with the substation, fencing for the BESS will likely be a 7-foot chain-link fence topped with one foot of barbed wire in accordance with security requirements. **Appendix D** displays the general proposed BESS arrangement for the Project.

The BESS industry is currently deploying two main types of lithium-ion battery chemistries: nickel manganese cobalt oxide (NMC), and lithium iron phosphate (LFP). Lake Wilson Solar intends to use LFP due to its superior safety profile when compared to NMC. Technology related to solar generation and battery storage is advancing at a rapid pace. Similar to other infrastructure components such as solar panels, the options available for the BESS when the Project begins procuring infrastructure could be significantly more advanced than those currently available. As such, it is important to maintain as much flexibility in the individual supplier and technology choice as possible until just before procurement to ensure selection of the best equipment to fit the Project at that time.

3.1.4.1 BESS Safety

Safety will be Lake Wilson Solar's foremost principle during construction and operation. Safe design and operation of the BESS begins with safe equipment and compliance with safety codes, regulations, and industry recommendations. The industry has developed detailed recommendations related to fire hazards associated with a BESS based on the McMicken fire incident in Arizona, which involved a BESS housed in a building that caught fire and firefighters were injured when they entered the building to put out the fire. That incident heightened industry concerns related to fire safety and resulted in improved fire-safety practices, as described in the McMicken Battery Energy Storage System Event Technical Analysis and Recommendations.[8] The McMicken project used a cell chemistry that is more prone to thermal runaway and fire, compared to LFP, and the batteries were housed inside a building that required people to enter into the building to access the batteries in cases of emergency. To prevent future incidents, the industry needs to comply with the newly developed industry standards, including National Fire Protection Association 855 (NFPA 855) (2023), which did not exist at the time the McMicken BESS was constructed. Lake Wilson Solar will stay abreast of new codes and standards to ensure its equipment vendors and designs comply with industry standards and best practices.

Lake Wilson Solar has proactively incorporated all reasonable safety precautions into the design of the proposed BESS. First, the BESS system will incorporate LFP batteries. LFP batteries are more stable than NMC and have a lower risk for thermal runaway propagation or a deflagration event, which means in the unlikely event of a battery cell failure, the failure is less likely to spread.

Second, Lake Wilson Solar's equipment suppliers manufacture to stringent quality standards, and equipment must be tested and certified by third party professionals. Standards, certifications, and code requirements from multiple nationally recognized organizations will be required for the engineering, design, manufacture, and testing of the enclosures and equipment included in the

[8] See https://www.aps.com/-/media/APS/APSCOM-PDFs/About/Our-Company/Newsroom/McMickenFinalTechnicalReport.ashx?la=en&hash=50335FB5098D9858BFD276C40FA54FCE. Accessed on November 11, 2022.

BESS. The BESS equipment will be stringently tested to prominent safety standards, including UL 1973, UL 1741, UL 9540, UL 9540A, and UN 38.3. BESS design shall comply with International Fire Code 2018 (IFC)[9], (NFPA 855), and National Electric Code (NFPA 70). For example, equipment suppliers will be required to perform the UL 9540A Large Scale Fire Test, which is a "Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems." The equipment procured must show that a thermal runaway event does not propagate from one battery rack to another. For this test, a third-party, Nationally Recognized Testing Laboratory will generate conditions, through external heating, overcharging, or other, to initiate thermal runaway in a battery cell. The thermal runaway characteristics are observed and quantified, including gas generation/composition. These tests and reports allow stakeholders to understand the potential hazards posed by the specific batteries to ensure that the appropriate safety features are incorporated based upon the results, as required by NFPA 855 and IFC.

Third, the BESS will include a complex monitoring system that monitors many different aspects within the system. Each battery system is equipped with cell level, module level, rack level, and system level monitoring points. These points produce real-time data that feeds into automatic control logic housed in the battery management system (BMS) and site controller. The BMS and site controller ensure that both BESS components of the Project are operating within the original equipment manufacturer's operating parameters and warranty requirements. If any operating limit is exceeded or an alarm is triggered, either a fault signal is sent to the whole battery string to disconnect from the inverter, or the rack contacts will open to disconnect individual racks. This real-time, automated system is designed to identify operational malfunctions or other safety hazards immediately and prevent incidents.

Fourth, the BESS will be certified to NFPA 69 (Standard on Explosion Prevention Systems). The HVAC system within each enclosure will evacuate combustible gases in the unlikely event of a battery off-gas failure. The ventilation system is designed to dilute any combustible gases to well below their lower flammability limit. In addition, the emergency response plan for the project will provide minimum approach distances for first responders and will require any first responder to wear a self-contained breathing apparatus if they need to enter the minimum approach distance. Safety studies and a hazard mitigation analysis will ensure the system is designed to not present any risks to human safety. The BESS also incorporates backup diesel generators to ensure this function can still be activated when there is a grid failure or power outage. The backup generators will be sized to provide at least two hours of standby power consistent with NFPA requirements and will be mounted on a concrete foundation.

Fifth, Lake Wilson Solar plans to house the BESS in separate containers rather than one building. A non-occupiable containerized solution provides natural segmentation and spatial separation of the BESS components, greatly reducing the risk of fire propagation at the Project and preventing

[9] The 2018 version of the International Fire Code is incorporated by reference into Minnesota Rules pursuant to Minn. Admin. R. 7511.0090.

people from getting trapped inside if a fire occurs. Although this design requires a larger overall footprint than a single building, it is an appropriate consideration for safety because it allows the components to be further apart to isolate and contain any unlikely incident. Outdoor enclosures will be external access only and will include auxiliary equipment for fire detection, annunciation, and thermal management systems. Enclosure design that does not allow human entry is also an important safe design consideration to allow access to the batteries in the event of an emergency and to avoid human entrapment inside of a building.

Finally, Lake Wilson Solar is committed to providing training resources for local responders, as well as the collaborative development of an emergency response plan ("ERP") specific to this Project. Lake Wilson Solar will work with local first responders to develop a site-specific ERP. The Project's ERP will require quarterly safety drills for the Project team and annual safety training with local first responders. The ERP for this Project would cover a wide breadth of possible incidents at the site and would include emergency procedures to be followed in case of fire, medical emergencies, and other potential situations. Lake Wilson Solar will initiate this process with an in-person or virtual meeting with local responders prior to the Project's operations date.

3.1.5 Balance of Plant Equipment

The electric collection system components include electrical cables and accessories, conduit, inverter pads, switchgears, step up transformers, SCADA system, and metering equipment. Electrical wiring will connect the PV solar modules to inverters which will convert solar energy generated power from DC to AC. Power inverters convert approximately 1,500 volts of DC power output from the PV solar modules to between 600-660 volts of AC power depending on the inverter selected. A step-up transformer then converts the AC voltage to an intermediate voltage of 34.5 kV. Collection cables then carry the 34.5 kV power to the BESS and/or Project Substation (see **Section 3.1.2** above). Step-up transformers are located with each of the inverters. The total length of the Project electrical collection system is approximately 441,000 linear feet (LF).

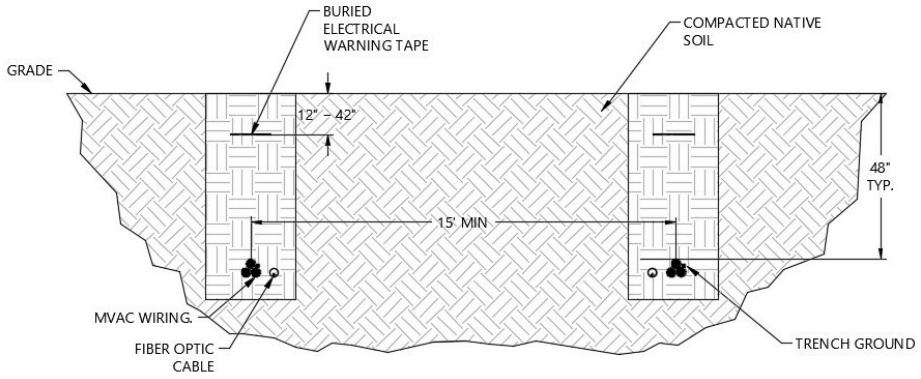

Image 6: Typical Solar Collection Trenches for Cables

The DC electrical collection cabling will be installed either below ground or underhung beneath the PV solar modules and racking via the CAB system.[10] The CAB system is a cable management system that delivers a safe, strong, and durable support for utility-scale wiring for ground-mount solar power generation facilities. CAB systems are quick and easy to install and provide potential labor and material cost benefits on solar projects. If buried, the underground trench will be approximately 2-5 feet below ground and 1-2 feet wide for AC cabling, or 4-10 feet wide for DC cabling (**Image 5**). Excavation and refilling the trench will be conducted in accordance with the Section 5.7 of the Agricultural Impact Mitigation Plan (AIMP) (**Appendix E**).

Inverter skids will be installed at locations throughout the Preliminary Development Area. Each skid includes a DC to AC inverter and a step-up transformer to which the inverters will feed electricity. The final number of inverters for the Project will depend on the inverter size, as well as inverter and panel availability. To represent maximum potential impacts, the Project's preliminary design proposes 55 inverter skids as shown on **Figures 3 and 4** and on the Preliminary Site Plan in **Appendix C**.

The inverter skids are located within the interior fenced portion of the Project along access roads. Skids provide the steel foundation for the enclosed inverter, step-up transformer, and SCADA system. **Image 7 shows one example of a potential inverter skid. The actual inverter skid selected may differ in size and appearance from that shown on Image 7**. The height of a skid is approximately 6-10 feet above grade. Typical pad mounted transformers that will be located on the inverter skids are approximately 10 ft wide and long, and approximately 8 - 10 ft tall. The skids will be placed atop a poured reinforced concrete slab or pile foundations and will typically measure 10 feet wide by 20 feet long, with final dimensions to be determined during detailed design by the contracted engineer and will be influenced by the inverter make and model. If a

[10] In this option some Project construction locations may install the CAB system on pile foundations (without racking) to connect the DC cables to the inverter/equipment pad.

concrete pad is used, the selected contractor will provide the concrete pad. Concrete foundations will be poured onsite or precast and assembled off-site.

Image 7: Example of Inverter Skid (DC Cables Buried)

A specific solar inverter has not yet been selected for the Project. Preliminary designs modeled use of the Power Electronics FS4200M Unit. However, several other models and vendors are under consideration, including units manufactured by FIMER, TMEIC, GE, SMA, and Sungrow. Lake Wilson Solar will consider the costs and performance of each option as well as environmental and safety standards when making its final selection.

Each inverter pad will also include one or more transformers to which the inverters will feed electricity (**Images 6 and 7** show the option where DC cables are buried). Inverters convert the DC output of the PV solar modules to AC, which is required for delivery to the electrical grid. After the inverter has converted the electricity, it is stepped-up via a transformer from low voltage to medium or intermediate voltage (stepped up to 34.5 kV). The final number of inverters for the Project will depend on the inverter size, inverter, and module availability, as well as the final array configuration. For the purposes of generation estimates, Lake Wilson Solar modelled the Power Electronics FS4200M Unit.

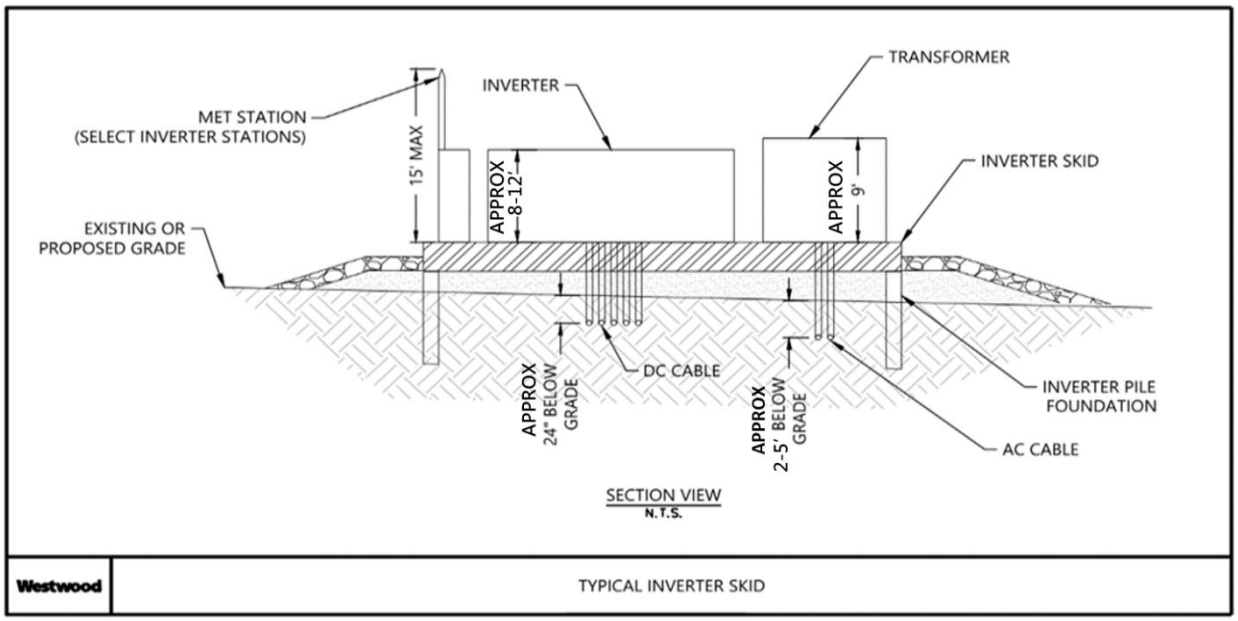

Image 8: Typical Solar Inverter Skid (DC Cables Buried)

The final type of electrical system will be determined prior to construction based on technology, availability of materials, and costs. Below-ground AC electric conductor collection lines will transfer the converted 34.5 kV AC electricity from the inverter equipment (which is assembled on skids and delivered to the Project as a package) to the Project Substation. During trench excavations, the topsoil and subsoil will be removed and stockpiled separately in accordance with the AIMP (see **Appendix E**). Once the electric conductor collection lines are laid in the trench, the trench will be backfilled with subsoil followed by segregated topsoil. Electrical collection technology is changing and will be site-specific depending on geotechnical analysis, constructability, and availability of materials. Final engineering and procurement recommendations will help determine the construction method for the electrical collection system.

The depth to cables may be deeper for installation under existing utilities or other features requiring avoidance. The specific electrical collection technology used will be site-specific depending on geotechnical analysis, constructability, and availability of materials. Final engineering and procurement will help determine the construction method for the electrical collection system. Underground cabling will be installed in accordance with Section 3.5 of the AIMP.

3.1.6 Operations and Maintenance Facility

The O&M facility would accommodate a permanent O&M building, parking area, and other associated facilities such as a security gate, lighting, and signage. The permanent O&M building would house administrative and maintenance equipment and personnel.

The O&M facility will be constructed on approximately 0.75 acre and co-located near the Project Substation and Xcel Switchyard with access from 70th Avenue (**Figures 3 and 4** and **Appendix C**). The O&M facility will be used to conduct maintenance and repair of Project equipment and solar module components, store parts and other equipment, and store other operation and maintenance supplies. The O&M facility will be locked when not in use by Project staff, and it will also store the SCADA system that will remotely monitor Project facilities. A parking area will be located adjacent to the O&M facility for staff use. During construction of the Project, temporary laydown yards/staging areas may be located near the planned O&M facility site. Upon completion of Project construction, these temporary areas will be returned to their original condition if not used as part of other Project facilities.

3.1.7 Fencing

Permanent security fencing will be installed along the perimeter of each grouping of the solar arrays (see **Figure 4** and **Appendix C**). Fencing will consist of a lightweight agricultural woven wire (containing wire "knots" wrapped around each intersecting wire) secured to wooden posts which will be directly embedded in the soil or set in concrete foundations as required for structural integrity (see **Image 1**). The fencing will extend a maximum total height of approximately 8 feet above grade. Barbed wire will not be used at the top of the fence around the Project arrays/construction units. "High Voltage Keep Out" signs will be placed in accordance with National Electric Code (NEC) requirements along the fence line. This fencing will be designed to prevent the public and larger wildlife from gaining access to solar array electrical equipment, which could cause harm or injury.

To comply with the NEC, security fencing around the Project Substation will likely consist of a 7-foot chain-link fence with one foot of barbed wire at the top (8-foot total height). High voltage warning signs will also be installed on the Project Substation fence. A lockable gate will be installed with the Project Substation site fencing. This fencing and gate will be designed to prevent the public and wildlife from gaining access to electrical equipment, which could cause injury.

3.1.8 Access Roads/Transportation System

The Project will include up to 11.5 miles of graveled access roads that lead to the inverters and other infrastructure for O&M activities (**Figure 4**). Access roads may be temporarily wider during construction and then reduced in width for long-term site access upon completion. The final length of the access roads will depend on the equipment selected and final engineering. These roads are typically 12-20 feet wide along straight portions of the roads and wider along curves at internal road intersections (approximately 45 feet). **Image 9** depicts the typical profile of an access road. Gates will be installed at access road entrances at public roads or at access road entrances near transmission lines.

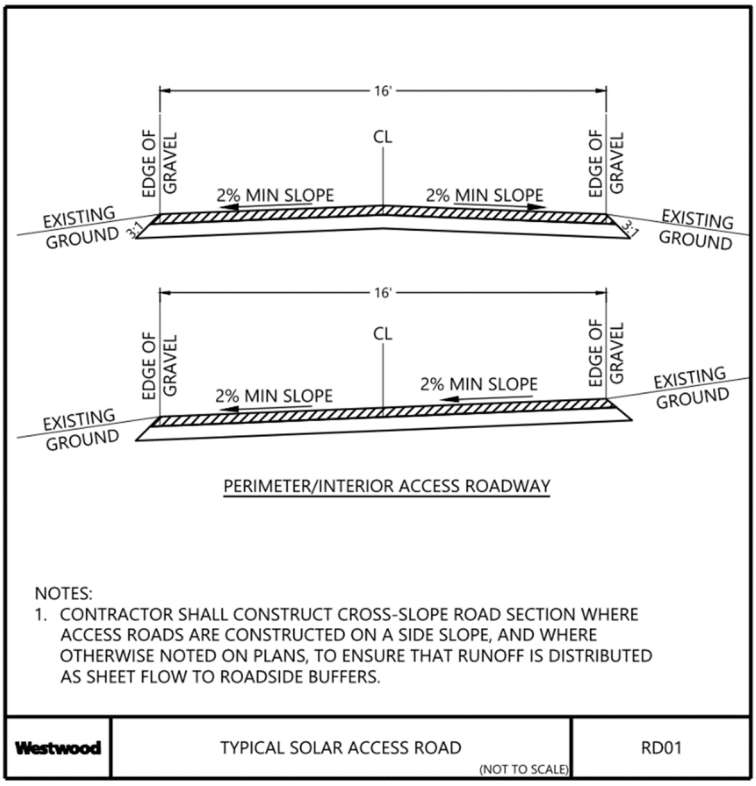

Image 9: Typical Solar Access Road Profile

Some upgrades or other changes to the public roads may be required for construction or operation of the Project. Lake Wilson Solar will work with Murray County and Leeds Township to facilitate upgrades to meet required standards and with landowners for final design considerations, as needed. Upgrades or changes could include, but are not limited to, road improvements, additional aggregate, and driveway changes. Lake Wilson Solar will continue to coordinate with County and State Road authorities as the Project develops. Driveway changes using Township or County roadways will require an access permit from Murray County, which will be obtained prior to construction.

Lake Wilson Solar will obtain relevant permits from road authorities relating to access to the Project through public roads, as well as installation of temporary facilities that may be proposed to occupy portions of public road rights-of-way during the construction process. Lake Wilson Solar will also obtain relevant permits and/or authorizations from road authorities relating to electric cables and/or feeder lines that may be placed in or across a public road right-of-way.

3.1.9 Pipeline System

No pipeline system will be built, accessed, or needed to accomplish the Project. As no pipelines will be needed for the Project, this section is not applicable to the Application. There are no existing pipelines in the Project Area.

3.2 Project Layout

The Project's final layout will optimize electrical generation and efficiency of the proposed solar Project while avoiding and minimizing human settlement, environmental, cultural resources, and infrastructure impacts. The Project's facilities will be sited to comply with the County's setback requirements, where feasible, and will also comply with other local, state, and federal regulatory standards. The preliminary Project layout can be found on **Figure 4** (see also **Appendix C**).

3.2.1 Setbacks

The Project is considered a Large Electric Power Facility as defined in Minn. Stat. § 216E.01, Subd. 6 and Minn. Admin. R. 7850.1000, Subp. 13 and is therefore permitted by the MPUC under Minn. Stat. § 216E and Minn. Admin. R. 7850.2800-3900. In designing the Project layout, Lake Wilson Solar reviewed applicable setbacks and related requirements. While applicable rules and regulations for siting an LEF and LEGF do not require projects to meet local ordinances, Lake Wilson Solar has attempted to incorporate County setbacks and applicable ordinance standards in addition to meeting applicable State requirements.

Because it has a nameplate capacity of more than 40 kilowatts, the Project would be considered a "Solar energy system, large" (large solar energy system) under Section 402 of the Murray County Zoning Ordinance if it were subject to County jurisdiction. The Project Area mainly consists of cultivated land and is zoned as Agricultural (A) according to Murray County Zoning information.

The setback regulations and distances for large solar energy systems in the County are included in **Table 6** and incorporated into the preliminary design plans depicted in **Figure 4** and **Appendix C**. Where setbacks differed for the same feature, Lake Wilson Solar used the most stringent setback when possible.

As indicated in **Table 6** below, the Project design setbacks meet or exceed the County's setback requirements as provided in the County's Renewable Energy Ordinance, Zoning Ordinance, and Buffer Ordinance. Lake Wilson Solar is committed to continually working with the county to meet setback requirements where feasible. In addition, all MNDNR buffer requirements under Minn. Stat. § 103F.48 have been met. In addition to these quantitative siting parameters, Lake Wilson Solar will meet all applicable standards of the County's Renewable Energy Ordinance.

Table 6: Murray County Setback Requirements

Setback Type	County Setback Distance (feet)	Project Design Setback (feet) (closest to array)*
Property lines (side and rear yards)	30	>50 from non-participating property boundaries
Public road right-of-way (from array)	100	>100
Public road right-of-way (from fencing and all accessory structures)	50	>50

Primary structure on adjacent properties	200	>238 from nearest non-participating residence
Buffer protection waters	50 average, 30 minimum	>50 average >30 minimum
Shoreland (from river, stream, landward extent of floodplain)	300	>300
Shoreland (from ordinary high-water level of a lake pond or flowage)	1,000	>1,000
*Based on current preliminary design and currently built infrastructure within the Project Area. Final distances may vary but, in any case, Lake Wilson Solar will work with the county to meet minimum setback requirements where feasible.		

Additionally, Lake Wilson Solar implemented their own internal setback best management practices into the Project design as detailed in **Table 7**. Setbacks are calculated as the distance from the nearest solar array (**Figure 4** and **Appendix C**).

Table 7: Lake Wilson Solar Initiated Setbacks

Setback Type	Project Design Setback (feet) (closest to array)
Wetlands	100
Transmission lines	75

3.2.2 Project Development Area

Table 8 describes the Project facilities' estimated acreage within the approximately 1,526-acre Preliminary Development Area based on the preliminary design configurations (see **Figure 4**).

Table 8: Estimated Project Component Acreages in Preliminary Development Area

Project Component	Acres
Access Roads	61.8
Inverters	2.6
Project Substation	3.7
Switchyard	0.7
BESS	5.3
Project O&M Facility	0.7
Temporary Laydown Areas	9.5
Solar Modules (excludes vegetated spacing between modules)	364.5
Collection Lines	93.3
Stormwater Facilities	26.0
Unused Area (acreage within the Preliminary Development Area with no facilities, including vegetated spacing between modules)	953.9
Total	**1526.0**

3.3 Construction, Commissioning, Restoration, Operation and Maintenance

A variety of activities must be completed to carry the Project through construction and into operation. Below is a preliminary list of activities necessary to develop the Project. Pre-construction activities will be completed between submittal of this Application and the start of construction. Pre-construction, construction, and post-construction activities for the Project include:

- Pre-construction
  - Geotechnical analysis;
  - Underground utility identification and location;
  - Design Project Substation;
  - Design solar array, access roads, electric collection system and BESS; and
  - Procure necessary facility components (e.g., solar modules, tracking system, inverters, BESS and transformers).
- Construction
  - Site preparation, grubbing, grading, and vegetation establishment;
  - Construct laydown areas and set up temporary job site trailers;
  - Civil construction of access roads;
  - Construct fencing;
  - Install PV pile foundation posts;
  - Tracker installation;
  - PV solar module installation;
  - Install below-ground or above-ground collection system;
  - Install electrical enclosure/inverters;
  - Construct Project Substation;
  - Construct O&M facility;
  - Construct Project Gen-Tie Line; and
  - Installation of BESS.
- Post-construction
  - Restore disturbed areas not intended for permanent above-ground facilities (Permanent above-ground facilities include the Project Substation and inverters skids and electrical cabinets, and access roads);
  - Test facility; and
  - Begin commercial operation.

3.3.1 Construction and Construction Management

Project construction will begin with workforce mobilization and the initial site preparation work, including grading, vegetation removal, and any necessary tree removal. A preliminary grading acreage estimate was generated using the proposed O&M site, BESS site, Substation site and preliminary access roads. This preliminary grading area is 58.5 acres. There also will be grading

in certain locations for the single axis tracking system, but grading quantities will not be determined until more advanced engineering and procurement has been completed.

As discussed in Section 3.2 of the AIMP, mass grading of the site will not be employed and will occur in discrete areas of the site to facilitate usage of the single axis tracking system, as well as for the access roads, BESS, and the Project Substation.

In this first phase of construction, general site improvements will be made, such as access improvements and preparation of the two proposed staging/laydown areas. Temporary staging/laydown areas are currently proposed to be approximately 3-10 acres each and located in the eastern and central portions of the Project Area. Any additional temporary laydown yards that may be used during construction would be located within the fenced array areas. The staging/laydown areas will be used for storage of construction materials and equipment shipping containers, receiving construction deliveries, and temporary parking for Project-related vehicles. Temporary construction offices will also be located onsite during construction.

The solar energy system (solar arrays and collection/distribution systems) will be installed next in conjunction with access roads within the arrays. The Project will be constructed in blocks, and multiple blocks will be constructed simultaneously.

Construction of the Project Substation will take place simultaneously with the solar arrays. Grading for the Project Substation foundation and future access roads will have already been completed with the grading that will be completed for other areas of the Project. The grounding grid, an underground conductive mesh to electrically ground equipment to earth's potential, and underground conduit will be installed in conjunction with the foundations for the transformer, control housing, and high voltage structures. The Project Substation equipment will then be delivered to the site and installed on the prepared foundations. Secondary containment areas for the transformer(s) will be constructed as necessary and finished grading will occur around the Project Substation. The last construction activities associated with the Project Substation include stringing the electrical wires, installing the perimeter fence, and placing course, clear crushed rock throughout the interior of the fenced area and three feet outside the fence.

Construction of the Xcel Switchyard may require minimal amounts of grading, which may be completed by Lake Wilson Solar's contractors, depending on construction timing, Xcel Energy's construction needs and Lake Wilson Solar's contractor availability. Further Xcel Switchyard construction activities will be completed by Xcel Energy. The final activities for the new Xcel Switchyard will be connecting the Project to the regional transmission grid via the Xcel Line Tap, as discussed in **Sections 3.1.2** and **3.1.3.**

The BESS construction is proposed to occur along with the arrays and Project Substation. Grading will be completed prior to installation of underground conduit. Additional site preparation will include installation of substructures and electrical equipment. The BESS will include BESS containers, inverters/power conversion systems, switchboards, medium voltage (MV) cabling, MV switchgear, a junction box, and an auxiliary transformer. The 0.75-acre O&M facility will be

located adjacent to the BESS, Project Substation, and Xcel Switchyard and will be constructed on the same timeline as the BESS, and Project Substation.

Onsite construction personnel will consist of laborers, craftspeople, supervisory personnel, construction management personnel, civil and construction trades, and administrative and support staff. Lake Wilson Solar will issue a Request for Proposal (RFP) to an Engineering, Procurement and Construction (EPC) contractor to construct the Project. Lake Wilson Solar will include preferences for contractor bids that utilize local construction craft employees to the greatest extent feasible in accordance with the Project's budget, timeline, industry standards and requirements, and corporate safety policies. The selected EPC contractor will work with labor unions, local subcontractors, or other vendors to implement a Project construction staffing model that attempts to maximize local hiring and local economic benefits for the Project to the extent practicable, while ensuring the Project is safely built on time and on budget.

Typical onsite construction staff levels will depend on the number of concurrent tasks being performed and the phasing of the Project. The Project will create up to approximately 250 jobs during the construction and installation phases, and approximately 5 full-time jobs during the operations phase.

Lake Wilson Solar estimates that there will be between 2 and 15 semitrucks used daily for equipment delivery during construction. During peak delivery for major equipment (trackers, inverters, and modules), the volume of traffic is estimated to be between 10 and 15 semi-trucks daily; this volume is estimated to only occur for 3-4 months. Truck traffic will be reduced for delivery periods preceding and succeeding the delivery of these components with an estimated volume of between 2 and 10 semitrucks daily. Light duty trucks will also be used on a daily basis for transportation of construction workers to and from the site.

Typical construction equipment such as scrapers, bulldozers, dump trucks, watering trucks, motor graders, vibratory compactors, and backhoes will be used during construction. Specialty construction equipment that may be used during construction will include:

- Skid steer loader;
- Pile driver;
- Medium duty crane;
- All-terrain forklift;
- Concrete truck and boom truck;
- High reach bucket truck; and
- Truck-mounted auger or drill rig.

Upon completion of construction, heavy equipment will be removed from the Project site.

3.3.2 Commissioning

Equipment inspections will be conducted prior to commercial operations of the proposed Project, and in compliance with applicable SP requirements. Inspection and testing will occur for each component of the solar array, as well as the associated communication, meteorological, collection, and SCADA systems. Testing, inspections, and commissioning will occur at periods during construction and upon completion of the construction phase.

3.3.3 Restoration

As portions of the Project near completion, temporary staging and laydown areas and other temporary disturbance areas will be restored. The Project will be graded to natural contours, where possible, and soil will be de-compacted in accordance with the Project AIMP. Disturbed areas will be reseeded and re-vegetated with specific seed mixes in accordance with the VSMP (**Appendix F**) and the Stormwater Pollution Prevention Plan (SWPPP). These seed mixes are designed to be used with the vegetation management practices of periodic mowing and selective spot herbicide applications. All areas that will not contain permanent facilities (area under the arrays and the laydown yards) will be stabilized with erosion control measures, such as silt fence, sediment control logs, temporary seeding, and mulching as needed, until permanent vegetation has been established. Lake Wilson Solar anticipates that the short-term establishment practices will occur from years 0-5, with long-term maintenance practices occurring from year 6 onward.

The VSMP provides a guide to site preparation, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation. The VSMP outlines vegetation management tasks during the establishment and maintenance phases, including monitoring for and treating invasive species, mowing, and re-seeding, as needed.

The Project will use an adaptive management approach for vegetation maintenance as outlined in the VSMP. Monitoring vegetation during the active growing season (June-September) is a key aspect of adaptive management. Consequently, site evaluations are planned during the vegetation establishment and maintenance phases. Monitoring will be useful in identifying issues, tracking progress, and reevaluating management needs.

The VSMP outlines several vegetation maintenance strategies that may be implemented at the Project, including mowing and selective herbicide use (see **Appendix F**). Mowing may be used when vegetation reaches a height of approximately 18-24 inches during the initial mowing period to bring it back to a height of roughly 4-6 inches and will help control weed species until the desired perennial vegetation becomes established. Herbicides will be employed only where it is determined that mowing alone will not accomplish perennial weed control.

3.3.4 Operation and Maintenance

Following commissioning and commercial operation, the care, custody, and control of the Project facilities transfers from the construction team to the operations staff. The construction manager works with the operations staff, the equipment suppliers, and other construction and maintenance personnel to ensure a smooth transition from the start of construction to the commercial operation date of the Project. The operations staff will have full responsibility for the facility to ensure operations and maintenance are conducted in compliance with approved permits, prudent industry practices, and the equipment manufacturer's recommendations.

The Project will be professionally maintained and operated by Lake Wilson Solar, an affiliate or a qualified contractor. Operations and maintenance activities for the BESS will be performed in coordination with the solar facility. Primary tasks include regularly scheduled inspection(s) of electrical equipment, vegetation management as well as snow removal on access drives, as needed.

The expected service life of the Project is 35 years or longer based on the useful commercial lifespan of modules, and Lake Wilson Solar estimates that the Project will result in up to five full-time positions to operate and maintain Project facilities. A maintenance plan will be created for the Project to ensure the performance of the solar facilities. Once construction is complete, the Solar Facility is expected to see three or four light-duty trucks on-site weekly with potentially more personnel on site at intervals associated with scheduled maintenance. The main scheduled activities are described in more detail in **Table 9** in **Section 3.3.4.5** below.

All maintenance activities will be performed by qualified personnel and will be performed during the day to the extent that they do not disrupt energy production. Activities that have the potential for substantial noise generation will be performed during the day to minimize impacts in areas where residents are present. It may be desirable to perform certain maintenance functions after sunset to minimize loss of power production.

The operation of the Project is partitioned, to a certain extent, to minimize the effect of unscheduled maintenance on overall energy production. As an example, if a module needs repair, that particular section of the array can be disconnected from the array by opening the combiner box circuit. The module can then be replaced and the combiner box circuit closed. Because of the way the facility is designed, a temporary shutdown such as this would result in only a minimal loss of production capability during that time. Additionally, the power production circuits are separated from the tracking circuits. This allows the PV solar modules to operate during an unscheduled outage of the tracker system.

The generating facility will be operated through a real-time control system for most operations functions, discussed further in **Section 3.3.4.1**.

3.3.4.1 Supervisory Control and Data Acquisition System

Performance monitoring of the Project will consist of real-time and continuous assimilation of the data acquired by the onsite meteorological station, energy meter, and a SCADA system. The SCADA system provides data on solar energy generation and production, availability, meteorology, and communications. The solar arrays and BESS will communicate directly with the SCADA system for remote performance monitoring at the Invenergy Control Center, energy reporting, and troubleshooting. Through remote monitoring, Lake Wilson Solar will ensure the batteries stay within optimal operating bands to ensure both safety and long-term performance. Critical information such as battery temperature, state of charge, and any system warnings are monitored on a 24/7 basis. Any anomaly is identified immediately and can be addressed by action from the Invenergy Control Center or by dispatching local technicians to the site. In addition to real time monitoring and support, analysts can analyze trends in operating data to predict anomalies or failures before they arise. Operators will be notified immediately of any abnormalities allowing for timely corrective action.

3.3.4.2 Equipment Inspection

Inspection of the main equipment will occur at regular intervals, as outlined below and in **Table 9**, including:

- PV solar modules: visual check of the modules, tracking system and surrounding grounds to verify the integrity of the modules and tracking structure, the presence of animals and nests, etc.;
- Inverters, transformer(s) and electrical panels: visual check of the devices including connection equipment and the grounding network - check for presence of water and dust;
- Electrical check: check of the main switches and safety devices (fuses);
- Noise: check of abnormal sounds;
- Cabling and wiring: visual check of electrical lines (where visible) and connection box to verify its status;
- Routine visual inspection of the Gen-Tie Line, structures, and components;
- Project Substation: scheduled visual inspections; and
- BESS: performance verification, check of air filters, HVAC system, and fire safety systems.

3.3.4.3 Performance Monitoring

Performance monitoring of the Project facilities will consist of a weekly or monthly download of the data acquired by the SCADA system (energy produced, alarms, faults, etc.).

3.3.4.4 Facility Maintenance

Housekeeping of the Project facilities will include access road maintenance, vegetation maintenance (method is to be determined based on plant design and the VSMP), fence and gate inspection, lighting system checks, and PV solar module washing at Lake Wilson Solar's direction (if required - minimal to no PV solar module washing is anticipated to be needed for the Project).

3.3.4.5 Maintenance Frequency

Table 9 provides more information on the anticipated frequency of the operations and maintenance tasks associated with the Project. The table represents the anticipated preliminary frequency of these tasks; the frequency of inspection may be varied based on facility demands and experience with performance of certain components and Project features.

Table 9: Project Operations & Maintenance Tasks and Frequency

Plant Device	Task	Preliminary Frequency
Photovoltaic (PV) Field	Daily performance verification using SCADA	Daily
	PV solar modules visual check	Once Yearly
	Wiring and junction boxes visual check	Once Yearly
	Overview aerial thermal scan	Once Yearly
	Advanced diagnostics	At Owner's Direction
	PV strings and sting boxes faults	Once Yearly
	PV solar modules washing	No regular washing planned (only as site-specific conditions warrant)
	Vegetation Management (if necessary at site)	Up to three times a year depending on site conditions, and compatible with plant design and the VSMP.
Electric Boards	Case visual check	Once Yearly
	Fuses check	Once Yearly
	Visual Torque check	Once Yearly
	Grounding check	Once Yearly
Inverter	Case visual inspection	Once Yearly
	Air intake and filters inspections	Once Yearly
	Conversion stop for lack of voltage	Once Yearly
	AC voltage and current check	Once Yearly
	Fuses check	Once Yearly
	Visual Torque check	Once Yearly
Support Structures	Visual check	Once Yearly
BESS	Daily performance verification using SCADA	Daily
	Inspection and cleaning of air filters for cooling system	Monthly
	HVAC systems check	Monthly

Table 9: Project Operations & Maintenance Tasks and Frequency

Plant Device	Task	Preliminary Frequency
	Fire safety systems check	Monthly
	Fire safety system inspections and certifications from qualified third-party contractor	Semi-annual
	Capacity Test	Once Yearly

3.4 Decommissioning and Repowering

At the end of the Project's useful life, Lake Wilson Solar will either take necessary steps to continue operation of the Project (such as re-permitting and retrofitting) or will decommission the Project and remove facilities. A Project Decommissioning Plan is included in **Appendix G**.

3.4.1 Decommissioning

At the end of commercial operations, Lake Wilson Solar will be responsible for removing all of the solar arrays and other associated facilities. At the end of the SP term, Lake Wilson Solar reserves the right to extend operations of the Project by applying for an extension of the SP, if necessary, and continuing operation. Should Lake Wilson Solar decide to continue operation, a decision would be made as to whether the Project would continue with the existing equipment or to upgrade the facilities with newer technologies.

Decommissioning of the Project would include removing the solar arrays (modules, racking and steel foundation posts), inverters, fencing, access roads, above-ground portions of the electrical collection system, overhead and underground cables and lines, BESS, Project Substation, and the O&M facility. Standard decommissioning practices will be used, including dismantling and repurposing, salvaging/recycling, or disposing of the solar energy improvements, and restoration. A detailed Decommissioning Plan outlining the decommissioning process for the Project is provided in **Appendix G** and is generally summarized below.

3.4.1.1 Timeline

Decommissioning is estimated to take approximately 40 weeks to complete, and the decommissioning crew(s) will ensure that all equipment and materials are recycled or disposed of properly.

3.4.1.2 Financial Resource Plan

Lake Wilson Solar will be responsible for all costs to decommission the Project and associated facilities. Because of the uncertainty in predicting future decommissioning costs and salvage values, Lake Wilson Solar will review and update the decommission estimate every 5 years as

described in the Decommissioning Plan included in **Appendix G.** Lake Wilson Solar will either secure a financial surety, such as a surety bond agreement, an escrow account, letter of credit or create a reserve fund to create adequate financial reserves for decommissioning purposes. Lake Wilson Solar will abide by the applicable SP condition(s) and ensure the Project is decommissioned in accordance with the SP and the Decommissioning Plan. In addition to SP conditions, Lake Wilson Solar has included an obligation to decommission the Project components in the Project's real estate agreements.

3.4.1.3 Removal and Disposal of Project Components

The removal and disposal details of the Project components are found below:

- **Modules:** Modules will be inspected for physical damage, tested for functionality, and disconnected and removed from racking. Functioning modules will be packed, palletized, and shipped to an offsite facility for reuse or resale. Non-functioning modules will be shipped to the manufacturer or a third party for recycling or disposal.

- **Racking:** Racking and racking components will be disassembled and removed from the steel foundation posts, processed to appropriate size, and sent to a metal recycling facility;

- **Steel Foundation Posts:** All structural foundation steel posts will be pulled out to full depth, removed, processed to appropriate size, and shipped to a recycling facility. The posts can be removed using back hoes or similar equipment. During decommissioning, the area around the foundation posts may be compacted by equipment and, if compacted, the area will be decompacted in a manner to adequately restore the topsoil and sub-grade material to a density consistent for vegetation.

- **Overhead and Underground Cables and Lines:** All underground cables and conduits will be removed to a depth of 4 feet so as to not impede the reintroduction of farming. If soil is excavated during decommissioning, Topsoil will be segregated and stockpiled for later use prior to any excavation and the subsurface soils will be staged next to the excavation. The subgrade will be compacted per AIMP standards. Topsoil will be redistributed across the disturbed area.

- **Inverters, Transformers, and Ancillary Equipment:** All electrical equipment will be disconnected and disassembled. All parts will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at Lake Wilson Solar's sole discretion, consistent with applicable regulations and industry standards.

- **BESS:** The BESS containers will be disconnected from electric ports prior to removal. The lithium-ion batteries will be prepared and packaged to be transported to a recycling facility. The containers can be resold, reused, or recycled. Gravel aggregate will be removed and shipped from the Project site to be reused, sold, or disposed of appropriately, at Lake Wilson Solar's sole discretion, consistent with applicable regulations and industry standards. Clean aggregate can often be used as "daily cover" at landfills for no disposal cost. All internal service roads are currently anticipated to be constructed with geotextile fabric and eight inches of aggregate over compacted subgrade. All pile foundations will be pulled out completely. Underground cables and duct banks will be removed to a depth of four feet. Topsoil will be reapplied to the disturbed area. Soil and

topsoil will be de-compacted, and the site will be restored to the pre-construction condition and re-vegetated, unless the area will be used for row-crop agriculture, in which event the area will not be re-vegetated.

- **Equipment Foundation and Ancillary Foundations:** The ancillary foundations are pile foundations for the equipment pads. As with the solar array steel foundation posts, the foundation piles will be pulled out completely. Duct banks will be excavated up to 4 feet below ground surface. All unexcavated areas compacted by equipment used in decommissioning will be decompacted pursuant to Section 4.6.1.4 of the AIMP in a manner to adequately restore the topsoil and sub-grade material to a density similar to the surrounding soils. All materials will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at the Lake Wilson Solar's sole discretion, consistent with applicable regulations and industry standards.

- **Fence:** All fence parts and foundations will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at Lake Wilson Solar's sole discretion, consistent with applicable regulations and industry standards. The surrounding areas will be restored to pre-Project conditions to the extent feasible.

- **Access Roads:** Facility access roads will be used for decommissioning purposes, after which removal of such roads will be discussed with applicable landowners, using the following process:

    1. After final clean-up, access roads may be left intact through mutual agreement of the landowner and Lake Wilson Solar unless otherwise restricted by federal, state, or local regulations; and
    2. If an access road is to be removed, aggregate will be removed and shipped from the site to be reused, sold, or disposed of appropriately, at Lake Wilson Solar's sole discretion, consistent with applicable regulations and industry standards. Clean aggregate can often be used as "daily cover" at landfills for no disposal cost. All internal service roads are currently anticipated to be constructed with geotextile fabric and eight inches of aggregate over compacted subgrade. Any ditch crossing connecting an access road to public roads will be removed unless the landowner requests it remain. The subgrade will be de-compacted to a depth of approximately 18 inches using a chisel plow or other appropriate subsoiling equipment. All rocks larger than four inches will be removed. Topsoil that was stockpiled during the original construction will be distributed across the open area. The access roads and adjacent areas that are compacted by equipment will be de-compacted.

3.4.1.4 Restoration/Reclamation of Facility

Lake Wilson Solar will restore and reclaim the Project site to approximately the pre-construction condition consistent with the requirements of the Project easement agreements, applicable SP terms and conditions, the Decommissioning Plan, the AIMP, and, most importantly, the landowners' chosen use for the site after decommissioning. Lake Wilson Solar assumes that most of the Project site will be returned to farmland and/or pasture after decommissioning and will implement appropriate measures to facilitate such uses in accordance with the AIMP. If no specific

use is identified by the landowner of the property, Lake Wilson Solar will vegetate portions of the site disturbed by decommissioning activities with a seed mix meeting the requirements of the landowner. The goal of restoration in that instance will be to maintain natural hydrology and the plant communities growing on the site during operation of the Project to the greatest extent practicable while minimizing new disturbance and removal of native vegetation.

During decommissioning, perennial vegetation growing throughout the project area will remain in place wherever possible to serve as a soil stabilization mechanism. When necessary, best management practices (BMP's) will be implemented to minimize erosion and to contain sediment on the Project site. The intent of meeting this goal is to minimize unnecessary new disturbance and removal of native vegetation to the greatest extent practicable such that soils can remain stabilized until they are returned to agricultural use by the landowner or other beneficial use according to the landowner direction. Any disturbed areas will be contained by installing erosion and sediment control measures, such as silt fences, bio-rolls, and ditch checks in all disturbance areas where potential for erosion and sediment transport exists, consistent with storm water management objectives and requirements.

Decommissioning and restoration activities of the Project site will be completed within 12 months after the end of commercial operations.

3.4.1.5 Post-Restoration Monitoring

Decommissioning of the Project site will comply with permits for National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater (CSW), Spill Containment and Countermeasure (SPCC) Plan, and SWPPP, if grading activities are necessary and exceed applicable permit thresholds. Decommissioning may include post-restoration monitoring as required by the NPDES/SDS CSW Permit and SWPPP and other applicable requirements. In addition, Lake Wilson Solar's Field Representative assigned to decommissioning monitoring will stay in contact with the landowner(s), including onsite check-ins until the NPDES/SDS CSW permit is closed.

3.4.2 Repowering

As the solar market continues to produce less expensive and more efficient solar modules, repowering the Project may be a viable option as the Project ages. Potential triggers for initiating a repower may be aging or faulty equipment, maintenance costs, extending the useful life of the Project, or increasing the generation output of the Project. Lake Wilson Solar will continually evaluate the Project's generation output, maintenance costs, and other contributing factors in conjunction with available technology upgrades to determine if repowering the Project is a worthwhile investment. Any proposed repowering of the Project will abide by all local, state, and federal regulations. A new or amended SP may be necessary and will be sought if required.

4.0 Environmental Information

Information in this section includes discussions of the natural environment and cultural resources within and surrounding the Project Area. The Project Area is also used as a reference for discussions of resources that are located outside of the Project Area (such as parks, trails, and other natural resources).

For approximating areas of temporary impact from the proposed Project, the Preliminary Development Area was used, which is the area needed for construction and operation of the Project based on preliminary design. The approximate 1,526-acre Preliminary Development Area includes, in part, project components within the fenced area including fenced arrays, inverters, transformers, access roads, collection lines, Project Substation, Xcel Switchyard, Project Gen-Tie Line, and O&M facility. The Preliminary Development Area also includes portions of collection lines and segments of access roads that are outside the fenced arrays.

4.1 Environmental Setting

The Project is located within the political boundaries of Leeds Township in Murray County, Minnesota. The Project is generally located between the cities of Lake Wilson and Hadley, south of MN State Highway 30 (see **Figure 1**). Land use is predominantly agricultural (corn and dry beans planted in row crops) with scattered farmsteads and residences. Several utility scale wind energy projects are in the vicinity of the Project including the Northern Wind, Rock Aetna, Fenton, and East Ridge wind projects (**Figure 6**). The Northern Wind and Rock Aetna Wind Projects replaced the Chanarambie Wind Project.

Except for MN State Highway 30 (Hiawatha Pioneer Trail) that borders the northern edge of a portion of the Project Area, roads that surround the Project Area are local county or township roads. The Project Area generally bound by 70th Avenue on the west, 81st Street on the south, and by County Highway 29 (105th Avenue) on the east. County Highway 28 (80th Avenue) bisects the Project Area in a north to south direction. Xcel Energy's existing Fenton – Chanarambie 115 kV HVTL travels along the east side of 70th Avenue allowing for a short connection to the new Xcel Switchyard (see **Figure 3**).

According to the National Resources Conservation Service (NRCS) Land Resource Region (LRR) and Major Land Resource Area (MLRA), the Project site is located within the northern part of the Central Feed Grains and Livestock Region (USDA, 2006). This MLRA is in the southern part of the rolling till prairies and is characterized by nearly level to rolling topography that has many depressions and drainages.

The MNDNR and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota that is used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features (MNDNR, 1993). Through the ECS, the State of Minnesota is split into Ecological

Provinces, Sections, and Subsections. The Project site is located within the North Central Glaciated Plains (251B) Section of the Prairie Parkland Province. The Project is located in the Coteau Moraines Subsection (251Bb).

The southwestern boundary of the Coteau Moraines Subsection, where the Project Area is located, occurs in an area of transition from shallow deposits of windblown silt over glacial till to deeper deposits of loess. Elevation ranges from 600 to 800 feet of glacial till above bedrock throughout most of the subsection. Soils consist of loamy well-drained soils with thick, dark surface horizons (primarily Mollisols - Aquolls and Udolls with some Borolls and Ustolls).

According to the MNDNR Minnesota State Climatology Website,[11] the annual precipitation from 1895-2022 for the area is 26.67 inches. The growing season generally lasts 145 to 150 days. Fire and drought are the dominant causes of natural disturbances in this subsection, and windy conditions are also commonplace. Pre-settlement vegetation was primarily tallgrass prairie, with smaller amounts of wet prairie and minimal amounts of forested areas. Currently, the predominant land use in this subsection is agriculture, with some wind farms also in the vicinity of the Project; there are few remnants of pre-settlement vegetation remaining (MNDNR, 1993).

4.2 Human Settlement

The Project Area is in a sparsely populated rural area with farmsteads located along roads, and away from population centers. The municipalities nearest to the Project Area are Lake Wilson and Hadley. The municipal boundary of Lake Wilson is about 2.4 miles northwest of the Project Substation. The municipal boundary of Hadley is approximately 4.0 miles northeast of the Project Substation. The larger city of Slayton is approximately 8.0 miles east of the Project Area**.** **Figures 4 and 9** depict the rural, agricultural landscape of the Project Area.

4.2.1 Public Health and Safety

Public health and safety issues during construction and operations include injuries due to falls, equipment use, and electrocution. If emergency personnel were needed at the Project, multiple agencies would likely respond, depending on the situation. These include the Murray County Sheriff, Lake Wilson volunteer fire department and emergency medical services; services from Slayton, including the fire department, police department, and emergency services, all of which are within 5 miles of the Project Area.

There are four towers that are a part of the Allied Radio Matrix for Emergency Response (ARMER) in Murray County (MnDOT, 2018). These ARMER towers are a part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for

[11] https://arcgis.dnr.state.mn.us/ewr/climatetrends/ (for the Des Moines River-Headwaters watershed which includes the Project Area)

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. The system can be interrupted if tall objects are proposed within the line-of-sight, typically at or near the top of a tower over 150 feet tall. There are no ARMER towers within one mile of the Project Area; the nearest ARMER tower is located in Oakland Township which is approximately 1.5 miles south of the Project (MnDOT, 2018).

The National Pipeline Mapping System (NPMS) was searched to assess whether pipelines are present in the Project Area and study area (NPMS, 2022). The NPMS Public Viewer enables the user to view NPMS pipeline, liquefied natural gas (LNG) plant and breakout tank data one county at a time, including attributes and pipeline operator contact information. The user can also view gas transmission and hazardous liquid pipeline accidents and incidents going back to 2002 for the entire US. NPMS pipeline data consists of gas transmission pipelines and hazardous liquid pipelines jurisdictional to Pipeline and Hazardous Materials Safety Administration. (PHMSA).

Review of the NPMS data identified no pipelines, accidents/incidents, or other facilities within the Project Area or one-mile buffer.

The MPCA's "What's in my Neighborhood" interactive online map service offers access a wide variety of environmental information about a given site and location (MPCA, 2022-a). The website provided data on:

- Potentially contaminated sites - Since the early 1980s when major federal and state cleanup programs were created, the MPCA has been aggressively searching for and helping to clean up contaminated properties, from very small to large. This website contains a searchable inventory of those properties, as well as sites that have already been cleaned up and those currently being investigated or cleaned up; and

- Environmental permits and registrations - This Web application also contains a searchable inventory of businesses that have applied for and received different types of environmental permits and registrations from the MPCA.

Westwood reviewed the MPCA map and noted the presence of four environmental records within the Project Area, including three feedlots and one construction stormwater site. An additional six records were noted in the 0.25-mile radius around the Project Area. Identified environmental records are summarized in **Table 10** below and shown on **Figure 5**.

Table 10: MPCA Sites within Project Area

MPCA Site ID	Site Name	Location	Site Status	Program Name
119367	Vander Wal Brothers	In Project Area, outside of Preliminary Development Area	Inactive	Feedlots
49519	Vander Wal Brother's Dairy	In Project Area, outside of Preliminary Development Area	Active	Feedlots
98221	Allen Vander Wal	In Project Area, outside of Preliminary Development Area	Active	Feedlots
247798	SAP 51-599-110	In Project Area, outside of Preliminary Development Area	Active	Construction Stormwater
72141	Todd Platt Farm	Within 0.25 Mile	Active	Feedlots
72130	Risacher Farms LLP	Within 0.25 Mile	Active	Feedlots
152277	M & J Farms	Within 0.25 Mile	Active	Feedlots
72131	Risacher Farms LLP Sec – 15	Within 0.25 Mile	Active	Feedlots
250827	Cannon River LLC	Within 0.25 Mile	Active	Construction Stormwater
143794	SAP 51-628-17	Within 0.25 Mile	Inactive	Construction Stormwater

The Preliminary Development Area excludes all identified environmental records from project infrastructure. An Active Construction Stormwater site is within the Project Area (and outside of the Preliminary Development Area) located southeast of the intersection of 70th Avenue and 91st Street; however, this area is designated for collection line easements. Proposed collection lines are located more than 140 feet east of the identified environmental record. No impacts to identified environmental records are anticipated as a part of the proposed Project.

Impacts and Mitigative Measures

Construction and operation of the Project will have minimal impacts on the health and safety of the local populace, and the level of use/service potentially needed by the Project is expected to be low. The Project is being engineered and designed and will be constructed to meet applicable NSC, MISO, state, and local electrical standards, including fencing and locked gates to exclude people who are not authorized to access the Project, and therefore will pose minimal safety and security risks to the public. As discussed in **Section 3.1.7** above, the Project arrays will be fenced/secured, and access allowed for authorized personnel via lockable gates. The Project Substation, new Xcel Switchyard, and BESS will also be fenced with controlled/locking access gates. Signs will be posted to warn unauthorized persons not to enter fenced areas and of the presence of electrical equipment associated with Project facilities.

While it is possible that portions of the Project facility (e.g., arrays, etc.) could be damaged or affected by extreme weather events, the Project will be designed and constructed such that Project materials are not expected to leave the Project site. Lake Wilson Solar will regularly inspect the Project for damage and, if found, will repair or replace impacted materials and dispose of generated waste in accordance with applicable requirements.

Lake Wilson Solar takes health and safety of its Project team and partners seriously and requires all parties involved with the Project to implement well-developed, comprehensive health and safety plans and protocols. While difficult to quantify, an emergency incident or accident may occur during construction and would be addressed as needed by Project personnel and local responders (as required).

Lake Wilson Solar is gathering information to coordinate with all emergency and non- emergency response teams for the Project, including law enforcement agencies (Murray County Sheriff, Lake Wilson and Slayton Police Departments), Lake Wilson Volunteer Fire Department and Slayton Fire Departments, and Lake Wilson and Slayton Emergency Medical Services. The type and number of responding agencies will depend on the incident requiring emergency services.

For construction and operation of the Project, Lake Wilson Solar will develop an Operations and Emergency Action Plan 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. Additionally, construction contractors will be required to comply with local, state, and federal regulations regarding installation of the Project facilities and use standard construction-related health and safety practices. Established industry safety procedures will be followed during and after construction of the Project; these include clear signage during all construction activities and fencing of all Project facilities to prevent public access.

While there are ARMER towers within five miles of the Project Area, the Lake Wilson Solar Project will not impact this communication system as Project facilities are proposed well below the typical height of a tower and line-of-sight near the top of these towers (i.e., greater than 150 feet above ground). Lake Wilson Solar anticipates the tallest Project facility to be the Gen-Tie Line and Xcel Line Tap poles and associated conductors that will connect the Project Substation/Xcel Switchyard to the existing Xcel Energy Fenton – Chanarambie 115 kV HVTL, which include 2-3 poles that will be up to 100 feet in height and approximately 250-300 feet in length (i.e., Xcel Line Tap) depending on final Project design. The Project solar array panels will be no more than 15 feet in height and not impact the ARMER system. As such, no mitigation concerning the ARMER system is proposed.

Review of environmental records in the MPCA "What's in my Neighborhood" database indicated the presence of environmental records located within the Project Area (MPCA, 2022-a). A number of sites are located in the vicinity of the Preliminary Development Area, though none are expected to be impacted by the Project. Prior to construction, Lake Wilson Solar will conduct a Phase I ESA of the Project Area to confirm these findings and refresh review of potential environmental site impacts to the Project.

4.2.2 EMF

The term electromagnetic field ("EMF") refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from the voltage or electrical charges. 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 from electrical collection lines, regardless of whether they are below-ground or above-ground, transmission lines, or transformers, dissipates rapidly with distance from the source (National Institute of Environmental Health Sciences [NIEHS], 2002).

There are presently no Minnesota regulations pertaining to magnetic field exposure. There also is no federal standard for transmission line electric fields. The Commission, however, has imposed a maximum electric field limit of 8 kV/m measured at one meter above the ground.[12] The standard was designed to prevent serious hazards from shocks when touching large objects parked under AC transmission lines of 500 kV or greater.

Considerable research has been conducted since the 1970s to determine whether exposure to EMF causes biological responses and health effects. Public health professionals have also investigated the possible impact of exposure to EMF on human health for the past several decades. Since the 1970s, a large amount of scientific research has been conducted on EMF and health. This large body of research has been reviewed by many leading public health agencies such as the U.S. National Cancer Institute, the U.S. National Institute of Environmental Health Sciences, and the World Health Organization (WHO), among others. These reviews do not show that exposure to electric power EMF causes or contributes to adverse health effects.

For example, in 2016, the U.S. National Cancer Institute summarized the research on *Electromagnetic Fields and Cancer as follows:*

> *Numerous epidemiologic studies and comprehensive reviews of the scientific literature have evaluated possible associations between exposure to non-ionizing EMFs and risk of cancer in children (12–14). (Magnetic fields are the component of non-ionizing EMFs that are usually studied in relation to their possible health effects.) Most of the research has focused on leukemia and brain tumors, the two most common cancers in children. Studies have examined associations of these cancers with living near power lines, with magnetic fields in the home, and with exposure of parents to high levels of magnetic fields in the workplace. No consistent evidence for an association between any source of non-ionizing EMF and cancer has been found.*[13]

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

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[12] *In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, S.D. to Hampton, Minn.,* Docket No. ET2/TL-08-1474, ORDER GRANTING ROUTE PERMIT (Sept. 14, 2010) (adopting the Administrative Law Judge's Findings of Fact, Conclusions, and Recommendation at Finding 194).
[13] NAT'L CANCER INSTITUTE, *Electromagnetic Fields and Cancer* (updated May 27, 2016), *available at* https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/electromagnetic-fields-fact-sheet.

adverse health impacts from electronic and magnetic fields are anticipated for persons living or working near the Project."[14]

Similarly, for a utility-scale solar project, the Commission concluded 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."[15]

For 115 kV transmission lines, such as proposed here, the NIEHS provides typical EMF levels (NIEHS, 2002). The typical electric fields directly below the 115 kV transmission line were reported at 1.0 kV/m before dissipating to 0.5 kV/m at 50 feet (approximate edge of right-of-way). The NIEHs also calculated average magnetic fields directly below a 115 kV transmission line at 29.7 milliGauss ("mG") before dissipating to 6.5 mG at 50 feet (NIEHS, 2002). Notably, the underground collector lines will also produce magnetic fields. A study done by a group of Canadian researchers of collection lines at a wind facility, measured EMF of a project's 27.5 kV collection lines with slightly lower voltage than the electrical collection lines proposed for the Project. This study found magnetic fields associated with buried electrical collection lines to be within background levels at 1 meter above ground and up to 16.5 mG directly beneath overhead 27.5 kV lines (McCallum et al., 2014).

Overall, multiple studies have concluded that 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.[16]

Impacts and Mitigative Measures

The nearest residence to solar arrays is approximately 238 feet, and the nearest residence to an inverter, electrical collection line, or transformer is 762 feet (see **Table 15** in **Section 4.2.6** and **Figure 9**). At this distance, both electric and magnetic fields would have dissipated to background levels. As such, impacts will be negligible and no mitigation measures are proposed.

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[14] *In the Matter of the Application of Xcel Energy and ITC Midwest LLC for a Route Permit for the Huntley-Wilmarth 345-kV Transmission Line Project,* Docket No. ET-6675/TL-17-185, Order Finding Environmental Impact Statement Adequate, Granting Certificate of Need, Issuing Route Permit, and Requiring Additional Analysis (August 5, 2019) (adopting the Administrative Law Judge's Findings of Fact, Conclusions, and Recommendation at Finding 346).

[15] *In the Matter of the Application of Elk Creek Solar, LLC for a Site Permit for the up to 80- Megawatt Elk Creek Solar Project in Rock County, Minnesota*, Docket No. IP-7009/GS-19-495, Order Adopting Findings of Fact, Conclusions of Law, and Recommendations, Granting Certificate of Need, And Issuing Site Permit (December 31, 2020) (adopting the Administrative Law Judge's Findings of Fact, Conclusions, and Recommendation at Finding 101).

[16] 5 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: https://www.tandfonline.com/doi/abs/10.1080/15459624.2015.1047021; 6 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.

4.2.3 Displacement

As previously indicated, the Project is located in an agricultural area with relatively few residences and widely dispersed farmsteads among row crop farm fields. There are two farmsteads within the Project Area (**Figure 14**). Based on currently existing structures, no displacements of residential homes, farming operation buildings, or business structures will occur as a result of the Project. All identified residences, farming operation buildings and business structures have been excluded from the Preliminary Development Area, although three existing residences are in the Project Area. All project infrastructure has been designed with applicable setbacks as discussed in **Section 3.2.1**. The landowners of the parcels containing farmsteads and/or farming operation structures are participating in the Project. The Project will not displace or require removal of any existing structures located in the Project Area.

Impacts and Mitigative Measures

Because the Project will not displace or require removal of any part of the existing farmsteads or farming operation structures areas located within the Project Area, no mitigation is proposed. However, Lake Wilson Solar is and will continue to work with the participating landowners to discuss the Project design and construction and ensure the Project will not interfere with existing facilities.

4.2.4 Noise

Noise is defined as unwanted sound. It may be made up of a variety of sounds of different intensities, across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The A weighted decibel scale (dBA) is used to reflect the selective sensitivity of human hearing. This scale puts more weight on the range of frequencies that the average human ear perceives, and less weight on those that we do not hear as well, such as very high and very low frequencies.

Pre-Construction Noise

Common sound sources within an agricultural and/or rural environment such as the Project Area include, but are not limited to, sound from farm equipment such as tractors and combines, farm support vehicles and equipment, grain handling/storage/drying operations, sound generated from traffic on surrounding roadways, sounds from birds, and wind rustling through the vegetation. Typically, the ambient acoustic environment of a rural or agriculturally oriented community has continuous sound levels (Leq, which is an energy-based time-averaged noise level) ranging from 30 dB(A) to 60 dB(A). According to ANSI/ASA S12.9-2013/Part 3 (ANSI 2013), rural residential areas have a typical daytime noise level of 40 dB(A) and a typical nighttime noise level of 34 dB(A). A comparison of typical noise-generating sources is outlined in **Image 10** (FAA 2020).

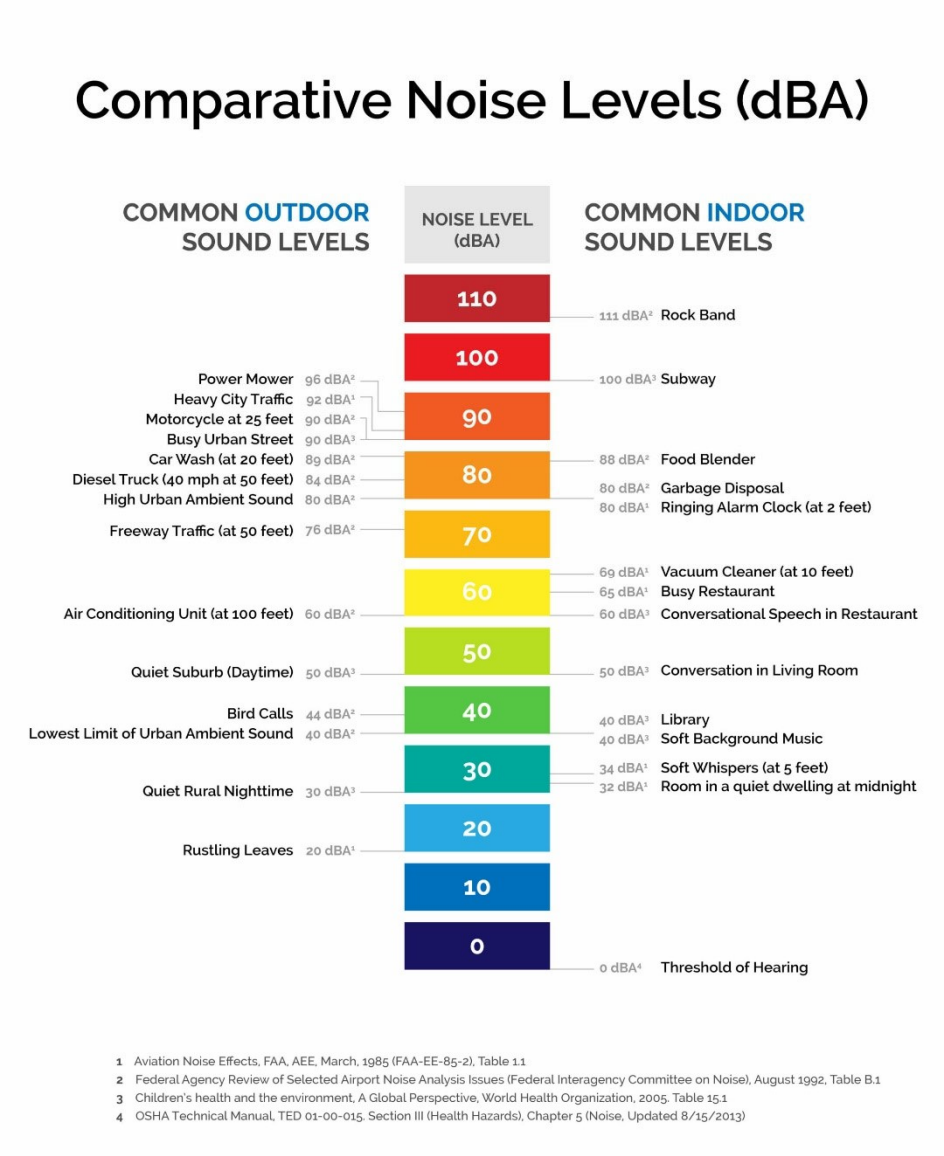

Image 10: Common Noise Sources

Construction Noise

During construction, intermittent noise will be emitted by the construction vehicles and equipment, including pile drivers for installation of piers. These noise impacts will be temporary, and the amount of noise will vary based on what type of construction is occurring at the Project on a given day. **Table 11** shows the maximum and minimum sound pressure levels at 25 meters and 15 meters dBA for construction equipment such as bulldozers, bobcats, and scrapers (FWHA, 2017).

Table 11: Typical Sound Levels from Construction Equipment

Equipment	Max Sound Pressure Level at 25 meters (82 feet) dBA	Max Sound Pressure Level at 15 meters (50 feet) dBA
Excavator	76	85
Dozer	76	85
Grader	76	85
Roller	76	85
Dump Truck	75	84
Concrete Mixing Truck	76	85
Concrete Pumper Truck	73	82
Man-lift	76	85
Flatbed Truck	75	84
Large Crane	76	85
Small Crane	74	83
Trencher	72	83
Compactor (Vibratory)	69	80
Forklift	75	85
Boom Truck	75	84
Small Pile Driver	73	84

Noise Standards

State and local sound regulations were reviewed. Minn. Admin. R. 7030 sets forth noise limits for different land uses. Noise sensitive areas in the Project Area consist of residential homes. Residences are classified as Noise Area Classification (NAC) 1 per Minn. Admin. R. 7030.0050, Subp. 2. NAC 1 has the lowest noise limits of the three NACs. These limits are listed in **Table 11a** below.

Table 11a: Minnesota Rules Chapter 7030 NAC 1 Noise Limits

Noise Level Metric	Daytime Limit (dBA)	Nighttime Limit (dBA)
L_{50}	60	50
L_{10}	65	55

These limits are expressed as L50 and L10, which are statistical noise level metrics representing the sound level that is exceeded 50% and 10% of the measurement period, respectively. Noise modeling most accurately predicts Leq levels, which is the equivalent continuous sound level or the overall average sound level over the measurement period. L10 levels are, on average, 3 dBA higher than Leq levels, while L50 levels are typically below Leq levels. As such, modelled Leq levels can be used as a conservative metric for ensuring compliance with the L50 levels specified in Minn. R. 7030.0040. Therefore, if Leq limits are assumed to be the same as the L50 limits, any modelled sound level below the Leq limits would be below the L50 limits prescribed by Minn. R. 7030.0040.

Operational Noise

A sound propagation model was developed and run for the Project. CADNA-A (a sound modelling software in compliance with ISO 9613-2) was used to calculate cumulative Project sound at all occupied residences within ¼ mile of the proposed Project fence line. A conservative ground absorption coefficient of 0.5 was assumed to account for the varying surface properties of the ground throughout the year (e.g., hard, frozen ground in winter vs. porous ground covered by vegetation in summer). Marginal changes in the ground absorption coefficient will have a negligible effect of less than 1 dB. As described below, predicted maximum total sound levels as a result of Project operation do not exceed the applicable nighttime limit of 50 dBA set forth in Minn. Admin. R. 7030.0040. Accordingly, minimal sound impacts, within regulatory limits, are expected from Project operation.

The proposed Project inverters, transformers, BESS containers, and HVAC systems were modeled as point sources, with sound source data taken from manufacturer cut sheets and NEMA (National Electrical Manufacturers Association) standards (see Appendix D-3). Where specific equipment specifications were not available, data from similar equipment was used. Project equipment and layout configuration details are shown below in Table 12. Unweighted octave-band sound power levels are listed in Table 13 along with overall A-weighted sound pressure levels. Levels represent the maximum sound output for Project components, which is at the source of the sound. The sound levels will decrease as distance increases, as shown in the Table 12 below.

Table 12: Project Equipment Estimated Sound Levels

Sound Source	# of Units	Equipment Model/Reference	Sound Pressure Level @ 1 m (Single Unit)	Source Height AGL	Distance to Sound Pressure Level of 50 dBA (Single Unit)
Solar Inverter	55	Power Electronics PE FS4200M	79 dBA	2.89 m	27 m
Main Power Transformer	2	NEMA TR1	90 dBA	4.00 m	95 m
Auxiliary Transformer	12	Eaton Pad-Mounted (NEMA TR1)	61 dBA	1.85 m	4 m
BESS Power Conversion System	34	GE FlexInverter	79 dBA	1.10 m	27 m
Battery Container HVAC Unit	204	Trane Voyager 3 – 30 ton RTU	81 dBA	1.10 m	32 m
Emergency Generator	3	CAT C15 (with Sound Attenuated Enclosure) – 500 kW	90 dBA	2.80 m	91 m

Table 13: Project Equipment Spectral and Overall Data (CADNA-A Inputs)

Noise Source	Unweighted Octave Band (Hz) Sound Power Levels (dB L_w)								Sound Pressure Level at 1 m (dBA L_p)
	63	125	250	500	1000	2000	4000	8000	
Solar Inverter	80.9	89.6	86.6	83.6	79.9	77.8	79.6	72.1	79
Main Power Transformer	100.6	102.6	97.6	97.6	91.6	86.6	81.6	74.6	90
Auxiliary Transformer	71.6	73.6	68.6	68.6	62.6	57.6	52.6	45.6	61
BESS Power Conversion System	80.9	89.6	86.6	83.6	79.9	77.8	79.6	72.1	79
Battery Container HVAC Unit	88.7	89.6	83.6	3.4	84.3	82.0	77.0	73.0	81
Emergency Generator	95.5	93.0	94.4	94.1	93.2	90.9	84.8	79.7	90

A background ambient level of 40 dBA was assumed according to ANSI 12.9-2013 Table C.1 – A- weighted day, night, and day-night average sound levels in decibels and corresponding approximate population densities as indicated, which provides 40 dBA as the Day level for the "very quiet suburban and rural residential" residential land use category. In order to determine predicted total sound levels, the assumed background ambient level of 40 dBA was added to the predicted sound levels. These summed levels represent the predicted total sound level at each receptor.

Impacts and Mitigative Measures

As stated, the Project will create some intermittent noise during construction and the amount of noise will vary based on what type of construction is occurring at the Project on a given day. Construction associated noise will likely be perceptible at nearby residences. According to the Federal Highway Administration Construction Noise Handbook, the majority of the construction equipment that could be used on the site such as grading equipment and bobcats is anticipated to generate noise between 72-85 dBA. Sound levels from grading equipment are not dissimilar from the typical tractors and larger trucks used in agricultural communities during planting or harvest. Lake Wilson Solar anticipates impact driving of the piles for rack supports (foundations for the solar panels) to be the most significant source of construction noise at roughly 101 dBA at 50 feet (FHWA, 2017). Installation of each rack support takes between thirty seconds to a few minutes depending on the soil conditions; Lake Wilson Solar anticipates this activity will take up to 3-6 months (depending on construction crew size), however, construction noise will not be concentrated in the same location but will rotate around the Project site during that time as each stage of construction is completed in sequence; for example, site preparation at some array

locations may occur while pile driving is occurring at others. The noise from construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. As shown in **Table 15** below and **Figure 14**, the average distance from the 25 homes within 0.25 miles of the proposed solar arrays is 1,752 feet with the closest being 238 feet.

Construction noise will be relatively minimal and will be temporary in duration with sound returning to background levels once construction is finalized. Lake Wilson Solar plans to limit construction and staging activities to daylight hours and run vehicles and equipment only when necessary. Equipment used for construction will be in good working condition and will be equipped with properly functioning mufflers and associated noise-control devices to reduce sound generation to the greatest extent practicable. Lake Wilson Solar will provide notice of construction to all properties adjacent to the project prior to the commencement of construction. The notice shall include the contact information for a dedicated project contact person to answer questions about construction.

During operation, as shown in **Table 14** and **Figure 14**, modeling results indicated the highest predicted Project sound contribution to existing ambient sound was 38 dBA, and the highest predicted total sound level (i.e., inclusive of the assumed 40 dBA background level) was 42 dBA. These levels are well below the residential land use nighttime limit of 50 dBA set forth in Minn. Admin. R. 7030. The scenario modeled represents the single worst case, indicating that the Project will be in full compliance. Therefore, no mitigation is proposed at this time.

Table 14: Modeling Results

Residence ID	Predicted Project Noise Level (Leq dBA)	Predicted Total Noise Level (Leq dBA, assuming 40 dBA ambient)
R01	20.1	40.0
R02	27.5	40.2
R03	28.5	40.3
R04	29.2	40.3
R05	20.3	40.0
R06	14.7	40.0
R07	22.1	40.1
R08	24.6	40.1
R09	28.8	40.3
R10	26.8	40.2
R11	15.9	40.0
R12	27.9	40.3
R13	18.4	40.0

R14	28.8	40.3
R15	17.1	40.0
R16	38.2	42.2
R17	29.2	40.3
R18	27.5	40.2
R19	25.8	40.2
R20	25.1	40.1
R21	22.3	40.1
R22	23.0	40.1
R23	19.3	40.0
R24	18.2	40.0
R25	21.1	40.1

4.2.5 Radio and Television Interference

No cellular, AM, FM, Microwave, TV, or other broadcast transmission towers were identified in the Project Area or located within one mile of the Project Area boundary according to publicly available FCC sources. Three Private Mobile Transmission Towers were identified within one mile of the Project boundary.

Corona from transmission line conductors can generate electromagnetic interference at the same frequencies that radio and television signals are transmitted.

Impacts and Mitigative Measures

Neither the Project Gen-Tie Line connecting the Project Substation to the new Xcel Switchyard or the Xcel Line Tap connecting the new Xcel Switchyard to the existing 115 kV line are anticipated to cause an adverse impact to any broadcast transmission towers due to their relatively short lengths and because the location where these would be installed is mainly agricultural fields and not near rural residences, farmsteads or other businesses.

Loose hardware on a transmission line can increase this interference. Frequency interference can disrupt the reception of these signals depending on the frequency and strength of the radio and television signal. AM radio frequency interference typically occurs under a transmission line and dissipates within the road right-of-way to either side. FM radio receivers usually do not suffer from interference from transmission lines. Corona-generated radio frequency noise currents decrease in magnitude with increasing frequency and are quite small in the FM broadcast band (88-108 Megahertz); and the interference rejection properties in FM radio systems make them limit amplitude disturbances. Television interference is unusual but may occur when a large transmission structure is aligned between the receiver and a weak distant signal, creating a shadow effect. Loose and/or damaged hardware may also cause television interference. Due to the short

lengths of planned new Gen-Tie Line or Xcel Tap Line and their planned locations, as well as regularly scheduled maintenance that would be conducted by Project personnel, interference to reception from loose hardware is not expected for the Project.

Impacts to radio and television reception from the Project to nearby receptors are not expected; therefore, no mitigation measures are proposed. If radio or television interference occurs due to the Project, Lake Wilson Solar will work with the affected landowner/business to restore reception to pre-Project quality.

4.2.6 Aesthetics

The Project Area is located in a rural, flat, agricultural setting (**Figures 1, 2, and 6**). The topography of the Project Area is generally flat with elevations ranging from 1,620 to 1,784 feet above sea level. Farmsteads in the area (often containing a farmhouse with barns, machine sheds and grain storage) are sprinkled across the landscape approximately 0.25 to 1 mile apart. Most farms have planted windbreaks consisting of trees and shrubs around them. Untilled lines of trees and shrubs can be seen along fence rows (**Figures 9 and 14**).

Paved and gravel roads form grids around farm fields separated by 0.5 to one mile with MN State Highway 30 along the northern edge of the Project. Few remaining high-quality surface water features exist as the area has numerous drain tiles and ditches to remove water from agricultural fields. As discussed in **Section 4.1**, land use within the Project Area is predominantly agricultural. Corn and soybeans are the most common agricultural crops grown. Cattle and hogs are also raised in the area.

There are two farmsteads within the Project Area and there are 25 residences and farmsteads within 0.25 mile of the Project Area (see **Figure 14**). **Table 15** provides distances to the nearest residences to the Project Area, including approximate distance to the Preliminary Development Area, distance to edge of solar arrays, and distance to nearest inverter based on the preliminary site plan in **Appendix C**.

Table 15: Proximity of Residences within 0.25 mile of the Project Area

Residence[1]	Distance to Preliminary Development Area (feet)	Distance to Solar Arrays (feet)	Distance to Nearest Inverter (feet)	Vegetative Screening from Solar Facilities
1	1514	1597	1940	Residence has existing vegetation on the western side of the property.
2	389	516	1046	Residence has existing vegetation on the western side of the property.
3	309	335	762	Residence has existing vegetative screening along the western side of the property, screening the residence from the solar panels.
4	337	527	884	Residence has existing vegetative screening along the property, screening the residence from the solar panels.
5	370	406	1337	Residence has some existing vegetative screening along the southwestern side of the farmstead, screening the residence from a majority of the solar panels.
6	2408	2452	3398	Residence has some existing vegetative screening along the west side of the farmstead, screening the residence from a majority of the solar panels.
7	586	2291	3074	Residence has existing vegetative screening along the north side of the property. The residence will likely have views of the solar panels from all other angles.
8	1752	1801	2452	Residence is screened is surrounded by existing vegetative screening along all sides of the farmstead.
9	238	238	844	Residence has scattered existing vegetative screening along the northern side of the property. The residence will likely have views of the solar panels from all other angles.
10	355	699	1364	Residence has scattered existing vegetative screening along the Northwest side of the property.
11	2511	2634	3743	Residence has existing vegetation and will be screened from the proposed solar facilities.
12	863	899	1347	Residence has some existing vegetative screening along the west side of the farmstead, screening the residence from majority of the solar panels.
13	2184	2215	2683	Residence has existing vegetative screening along all sides, which will fully screen the residence from the solar panels.
14	273	319	787	Residence has some existing vegetative screening along all sides of the farmstead, screening the residence from majority of the solar panels.
15	2394	2431	3039	The existing vegetation on the western side of the property will likely screen the residence from the proposed solar facilities.
16	1584	1642	2087	The existing vegetation on the eastern side of the property will likely screen the residence from the proposed solar facilities.
17	2127	2138	2336	Residence has existing vegetative screening along all sides of the property.
18	2165	2358	2711	Residence has existing vegetation on the northern side of the property and will likely be screened from the proposed solar facilities.
19	3178	3236	3762	Residence has existing vegetation on the northern side of the property and will likely be screened from the proposed solar facilities.

20	2193	2302	3363	Residence has existing vegetation on the northern side of the property and will likely be screened from the proposed solar facilities.
21	1539	1659	2327	Residence has existing vegetative screening along all sides of the property and will likely be screened from a majority of the proposed solar facilities.
22	679	719	1430	Residence has existing vegetative screening along the northern side of the property and will likely be screened from a majority of the proposed solar facilities.
23	1765	1935	2449	Residence has existing vegetation on the southeastern side of the property and will likely be screened from the proposed solar facilities.
24	3034	3699	4053	Residence does not have any existing vegetation that would screen the property from the proposed solar facilities
25	1731	4768	5002	Residence has some existing vegetation on the northern side of the property, however, it will likely not be screened from proposed solar facilities.
[1] Residences 7, 9 and 12 are within the Project Area.				

Impacts and Mitigative Measures

The Project will convert predominately agricultural land (see **Table 21** in **Section 4.2.11.2** and associated discussion) to a Solar Facility for the life of the Project and will alter the current viewshed. Rows of solar PV solar modules together with perennial vegetation will be constructed over most of the Preliminary Development Area. PV solar modules use dark anti-reflective glass panels that are designed to absorb sunlight to produce electricity. The images in **Section 3.0** provide a reference for how the Project will appear during operation. PV solar modules commonly used for this type of project absorb up to 98 percent of the incoming sunlight depending on the angle of the sun, glass texture and use of anti-reflective coatings. Therefore, during operation of the facility there will be little glare from the PV solar modules used for the Project.

Solar arrays will occupy most of the disturbed area of the Project. Electrical transformers and inverters, a Project Substation, Project BESS, a new Xcel Switchyard, an O&M Facility, and access roads will utilize the rest of the disturbed area. Most of the facility, including the solar arrays, will be low-profile, typically less than 12 feet, but no more than 15 feet tall. While the proposed substation, BESS, Switchyard and O&M Facility are similar in visual impacts to existing electrical facilities and buildings in the area, the Project solar arrays will create new aesthetic impacts, changing the viewscape in these areas from crops to solar arrays.

Since the Project Area and vicinity are generally flat with existing trees along agricultural fields and vegetative cover along wind rows, the visual impact of the Project is expected to be limited to higher elevation points, as well as immediately surrounding land, which is mitigated to an extent by existing vegetative screening at most residences as indicated in **Table 15**. The feedback that Lake Wilson Solar has gathered from surrounding landowners or community for the Project to date has not indicated aesthetic or visual concerns associated with the Project. As stated above and in **Section 5** below, the Project has garnered strong positive landowner involvement and support, as well as overall wide community support.

The Project Substation and new Xcel Switchyard will contain transmission pole A-frame deadend structures that will support above ground conductors. The deadend structures will be up to 100 feet in height. These transmission facilities will be grouped together and connect to the existing Xcel Energy Fenton – Chanarambie 115 kV HVTL that travels north south along the eastern edge of the Project Area. The existing Fenton – Chanarambie 115 kV HVTL spans the length of the western Project boundary and is visible from nearby roadways and residences. The nearest residence (R16) is about 0.3 mile from the 115 kV HVTL and about 0.5 mile from the POI. From outside the interconnection facilities, these structures would be most visible from 70th Avenue and 81st Street. Other power poles with heights up to 100 feet are located in the vicinity of the Project and adjacent to roadways. The addition of Project transmission facilities is not expected to significantly alter the viewshed or increase visual impacts.

The Project PV solar modules (surrounded by security fence) will be visible from adjacent roadways and parcels up to approximately 0.5 mile given their relative low profile and color. Project fencing will look similar to existing agricultural field fencing. While relatively few trees exist within the Project Area, Lake Wilson Solar has designed the Project to avoid tree clearing which will help to break up the view of the arrays in some areas.

Exterior security lighting will be installed at the O&M Facility, Project Substation, and the new Xcel Switchyard; as needed by maintenance personnel, lights will be used if work or maintenance is required after dark. A motion sensing, down casting security light will be installed at the locked entrance of the Project. Switch activated lights will be placed at each inverter for repair purposes. Impacts to light-sensitive land uses are not anticipated given the rural Project location coupled with minimal required lighting for operation of the Project.

4.2.7 Socioeconomics

The Project is located in rural Leeds Township, Murray County, MN. No incorporated communities are located within the Project Area (see **Figure 1**). There are two cities that are within two miles of the Project: Lake Wilson and Hadley. Lake Wilson is located just over one-mile northwest of the Project Area. Hadley is sited just over one-quarter mile east of the Project Area. Data is provided at the Township, County, and State levels for the purpose of comparing the demographics in the Project Area to a larger area. Data was retrieved from the U.S. Census Bureau's 2020 Decennial Census data and the 2020 American Community Survey 5-Year Estimates. There is no indication that any minority or low-income population is concentrated within the vicinity of the Project or that the PV solar modules will be placed in an area occupied by a minority group.

This discussion does not address every socioeconomic measure, but instead addresses the most applicable statistics related to the Project. The socioeconomic statistics that best characterize the demographic and economic context within the vicinity of the Project that potentially could be

affected by construction and operation of the Project include population, race, housing, income, and poverty.

4.2.7.1 Population and Race

Population and race characteristics for Leeds Township, Murray County, and Minnesota are detailed in **Table 16**. Leeds Township comprises a small portion of the overall county population. The population of Murray County in 2020 was 8,179 with a median age of 47.9 years. Leeds Township had a population of 189 and a median age of 44.2 years.

The predominant race in Leeds Township and Murray County is White (non- Hispanic or Latino). Less than 10 percent of the county population is categorized as a minority population. The largest minority population in Murray County is comprised of residents who identify as Hispanic or Latino Origin at 4.6 percent (of any race). Based on these statistics, there is no indication that minority populations are concentrated within the vicinity of the Project, or that the Project is located in an area occupied by a minority population.

Table 16: Population and Race Characteristics

Category	Leeds Township	Murray County	Minnesota
Total Population	189	8,179	5,706,494
Median Age	50	47.9	38.1
Race and Hispanic or Latino Origin			
One Race (%)	91.5	98.0	89.8
White (%)	94.7	96.2	82.4
Black or African American (%)	0.0	0.3	6.9
American Indian or Alaska Native (%)	0.0	0.1	1.0
Asian (%)	0.5	1.3	5.2
Native Hawaiian/Pacific Islander (%)	0.0	0.0	0.0
Some Other Race (%)	0.0	0.1	0.4
Two or More Races (%)	4.8	2.0	4.1
Hispanic or Latino Origin (of any race) (%)	3.7	4.6	6.1
White Alone, not Hispanic or Latino (%)	91.0	91.5	76.3
Population Density (per square mile)	6.7	11.6	66.6

4.2.7.2 Housing

Murray County had 4,388 total housing units in 2020 with 807 vacant housing units, while Leeds Township had 78 total housing units and 0 vacant housing units. The housing characteristics are detailed in **Table 17**.

Table 17: Housing Characteristics

Category	Leeds Township	Murray County	Minnesota
Total Households	78	3,659	2,207,988
Average Household Size	2.4	2.2	2.5
Total Housing Units	78	4,388	2,485,558
Occupied	78	3,581	2,253,990
Vacant	0	807	231,568

In the City of Hadley, Minnesota, there were 0 vacant housing units reported in 2020 (U.S. Census Bureau, 2020). In addition, according to the City of Slayton's website, one motel and several campgrounds are available in the greater Slayton area. Hotels in the surrounding cities of Worthington, Luverne, and Pipestone could support an influx of construction workers if needed.

4.2.7.3 Income and Poverty

As shown in **Table 18**, the per capita income for Murray County is $32,791. Leeds Township had a slightly lower estimated per capita income of $31,349. Leeds Township had a lower unemployment rate than Murray County as a whole and significantly less individuals living below poverty level.

The primary industries in Murray County are classified as Educational Services and Health Care and Social Assistance (24.17 percent), Agriculture, Forestry, Fishing, Hunting, and Mining (12.6 percent) and Manufacturing (11.9 percent). It should be noted that the current situation with COVID-19 could still be affecting current demographic statistics within the vicinity of the Project related to population, primary occupations, and income and unemployment rates.

Overall, Leeds Township had a lower per capita income, a lower unemployment rate, and lower proportion of persons living below the poverty level than Murray County and Minnesota.

Table 18: Income and Poverty

Category	Leeds Township	Murray County	Minnesota
Per Capita Income	31,349	32,791	38,881
Unemployment Rate (population over 16 years) (%)	0.0	2.8	3.8
Persons Living Below Poverty Level (%)	0.0	7.6	8.3

4.2.7.4 Environmental Justice

Environmental Justice (EJ) refers to the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (MPCA, 2022-

b). In general, EJ is intended to ensure all people benefit from equal levels of environmental protection and have the same opportunities to participate in decisions that may affect their environment or health (MPCA, 2022-b). Minority and/or low-income communities are often concentrated in small geographical areas within the larger geographically and/or economically defined population. Minority communities and low-income communities may constitute a very small percentage of the total population and/or geographical area.

Lake Wilson Solar evaluated the Minnesota Areas of Environmental Justice Concern interactive map created by the Minnesota Pollution Control Agency (MPCA, 2022-b) which identifies areas of EJ concern in Minnesota. The MPCA uses U.S. Census tract data in preparing the mapping. A census tract is considered to be an area of concern if it meets one or both of the following: the number of people of color is greater than 50 percent, or more than 40 percent of the households have a household income of less than 185 percent of the federal poverty level. Additionally, communities within Tribal boundaries are also considered areas of concern for Environmental Justice.

The Project is not within an MPCA-identified area of concern for Environmental Justice. The Project Area is included in Census Tract #9002, which consists of approximately 33% of Murray County (the southwest portion of the county) and includes the communities of Lake Wilson, Chandler, Iona and Fulda. In Census Tract #9002, 24.37% of people (with a +/- 7.5% margin of error) reported income less than 185 percent of the poverty level. No portion of the census tract, including the Project Area includes over 50 percent people of color.

Impacts and Mitigative Measures

No measures to mitigate socioeconomic or Environmental Justice impacts are needed because the Project is anticipated to achieve a positive socioeconomic benefit. Owners of land where the Project will be constructed have entered into easement and lease agreements or purchase contracts with the Applicant and are compensated for the use and/or purchase of the applicable land based upon these agreements.

The Project is designed to be socioeconomically beneficial to the landowners and those who reside near the Project Area, local governments, and communities. The development of solar energy in this part of Minnesota has been important in diversifying, supporting, and strengthening the personal income tax base of southwestern Minnesota. As no areas of concern for Environmental Justice were found within the Project Area, this Project will not negatively impact minority groups or other groups/areas of concern.

Construction of the Project would provide temporary increases to the revenue of the area through increased demand for lodging, food services, fuel, transportation and general supplies. The Project will also create new local job opportunities for various trade professionals that live and work in the area, and it is typical to advertise locally to fill required construction positions. Opportunity exists for sub-contracting to local contractors for gravel, fill, and civil work. 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 expected to be available in Murray County or Minnesota to serve the Project's basic infrastructure and site development needs. Specialized labor will be required for certain aspects of the Project. It may be necessary to import specialized labor from other areas of Minnesota or neighboring states. The relatively short construction duration often precludes special training of local or regional labor, and much of the workforce needed to construct a solar facility must be comprised of Minnesota licensed electricians because much of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code.

Lake Wilson Solar will issue an RFP to contractors to construct the Project. Lake Wilson Solar will include preferences for contractor bids that utilize local, construction craft employees to the greatest extent feasible in accordance with the Project's budget, timeline, industry standards and requirements, and corporate safety policies. Lake Wilson Solar will require the selected contractor to work with labor unions, local subcontractors, or other vendors to implement a project construction staffing model that attempts to maximize local hiring and local economic benefits for the Project, while ensuring the Project is safely built on time and on budget.

Effects on temporary or permanent housing are anticipated to be negligible. During construction, out-of-town laborers will likely use lodging facilities nearby. The operations and maintenance of the facility will require approximately four or five long-term personnel. The Project anticipates that sufficient temporary lodging and permanent housing will be available within Murray County, and within the Slayton, Worthington, Luverne, and Pipestone areas, to accommodate construction laborers and long-term personnel.

The Project is expected to produce beneficial socioeconomic effects to the area. Wages will be paid, and expenditures will be made to local businesses and landowners during the Project's construction and operation. Easement agreement payments and purchase option payments paid to the landowners will offset potential financial losses associated with removing a portion of their land from agricultural production. The Project is expected to generate an estimated average annual solar energy production and property tax revenue over the life of the project of approximately $330,000 for Murray County and approximately $75,000 for Leeds Township. It is also expected to support up to 250 jobs during the construction and installation phases, and during the anticipated 35-year operational life of the Project it is expected to support up to 5 onsite jobs and 11 indirect jobs in Murray County, and an additional 9 indirect jobs in the State of Minnesota. The Project will also contribute to the local economy through land rent payments to participating landowners and direct/indirect purchases of goods and services.

Temporary construction jobs within Murray County will generate indirect economic benefits as employees spend their income on local goods and services and pay local sales tax. As an operating facility, the Project will annually generate an estimated $4.5 million in economic output for the

State of Minnesota by supporting onsite and indirect jobs in Minnesota as described above and distributing nearly $1.7 million in earnings. Adverse socioeconomic impacts will be limited to the temporary loss of the agricultural production on the land currently farmed. However, these temporary losses are offset by the payments to the landowners from the Project. The socioeconomic impacts associated with the Project will be positive; therefore, no mitigation measures are proposed.

4.2.8 Cultural Values

Cultural values include those perceived community beliefs or attitudes in a given area, which provide a framework for community. According to the U.S. Census Bureau (2020), the population of Murray County derives from a mostly European heritage accounting for approximately 96.2% of the population, followed by 4.6% Hispanic, 1.3% Asian, 0.3% African American, and 0.1% Native American. The majority of the population in Murray County identifies as Caucasian with an ethnic background of European origin. The region surrounding the Project has cultural values tied to the area's German, Norwegian and Native American heritage, and the agricultural economy. Cultural representation in community events appears to be tied to geographic features (such as nearby lakes), seasonal events, national holidays, and municipal events as well as ethnic heritage.

Cultural representation in community events appears to be more closely tied to art, food, seasonal events, national holidays, and municipal events than to those based in ethnic heritage. Examples of regional cultural events include summertime festivals such as the Murray County Fair (Murray County Fair, 2022).

Construction of the proposed Project is not expected to conflict with the cultural values and heritage of the area.

Impacts and Mitigative Measures

Construction and operation of the Project would not impact public participation in the regional community cultural events noted above, as the Project Area is located outside of municipal areas. Therefore, no impacts to cultural values are anticipated and no mitigation measures are proposed.

4.2.9 Recreation

Murray County has many various recreational opportunities, primarily including snowmobiling, swimming, kayaking, hiking, camping, bicycling, nature walking, picnicking, boating, and fishing. Murray County also provides people with opportunities to explore museums, parks, and nature centers. There are recreational lakes present in Murray County, including Lake Chetek, Lake Sarah, Lake Wilson, Moon Lake, and Summit Lake.

Information from the MNDNR, Murray County and other federal GIS databases were reviewed to identify recreational resources within and near the Project. No designated public (federal, state, or local) recreational lands are located within the Project Area.

According to the MNDNR Recreation Compass, there are no state forests, national forests, or national wildlife refuges within proximity to the Project Area. Additionally, there are no state-owned Off-Highway Vehicle (OHV) trails and no MNDNR Scientific & Natural Areas (SNAs) identified within a mile of the Project Area boundary (MNDNR, 2022). Also, no lakes with public access are located in the Project Area.

Recreational resources identified within roughly 2 miles of the Project Area are shown in **Table 19** and **Figure 7**.

Table 19: Recreational Resources

Resource	Distance to Project Area Boundary
Carlson WMA	Borders Project Area
Peters WMA	0.4 mile north
Lake Wilson	0.6 mile northwest
Chandler South Unit WMA	0.6 mile southwest
Chandler North Unit WMA	0.8 mile southwest
Camp Summit	0.9 mile northeast
Leeds WMA	1.0 mile northwest
Beaver Creek Snowmobile Trail	1.0 mile north
Casey Jones State Trail	1.8 miles northwest

The nearest public recreational resource to the Project is Carlson Wildlife Management Area (WMA), followed by the Peters WMA, Lake Wilson, and the Chandler WMAs. The nearest MNDNR Aquatic Management Area (AMA) is the Shetek Rearing Pond AMA, located over eleven miles northeast of the Project Area and the nearest state park is the Lake Shetek State Park, located over eleven miles northwest of the Project Area. Camp Summit is an RV park with recreational activities located in Hadley about 1 mile away from the Project Area, and is the only local park located within one mile of the Project Area.

The nearest MNDNR Aquatic Management Area (AMA) is the Shetek Rearing Pond AMA, located over eleven miles northeast of the Project Area and the nearest state park is the Lake Shetek State Park, located over eleven miles northwest of the Project Area.

Impacts and Mitigative Measures

No adverse impacts on Camp Summit are anticipated from construction or operation of the Project due to its distance from the proposed Project. No significant impacts to any other recreational opportunities are anticipated and, therefore, no mitigative measures are proposed for development of the Project.

4.2.10 Public Service and Utilities

4.2.10.1 Public Services and Infrastructure

Public services are those typically provided by a government entity to its citizens and those services are used to benefit public health and safety. These services can include emergency services, potable water, sanitary systems, and utilities. Murray County provides Police services to the area where the Project is proposed; the Lake Wilson Volunteer Fire Department and Chandler Volunteer Fire Department provide fire protection and first responder medical services to the Project Area. The Project is sited near the Murray County Medical Center located approximately five miles east in the City of Slayton, MN.

The Project is located in an area where private wells and septic systems are used at rural and farmstead residences. See **Section 4.5.2.3** for information on MDH recorded wells within one mile of the Project Area.

Five high voltage transmission lines cross the Project Area (see **Figure 6**). The Lake Wilson-Chandler Tap 69 kV and the Hadley-Lake Wilson 69 kV lines travel east-west across the center of the Project Area. The Chandler Tap-East Ridge Tap 69 kV and the Xcel Energy Fenton-Chanarambie 115 kV lines travel north-south along the western boundary of the Project Area. The South Ridge-Chandler Tap 69 kV line begins at the western edge of the Project Area and travels east-west. According to the National Pipeline Mapping System, no natural gas pipelines or hazardous liquid pipelines are located in the Project Area or immediate vicinity (NPMS, 2022).

No AM, FM, microwave, television, or other radio towers were identified in the Project Area according to publicly available FCC sources. Three Private Mobile Transmission Towers were identified within one mile of the Project Area boundary. There are numerous telephone services and broadband providers in Murray County (MN DEED 2020).

Impacts and Mitigative Measures

Lake Wilson Solar will coordinate with Gopher State One Call before and during construction to fully understand infrastructure, utility locations and safety concerns and to avoid possible structural conflicts. Lake Wilson Solar will also conduct an American Land Title Association survey to identify the locations of underground utilities. Final design will minimize and avoid impacts to underground utilities; if conflicts are unavoidable Lake Wilson Solar will coordinate with the utility to develop an approach to reroute or otherwise protect the utility. Underground utilities will be marked prior to construction start.

The Project will interconnect into the existing Xcel Energy Fenton - Chanarambie 115 kV HVTL. During interconnection construction work associated with the new Xcel Switchyard, customers

may experience short outages when the Fenton - Chanarambie 115 kV HVTL is shut down and temporary service is being established. The timing and duration of any service interruptions would be determined and communicated by the interconnecting utility (Xcel Energy). Limited, temporary impacts to service are anticipated to be of short duration and closely coordinated with utilities and landowners.

No pipelines are located in the Project Area or surrounding region; therefore, no impacts are anticipated, and no mitigation measures have been considered.

4.2.10.2 Roadways

Access to the Project will be via existing county and township roads. The major roadways in the area include MN State Highway 30 (Hiawatha Pioneer Trail) and County Highway 28 (80th Avenue). Other roads that surround the Project Area are local County or township roads. The Project Area is bordered by MN State Highway 30 in the northern portion of the site. County Highway 28 travels through the Project Area in a north to south direction. Annual Average Daily Traffic (AADT) counts based on Minnesota Department of Transportation's (MnDOT's) 2017 and 2021 publications of traffic volumes for Murray County are provided in Table 20 (MnDOT, 2017 and 2021).

Table 20: Annual Average Daily Traffic in the Project Vicinity

Roadway	Year	AADT Traffic Volume Total
MN State Highway 30 (Hiawatha Pioneer Trail; northern border of Project Area)	2021	2,058
County Highway 28 (bisecting Project Area in North to South Direction in central portion of Project Area)	2017	35

There will be several access points to the Project. The western portion of the Project will be accessed from 70th Avenue. The central portion of the Project will be accessed from County Highway 28, 90th Avenue, 81st Street, and 91st Street. The eastern portion of the Project will be accessed from 90th Avenue, 81st Street, and 91st Street.

Impacts and Mitigative Measures

Access to the Project will be via existing Township and County roads. With the limited possible exception of minor field access or driveway changes depending on final design, no changes to existing roadways are anticipated. The roads used for access to the Project are shown on the figures and on the preliminary site plan in **Appendix C**.

During the construction phase, temporary impacts are anticipated on some public roads within the vicinity of Project facilities, primarily through additional construction worker traffic, equipment and material deliveries and potentially slow-moving construction vehicles. Lake Wilson Solar will secure necessary local permits for road access and other ancillary aspects of the Project.

Overall construction traffic will use the existing State and County roadway system to access the Project site and facilities to deliver construction materials and personnel. Traffic during construction is estimated to average approximately 150 trips per day for daily construction personnel commuting traffic. This traffic will consist of pickup trucks, cars, and/or other types of employee vehicles arriving onsite for the majority of construction and takes into account carpooling. This traffic will be dispersed across the project area depending on the construction activities at the time. As indicated in **Section 3.3.1**, approximately 2-15 semitrucks per day will be used for delivery of facility components during construction. Semitruck delivery will vary per day depending on time of construction and delivery timeline of equipment.

For purposes of comparison, the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day (AADT). Since the area roadways have AADTs that are well below capacity, this increased traffic may be perceptible to area residents, but the slight increase in volume is not expected to affect traffic function. Traffic congestion during construction will be minimal, and any traffic congestion will be managed, minimized, or mitigated to the extent practicable. To the extent site conditions allow, delivery trucks will be off loaded near the point of use to minimize double handling and the amount of trucking. Signage will be installed to guide trucks to the appropriate roads, after conferring with local officials. Trucks will not be allowed to stage or block public roads. If trucks cannot exit a road in a timely fashion, they will be directed to a designated staging area. Major component deliveries will be required to stagger delivery times and dates so the on-site teams are not overwhelmed with a surge of trucks at one time. Trucks will be directed off major roads, onto secondary roads or the site to minimize the potential for traffic congestion. Traffic delays should be limited to the time it takes for delivery trucks to turn on or off public roads. Lake Wilson Solar will work with Murray County and Leeds Township staff on a road use agreement to address road use and related concerns. This agreement will be completed prior to start of construction. Except for the delivery of the main transformer(s) in the Project Substation, overweight or oversized loads are unlikely given the type of construction and materials required for the Project. If there becomes a need for overweight or oversized loads, Lake Wilson Solar, the equipment vendor, or the transportation company delivering the equipment will obtain the appropriate approvals prior to delivery of the overweight or oversized loads in accordance with the requirements of the authority having jurisdiction over the roads that will be used for the move.[17]

After construction is complete, traffic impacts during the operational phase of the Project are expected to be negligible. A small maintenance crew will commute to site and drive through the area on a regular basis (approximately 3-4 light-duty pickup trucks) to monitor and maintain the facilities as needed; traffic function in the Project Area will not be impacted as a result.

[17] E.g., MNDOT Single Trip permits are only valid for 7 days after issuance. See https://www.dot.state.mn.us/cvo/oversize/permit-types.html

4.2.10.3 Other Transportation Infrastructure

No active or abandoned railways were identified in the Project Area or immediate vicinity. An abandoned railway was identified more than a quarter mile north of the Project Area. The nearest active railways are located approximately 16 miles to the north and northwest.

According to the Federal Aviation Administration (FAA), there are no FAA-registered airports located within three nautical miles of the Project Area.

Impacts and Mitigative Measures

No railways are located in the Project Area; therefore, no crossing or encroachments agreements will be required prior to construction. No impacts are anticipated, and no mitigation measures have been considered with respect to railways.

There are no FAA-registered airports in the Project vicinity that will be affected by the Project; therefore, no mitigation is needed or planned concerning airports.

4.2.11 Zoning and Land Use

4.2.11.1 Zoning

Based on the Murray County Zoning Map (Murray County, 2019), the Project Area is zoned agricultural with lesser areas of special protection (i.e., shoreland). The County's Zoning Ordinance outlines standards for "large solar farms and solar facilities" (Murray County, 2020). Renewable Energy Systems are listed as a conditional land use in the agricultural district, subject to the Murray County Renewable Energy Ordinance (Murray County, 2020).

Lake Wilson Solar is coordinating with County and Township local officials regarding the Project (see Section 5.0 below). The Murray County Renewable Energy Ordinance applies to solar energy systems that are not otherwise subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act (Minn. Stat. § 216E, 2022). Minn. Stat. §216E.10, Subd. 1 states that the SP is the only site approval required for construction of the proposed Project. A SP supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances put in place by regional, county, local and special purpose governments. Regardless, Lake Wilson Solar has applied County standards to the Project where feasible.

The proposed Project will consider the setback requirements noted in the Renewable Energy Ordinance where practicable and as discussed in Section 3.2.1.

4.2.11.2 Land Use and Land Cover

A total of six land cover types were mapped within the Project Area using NLCD data (Dewitz and USGS, 2021). These include cultivated crops (corn and soybean), hay/pasture, grassland/herbaceous, developed land, forest, and wetland (Figure 9 and Table 21).

Developed land within the Project Area generally consists of either structures within the Project Area or public roads, namely 70th Avenue, 80th Avenue, 91st Street, 90th Avenue, 81st Street, and MN State Highway 30. Developed Open Space is associated with maintained vegetation, such as lawns. Pasture/hay and grassland/herbaceous cover types are associated with roadside ditches and uncultivated areas. Areas of emergent herbaceous wetlands are found in the south-central portion of the Project Area. Deciduous forest lands are found in the southeast portion of the Project Area.

Table 21: NLCD Land Cover within Project Area

Land Cover Type	Acres	Percent of Project Area
Cultivated Crops	2,491.1	95.0
Developed (open space, low/med/high intensity)	80.9	3.1
Grassland/Herbaceous	42.6	1.6
Deciduous Forest	0.2	< 0.1
Emergent Herbaceous Wetlands	1.6	< 0.1
Pasture/Hay	4.4	0.2
Total	**2,620.8**	**100%**

Farmsteads are sparsely scattered throughout the Project Area, generally situated near public roads. All proposed Project facilities have been sited away from the residences and setbacks implemented. Based on review of available aerial photography, there are eight residences located on parcels adjacent to the Project Area as shown on **Figure 14**. Additionally, there are four utility scale wind projects exceeding 10 MW nameplate capacity within five miles of the Project Area, the Northern Wind, Rock Aetna, Fenton, and East Ridge wind projects.

Lake Wilson Solar reviewed Murray County's Comprehensive Plan during preparation of the Project design (Murray County, 2016). As feasible, the Project has been designed in compliance with the Comprehensive Plan for Energy Facilities and Infrastructure as a future land use in Murray County.

The Murray County Comprehensive Plan acts as a basis for the Murray County Zoning Ordinance and as a guideline to be used to make adjustments to the land use system of the County. Policies of the Agricultural District are to maintain and conserve agricultural lands which are historically valuable for crop and animal production, pastureland and natural habitat for wildlife. The Comprehensive Plan states that the County will develop policies that protect and enhance the rural landscape.

Lake Wilson Solar has demonstrated a need for the use of a solar energy facility in this location in the CN application and throughout this Application being submitted to the Commission for approval. Lake Wilson Solar has demonstrated the lack of other suitable locations (see **Section 2.5**). Since most Project land will be temporarily leased from participating landowners and land will be returned to agricultural land uses upon decommissioning of the Project, the Project will further the County's goals of providing long-term agricultural opportunities.

Impacts and Mitigation

The Project will temporarily change the land use within the Preliminary Development Area from the predominant agricultural uses to solar energy generation use for the life of the Project within the Preliminary Development Area. The temporary conversion of agricultural land to the Solar Facility will have a relatively minimal impact on the rural character of the surrounding area or Murray County. Expected land use impacts within the Preliminary Development Area are provided in **Table 22**.

Table 22: Existing Land Use within the Preliminary Development Area

Land Use Type	Acres	Percent of Preliminary Development Area
Cultivated Crops	1478.7	97.01
Developed (open space, low/med/high intensity)	32.3	2.04
Grassland/Herbaceous	15.0	0.95
Deciduous Forest	<0.1	<0.1
Emergent Herbaceous Wetlands	0.0	0.0
Pasture/Hay	0.0	0.0
Total	**1,526.0**	**100.0%**

Even though Lake Wilson Solar proposes impacting a relatively small percentage of available farmland in Murray County with the Project, Lake Wilson Solar has coordinated with DOC-EERA, Minnesota Department of Agriculture (MDA), and other applicable stakeholders concerning the Project AIMP (see Appendix E) and VSMP (see Appendix F), as discussed below. The AIMP has been designed to incorporate BMPs into siting procedures; pre-construction, construction, and post construction methods; operational procedures; and decommissioning and restoration procedures to avoid and minimize impacts to soil and site productivity such that pre-construction agricultural productivity (anticipated use, appropriate management) is rapidly returned to the site following decommissioning. The VSMP was developed to address vegetation establishment, reclamation and maintenance of the Project site in accordance with DOC-EERA guidance. Lake Wilson Solar met with MDA staff on December 10, 2021, to discuss the AIMP and VSMP plan contents and site-specific characteristics (see Section 5.0 and Appendix H for agency correspondence).

Normal agricultural activities can continue within some portions of the Project Area not converted to solar modules, access roads, O&M Facility, BESS, transmission facilities, and fencing. After the useful life of the Project, the current agricultural land use would be restored by decommissioning the Project pursuant to the Decommissioning Plan prepared by Lake Wilson Solar (see Section 3.4 and **Appendix G**).

The Project is not anticipated to preclude current or planned land use on adjacent parcels. Upon decommissioning and removal of the Project, the affected parcels may be returned to the existing agricultural use or transitioned to other planned land uses.

The Project has been designed in compliance with the Murray County Zoning Ordinance and Comprehensive Plan. As stated, agricultural activities can be resumed upon decommissioning of the Project. Based on consultations with Murray County, there are no known planned extension of water, sewer, or other services within the Project Area. Construction of the Project would not preclude the future orderly extension of services across property under Lake Wilson Solar's control as these extensions would likely be to existing residences and farm buildings, which will not be impacted by the Project and any such extensions would likely be accomplished by utilizing existing public rights-of-way which will not be impacted by the Project.

As the Project is subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act, the CN and SP to be issued by the MPUC will serve as approval of the Project. Lake Wilson Solar will continue to coordinate with Murray County and Leeds Township on other potential permits for the Project (e.g., road use agreement, driveway permits, utility crossing permits, etc.).

Because no permanent land use or zoning impacts are anticipated, no additional mitigation measures are proposed beyond those described above.

4.3 Land-Based Economies

4.3.1 Agriculture

According to the U.S. Department of Agriculture's (USDA's) 2017 Census of Agriculture, of the 461,000 acres that comprise Murray County approximately 362,578 acres are cropland. A total of 864 individual farms are located in Murray County with the average farm size at 457 acres. The top crops (in acres) include corn, soybeans, and other vegetables harvested for sale. Hogs and pigs top the list of livestock inventory, with a significantly smaller number of cattle and calves making up the remaining livestock (USDA, 2017).

The 2017 market value of agricultural production in Murray County was approximately $338 million. Livestock, poultry, and their products accounted for approximately 46 percent of the total

value of agricultural production, while crop sales accounted for the remaining 54 percent (USDA, 2017).

Agricultural use encompasses nearly 100% of the land within the Project Area (**Table 21 and Figure 9**), with corn and soybean crops and fallow field covering roughly 82% of the total land area (AcreValue, 2021). The remaining land is mostly made up of other agricultural land.

Impacts and Mitigative Measures

As indicated in **Table 22** above, the Project will temporarily impact up to approximately 1,526 acres of cropland within the Preliminary Development Area and will not allow those landowners to use that land for agricultural purposes during the life of the Project. The Project will not result in a significant impact to land-based economies in Murray County as this acreage constitutes less than 0.5% of the cropland land in the county (362,082 acres). Agricultural production would continue in the surrounding areas during construction and operation of the Project.

As provided in the land easement agreements, payments will be made by Lake Wilson Solar to the owners of the land used for the Project. These payments will replace the revenue which would have been generated if agricultural production were continued by the landowners.

Areas disturbed during construction will be repaired and restored to pre-construction contours and characteristics as much as practicable. This restoration will allow the Project's land surfaces to drain properly, blend with the natural terrain, re-vegetate, and avoid erosion. Agricultural production would be allowed to continue in certain areas within the Project Area but outside the fence of the Preliminary Development Area during construction and operation of the Project.

Measures to mitigate topsoil removal include limiting removal to areas designated for spot grading and construction of roads and structures. Impacts to soils will be further mitigated by incorporating erosion control measures during and following construction. Installation activities will implement erosion and sediment control BMPs outlined in the SWPPP, which will be specifically prepared for the Project, and as provided below. BMPs during construction and operation for general agricultural impact mitigation is outlined in the Project AIMP included in **Appendix E**. Vegetation management during construction and post-construction Project operations will be implemented in accordance with the Project VSMP included in **Appendix F**.

The SWPPP will also include a discussion on topsoil and compaction management during construction. During the operating life of the Project, erosion control will be further accomplished by establishment of a perennial vegetative cover under the solar arrays and installation of gravel roads with culverts (as necessary) to redirect concentrated surface water. These actions will preserve the soils in place and will likely result in less soil erosion than is typical with row crop agricultural activities.

As discussed in the SWPPP, AIMP and VSMP, the following is an overview of best practices and mitigation planned during construction:

- Topsoil will be separated from the other subgrade/subsoil materials when earthmoving activities, excavation, or trenching are taking place;
- Construction activities will be halted if weather conditions pose a risk to worker safety and/or would cause significant soil compaction or rutting;
- The construction plan will remain flexible and implement new practices/procedures as needed under the directive of adaptive management;
- Stripped topsoil will be stored on site and any topsoil that is respread will be loosely compacted;
- While performing foundation work, stripped topsoil will be stored for later use and once the construction is complete, topsoil piles will be distributed in a thin layer adjacent to the Project Substation and Xcel Switchyard areas and the topsoil revegetated with an appropriate seed mix;
- Trenching activities will require excavation of topsoil and subgrade materials (which will be segregated) and ultimately backfilled with unscreened native backfill and covered with topsoil;
- Silt fencing on the downside of all hills, near waterways, and near drain tile inlets will all be used to minimize erosion;
- Lake Wilson Solar is committed to preserve soil drainage performance on neighboring, non-participating properties and restoring drain tile systems on participating properties as-needed during operations, or upon Decommissioning if tiles are not deemed necessary during solar operations; and
- Construction-related debris and unused material will be removed by Lake Wilson Solar.

Livestock operations are located within the Project Area and adjacent to the Project Area; however, no direct impacts to livestock are anticipated except for minor disturbances during construction. No conversion of feedlots or pastureland is proposed by the project.

4.3.1.1 Prime Farmland

Lake Wilson Solar conducted a prime farmland assessment to review the feasibility and prudency of potential sites as well as the prime farmland impacts due to the Project (see Prime Farmland Assessment in **Appendix B**). The prime farmland impact assessment for the Project followed guidance issued by the Minnesota Department of Commerce Energy Environmental Review Analysis (EERA) in May 2020 (Guidance) as it relates to the Rule.[18] The EERA Guidance was prepared to help developers define factors they should consider and describe steps they should take when developing a permittable solar site on prime farmland.

[18] *Solar Energy Production and Prime Farmland – Guidance for Evaluating Prudent and Feasible Alternatives* (Minnesota EERA, May 19, 2020). See also https://mn.gov/eera/web/doc/13929/.

Soil characteristics within the Project Area were assessed using the Soil Survey Geographic database (SSURGO) (Soil Survey Staff, 2022). 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 (Soil Survey Staff, 2022). **Table 23** lists the prime farmland classifications within the Preliminary Development Area 10). **Figure 10 and 10a** show the prime farmland classifications within the Project Area.

Table 23: Prime Farmland Classifications within Preliminary Development Area

Farmland Classification	Preliminary Development Area (acres)	Percent of Preliminary Development Area
Prime Farmland	762.2	49.9
Prime Farmland if Drained	415.2	27.2
Prime Farmland if Protected from Flooding or not Frequently Flooded during the Growing Season	7.4	0.5
Statewide Importance	191.2	12.5
Not Prime Farmland or Statewide Importance	149.8	9.8
TOTAL	**1,526.0**	**100**

The majority of the Preliminary Development Area is located on prime farmland/prime farmland if drained/prime farmland if protected from flooding or not frequently flooded during the growing season and roughly seven percent is located on farmland of statewide importance (discussed below). Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pasture, woodland, or other lands). The SSURGO notes whether a soil meets the definition of being Prime Farmland. Prime Farmland contains soils that are considered to be nationally significant and is officially defined by the USDA as *land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses*. Only land officially classified by the USDA is considered Prime Farmland. Urbanized land and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating) (Soil Survey Staff, 2022).

Approximately 762 acres of designated prime farmland, 415 acres of prime farmland if drained, and 7 acres of prime farmland if protected from flooding or not frequently flooded during the growing season are located within the Preliminary Development Area. These acreages of prime farmland would be temporarily taken out of production for the life of the Project but would not be

permanently removed. In addition to prime farmland, 191 acres (12.5%) of the Preliminary Development Area is on farmland of statewide importance. These areas are classified as soils that, although they do not have national significance and are not considered prime farmland, are of statewide importance for agriculture. In addition to that distinction, farmland of statewide importance does not carry the same protections as Prime Farmland as discussed below.

In addition to the proposed Project site, Invenergy Solar Development, owner of Lake Wilson Solar, identified and evaluated another potential site (the Hat Trick site) in Roseau County near Warroad Minnesota in an attempt to find a location for the Project that would utilize fewer acres of prime farmland (See **Appendix B).** The Hat Trick site is not considered an alternate to the proposed Project site but is described in **Appendix B** to document Lake Wilson Solar's consideration of a potential site for the Project in another area of Minnesota to demonstrate compliance with the 'prime farmland exclusion rule' found in Minnesota Rules 7850.4400, subp. 4 (Rule). At one point in time, Invenergy Solar Development was able to secure leases on non-prime farmland at the Hat Trick site from local landowners for potential use as solar photovoltaic electricity generation.

Invenergy Solar Development ultimately ruled out the Hat Trick site because the project area did not have a suitable point of interconnection that would enable the Project to obtain the requisite Network Resource Interconnection Service (NRIS) that would make the project attractive to customers, and because the Hat Trick site was unable to meet the 0.5 acre of prime farmland per MW of net generating capacity limit set in the Rule due to existing environmental constraints. Invenergy Solar Development no longer has any leases or purchase options that would allow it to use the Hat Trick site for the Project. Invenergy Solar Development does not have condemnation rights and therefore is unable to force any landowner to grant Invenergy Solar Development a lease, easement or purchase option in any other area. The assessment of the Hat Trick site included review of the feasibility of the site for the Project, the prime farmland impacts that would result from use of this site for solar, and a determination that the Hat Trick site was not feasible or prudent. Accordingly, there are no feasible or prudent alternatives to the proposed Project Area (as herein defined) for the Project.

Impacts and Mitigative Measures

The Project site was chosen, in part, due to the capacity of and proximity to the Xcel Energy Fenton – Chanarambie 115 kV HVTL (thus minimizing the need for extensive new transmission facilities). Additionally, willing landowners and community interest in the Project, the lack of farmsteads and rural residences and human settlement impacts, the lack of other environmental constraints, adequate roads for access, flat terrain, and overall need for renewable energy generation make the project location optimal for a solar development.

Grading activities with the greatest potential to affect topsoil conditions is likely to be for grading associated with construction of access roads, the Project Substation, BESS, new Xcel Switchyard and O&M Facility. Cut and fill volume estimates for the access roads, basins, inverter pads, Project

Substation, BESS, new Xcel Switchyard and O&M Facility are pending further design engineering. All grading and vegetation management during construction and operation of the Project will occur in accordance with the AIMP and VSMP, with any potential impacts to be mitigated accordingly.

Upon construction of and implementation of the mitigative measures described in this SPA, AIMP and VSMP, the Project will directly and indirectly provide benefits and improve the water quality in the Des Moines Headwaters and Rock Watershed Districts in which the Project is located. These benefits include:

- decreasing the amount of nutrients (including phosphorous and nitrogen) applied to the Preliminary Development Area during the anticipated 35-year life of the Project (i.e., row crop agricultural operations would temporarily cease during Project construction and operation);
- managing nutrients at the Project site through incorporation, installation, establishment and maintenance of perennial plant species, as detailed in the VSMP and AIMP that will be implemented for the life of the Project;
- designing, engineering, permitting, constructing, operating and maintaining a stormwater management system (i.e., stormwater ponds) in accordance with applicable Minnesota Pollution Control Agency (MPCA) rules and regulations to effectively address stormwater runoff from the Project site;
- obtaining and implementing a National Pollutant Discharge Elimination System construction stormwater runoff permit/Stormwater Pollution Prevention Plan from the MPCA during construction to address, manage and control erosion, stormwater runoff from construction activities and re-establishment of vegetative cover post-construction;
- possibly increasing the water storage capacity and controlling flow structures with the installation and establishment of native or regionally appropriate plant species in the vegetative cover in combination with the stormwater management facilities (ponds) to be installed for operation of Project facilities which will help improve site soil health and related conditions (installation of these Project facilities will improve downstream water quality, and improve site soils over time); and
- maintaining county drain tile and judicial drainage ditches across the Project site to ensure no impact to neighboring agricultural land uses and field drainage

4.3.2 Forestry

The Preliminary Development Area is located almost solely on agricultural land (**Figure 9**). Similarly, there are no resources within the Project Area considered to be forestry resources for commercial use. The primary tree cover within the Project Area is associated with undeveloped wetlands and waterways, fence lines, and old shelterbelts adjacent to homesteads.

Impacts and Mitigative Measures

No economically significant forestry resources will be affected by the Project; therefore, no mitigation measures are proposed.

4.3.3 Tourism

This region draws tourists to participate in recreational activities such as festivals, fairs, markets, celebrations and outdoor recreation like fishing, boating, camping, bicycling, and hiking. Primary tourism activities in the vicinity of Project facilities are associated with the recreational resources discussed in **Section 4.2.9**, and local community festivals and other events. Examples of local community festivals include summertime events like the Murray County Fair (Murray County Fair, 2022).

No recreation resources are located in the Project Area (see **Figure 7**), further discussed in **Section 4.2.9**. Additional resources are located outside of the Project Area boundary.

Impacts and Mitigative Measures

Because all Project facilities will be located on private land, there will be no direct impacts to existing recreational facilities and tourism activities that typically generate revenue for the local community. Any potential impacts to off-site recreation or tourist attraction areas may be mitigated by implementing techniques including, but not limited to, the following: pre-seed prior to construction and limit vegetation disturbance to that which is critical for Project construction and maintenance; implement stormwater BMPs to minimize stormwater-related impacts resulting from construction activities; manage state and county listed noxious and invasive weeds as necessary for Project operation and in accordance with the VSMP; revegetate the site to minimize visual impacts and protect newly established perennial vegetation from wind and water erosion with appropriate BMPs in accordance with the VSMP; and reduce noise by limiting construction activities to regular working hours to the extent feasible.

Lake Wilson Solar will construct the Project facilities within the limits of the Preliminary Development Area and no road closures are anticipated during active construction. Lake Wilson Solar will closely coordinate construction activities with County and Township staff if any closures are determined necessary. The annual events hosted by the County do not occur within the Project Area; most of these events are held within City limits or in areas outside of the Project Area. No impacts to public access to these events is anticipated during construction or operation of the Project.

No significant impacts to tourism or recreational resources are proposed, therefore, no mitigation measures are proposed.

4.3.4 Mining

According to the Minnesota Department of Transportation (MnDOT) County Pit Maps, there are no mines located within the Project Area (MnDOT, 2000). One active gravel pit is located southwest of the City of Lake Wilson and one inactive gravel pit is located west of Lake Wilson. No other mines were identified within five miles of the Project Area boundary.

Impacts and Mitigative Measures

No impacts to mining operations are anticipated; therefore, no mitigation measures are proposed.

4.4 Archaeological and Historical Resources

Lake Wilson Solar has been considering Project effects upon archaeological and historical resources. Investigations to date include desktop review, file searches, and survey fieldwork. Additionally, Lake Wilson Solar engaged cultural resource regulatory and tribal stakeholders to introduce the Project, request comments and gain feedback as detailed in **Section 5** below (see also **appendices I and K**). As requested by the DOC EERA and in general accordance with Governor Walz Executive Order 19-24 (dated April 4, 2019), which requires state agencies to conduct meaningful and timely consultation with Minnesota Tribal Nations, Lake Wilson Solar mailed and emailed a Project introduction letter and map to the Minnesota Tribal Nations requesting feedback on the Project (**Appendix K**). As described in **Section 5.0** below, letters were sent to the Tribal Nations on November 5, 2021, and July 29, 2022.

Westwood performed a review of records for cultural resources in September 2021 and this review is provided in the Cultural Resources Literature Review dated October 12, 2021 (see **Appendix I**). This review included a request for data from the Minnesota State Historic Preservation Office (SHPO) and a review of the online Portal maintained by the Office of the State Archaeologist (OSA). The records review study area included the Project Area and a one-mile buffer. As SHPO offices were closed due to the COVID-19 pandemic, in-person review at SHPO and OSA could not be performed to review previous survey reports. In October 2022, Westwood updated the 2021 review based on the final project area (see **Appendix I**).

A review of archaeological data indicated that no previously recorded archaeological sites had been identified in the Project Area, and two archaeological sites have been recorded in the one-mile buffer. Both are alpha sites; they were identified through historic documentation or landowner/collector's reports but have not been verified by a professional archaeologist. They are unevaluated for eligibility in the National Register of Historic Places (NRHP). Documentation indicates that a third recorded site in the buffer was mistakenly identified and is a natural geographic feature. No historic/architectural resources were previously recorded in the Project Area, but twenty resources were inventoried in the one-mile buffer. Of those, two are immediately adjacent to the Project's northern boundary. Seventeen historic resources are located more than

0.65 miles northwest in the town of Lake Wilson. None of the historic/architectural resources have been evaluated for listing in the NRHP.

Westwood's review determined that the Project Area is located primarily in Minnesota Archaeological Region 2s – Prairie Lake (South). Sites of earlier prehistoric periods in this region are generally located on islands and peninsulas of lakes, with some villages near major rivers. Winter villages would be located in the wooded areas of large river valleys. Temporary campsites could be found on rivers and around lakes. Late prehistoric large village sites may be found on the terraces of the Minnesota and Blue Earth rivers, with some campsites on islands and peninsulas of lakes (Gibbon et al., 2002). The far western portion of the Project Area is within Minnesota Archaeological Region 1 – Southwest Riverine. Early prehistoric sites will most likely be near streams and glacial features (Gibbon et al., 2002). Similarly, middle prehistoric sites will also most likely be near rivers and streams. Camps of the Woodland period will most likely be those of temporary use and found on the terraces of significant streams with special use activities occurring anywhere.

Westwood performed a Phase I Archaeological field survey for the original planned development areas in November 2021 (**Appendix I**). Survey methods for the analysis included background research, a literature review, and field investigations in the form of a pedestrian survey. The pedestrian visual ground surface survey analyzed the Preliminary Development Area in 15-meter interval transects. Results of the field investigation concluded that no new or previously recorded archaeological, architectural, or historic sites are present in the Preliminary Development Area. An additional Phase I Archaeological field survey of all areas not previously surveyed in the Preliminary Development Area was completed in late October 2022 and an updated report is included in **Appendix I**.

Impacts and Mitigative Measures

No previously recorded archaeological or historic sites will be directly impacted by the proposed Project. A Phase I archaeological survey and report for the majority of the Preliminary Development Area determined that no archaeological, architectural, or historic sites are present in the portion of the Preliminary Development Area surveyed. Additional field surveys were completed on the remaining Preliminary Development area in October of 2022. These field surveys also determined that no archaeological, architectural, or historic sites are present in the remaining portion of the Preliminary Development Area surveyed. The results of all the various background and fieldwork analyses concluded that no further work is recommended with the current Project designs.

Should previously unknown archaeological resources be inadvertently encountered during Project construction and/or operation, work will stop, and the discovery will be examined by an archaeologist. If the discovery is determined to be a significant cultural resource, SHPO and OSA will be notified. With regard to a discovery of potential human remains, procedures would be

followed to verify if the remains are human and that the appropriate authorities would become involved quickly and in accordance with local and state guidelines.

4.5 Natural Environment

4.5.1 Air

Minnesota has a good record of complying with federal air quality standards, and the State's air quality has been improving for most pollutants. According to the U.S. EPA Green Book National Area and County-Level Multi-Pollutant Information database, all areas of Minnesota are currently attainment areas for all criteria pollutants, with the exception of an area in Dakota County (EPA, 2022b). Much of this decline in pollution is attributed to lowered emissions from major facility or "point sources" from enforcement of the Clean Air Act (CAA) and subsequent amendments. The CAA requires that the U.S. EPA establish National Ambient Air Quality Standards (NAAQS) for various pollutants, including carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution and sulfur dioxide. The Project Area presently meets federal air quality standards.

In recent years, because of an increased understanding of the health effects of certain pollutants, air quality standards have become stricter and acceptable thresholds for some pollutants have been lowered including the daily fine particle standard, the ozone standard, and lead standards. According to the MPCA's January 2021 Report to the Legislature regarding the state of Minnesota's air quality, air pollutants that affect those most vulnerable to air pollution (e.g., children, elderly, and people with chronic lung or heart conditions) come from a variety of sources—including vehicles, off-road equipment, and small neighborhood sources (e.g., gas stations and dry cleaners) in addition to large facilities. In particular, mercury air pollution is a priority in Minnesota, with emissions from electric utilities in 2019 down by 93% from 2005 levels (MPCA, 2021). Renewable energy generation facilities that do not emit any mercury are exempt from Minnesota mercury emissions reporting requirements as they do not notably contribute to pollutant levels (MPCA, 2021).

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 O3, PM2.5, SO2, NO2, and 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 and unhealthy, or very unhealthy (MPCA, 2022-c).

The Project is located nearest to the air quality monitor in Marshall, Minnesota. This station is located approximately 30 miles north of the Lake Wilson Solar Energy Center. This station monitors O3 and PM2.5. The most recent annual AQI Days (AQI) for Marshall for the years 2015-2021 is provided in **Table 24** (MPCA, 2022-d).

Table 24: Days in Each Air Quality Index Category (Marshall, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2021	289	65	3	2	0
2020	330	30	0	0	0
2019	326	35	0	0	0
2018	333	32	0	0	0
2017	329	31	0	0	0
2016	336	19	1	0	0
2015	338	26	1	0	0

Air quality has largely been considered good (i.e., approximately 90% of reported days) for the majority of the past seven reported years in Marshall. Since 2015, the largest number of days classified as moderate (65), unhealthy for sensitive groups (3), and unhealthy (2) occurred in 2021. No days have been classified as very unhealthy since 2015.

Impacts and Mitigative Measures

Minor temporary effects on air quality are anticipated during construction of the proposed Project as a result of exhaust emissions from construction equipment and other vehicles, and from fugitive dust from wind erosion of agricultural land that becomes airborne during dry periods of construction activity.

The magnitude of air emissions during construction is influenced by weather conditions and the type of construction activity. Exhaust emissions, primarily from diesel and other carbon-based fueled equipment, will vary with the phase of construction. Emissions from construction vehicles will be minimized by using modern equipment with lower emissions ratings and properly functioning exhaust systems. Adverse effects on the surrounding environment are expected to be negligible because of the short and intermittent nature of the emission and dust-producing construction phases. These effects will most likely be less than the historic emissions from farm machinery and fugitive dust produced during normal farming operation that would otherwise typically occur within and near the Project site.

Post-development emissions will be less than current and historic emissions due to the cessation of farming and the installation and maintenance of perennial plantings and other vegetation planned at the Project site under solar panels and other areas disturbed by construction. The soil fertility at the site is suitable for the planned perennial mixture, therefore, the use of any fertilizers or soil amendments is not anticipated and will therefore not contribute to any emissions. In accordance with sections 4.4 and 4.5 of the VSMP, herbicide application will be limited to spot treatment and will be conducted in such a manner to minimize potential drift; as such, herbicide application will negligibly contribute to emissions, if at all. While some dust may be produced from use of planned gravel access road from O&M vehicles, this emission is expected to be minimal, temporary and infrequent throughout the year. Emissions generated during operational

activities will further be limited in duration and frequency from use of relatively few trucks, cars and other related O&M vehicles as part of O&M activities associated with the Project. The normal operations of the emergency generators will be limited to once-a-month testing, consisting of a 30-minute run time for each unit which may emit nominal amounts of emissions that are standard for engines burning fossil fuels such as: carbon monoxide (CO), carbon dioxide (CO2), nitrogen oxides, sulfur oxides, hazardous air pollutants, and particulate matter. The generators will comply with federal new source performance standards and emissions are anticipated to be below state and federal standards that would require state or federal operational permits.

Applicable BMPs will be used during construction and operation of the Project to minimize dust emissions. Additional BMPs will be implemented as part of the VSMP and AIMP (see **Section 4.3.1** and **Appendices E and F**) which will also address emissions (e.g., mulching exposed soils, installing and maintaining vegetative cover, engineering controls, reducing vehicle and equipment speed, maintaining equipment and exhaust/mufflers, etc.). Additional practices may include watering or treating haul and access roads and other exposed dust producing areas, containment of excavated material, protection of exposed soil, soil stabilization, and treating stockpiles to control fugitive dust. As part of the required construction stormwater permit that will be obtained for the Project, a NPDES/SDS CSW Permit and associated SWPPP will be developed prior to construction and implemented during construction that will include BMPs to minimize to potential for fugitive dust.

The Project is expected to have an overall effect of improving air quality by replacing electrical generation produced from the burning of fossil fuels. This is expected to reduce harmful greenhouse gas and other pollutant emissions detrimental to air quality. Additionally, since agricultural operations at the Project site will no longer occur during construction and operation of the facility, reduced particulate emissions, dust and farm equipment exhaust would occur and further improve air quality at and in the vicinity of the site. Following construction, the facility will not directly emit pollutant emissions.

4.5.2 Soils, Geology, and Groundwater

Soils, underlying geologic bedrock formations, groundwater and other hydrogeologic resource features of the Project Area were identified during desktop evaluations and included use of:

- GIS layers (NRCS Soils of Murray County, Minnesota County Well Index, Karst Feature Mapping of Minnesota, USGS Topographic Mapping);
- Murray County Soil Survey (USDA, 1990); and
- Observations made during various field studies conducted within the Project Area during 2020.

4.5.2.1 Soils

The Soil Survey of Murray County (USDA, 1990) indicates that the soils of Murray County are primarily clay loamy soils. The near level to very steep soils were formed medium textured to moderately fine textured, calcareous glacial till. The different parent materials, topography, and native vegetation account for the variety of soils in the County.

Soils within the Project Area mainly consist of silty clay loams, clay loam and loamy soils (see **Figure 11** and **Appendix F**). Most of the Project Area is on level to nearly-level topography, which is consistent with the current row-crop agricultural production. Large areas of hydric soils are present across the Project Area where historic wetlands were present prior to drainage (e.g., installation of drain tiles and county ditches) or where wetlands are presently located.

The majority of the soils are classified as predominantly non-hydric (38.6 % or 1,012.0 acres), followed by predominantly hydric (34.7% or 908.6 acres), non-hydric (23.4% or 614.7 acres), and all hydric soil (3.3% or 85.5 acres). The majority of soil in the Project Area is classified as silty clay loam formed from till sediments or alluvial deposits (Soil Survey Staff et al., 2022).

Approximately 43.5% of the Project Area is considered prime farmland, 32% prime farmland if drained, 10.1% is farmland of statewide importance, and 5.2% is prime farmland if protected from flooding or not frequently flooded during the growing season, and 9.2% of the Project Area is not prime farmland and not farmland of statewide importance (Soil Survey Staff et al., 2022).

Impacts and Mitigative Measures

Impacts to soils will occur during both the construction and, to a much lesser degree, operational stages of the Project. Grading impacts will primarily be with the construction of foundations for the Project Substation, O&M Facility, BESS site, new Xcel Switchyard, access roads, and, as needed, for the solar array, foundations, and inverter skid locations. Use of direct-embedded pier foundations for the inverters will further minimize impacts to soil.

While minimal, impacts to soils will also occur associated with the few poles to be installed for the associated Gen-Tie Line. Because the Project is located on relatively level existing agricultural fields, a relatively small amount of grading will be necessary for the Project overall given its size. In addition, some soil compaction may result from the installation of the direct-embedded piers for the solar arrays and inverter skids. Soil compaction will be mitigated by use of low-impact equipment and methods, regrading, and tilling these areas following construction.

During operation of the Project, ongoing soil compaction could occur from the use of access roads. This impact is expected to be negligible, confined to the roadbed and mainly from relatively light duty maintenance vehicles. Overall, the Project is expected to reduce the potential for erosion by establishing permanent vegetation, in contrast to the current amount of exposed soils common to row cropping in the existing agriculture fields. Potential erosion will be further minimized by

dressing access roads with gravel and installing culverts under access roads where necessary to redirect concentrated surface water runoff.

Because the Project will disturb more than 50 acres, Lake Wilson Solar will submit the NPDES/SDS CSW Permit application and SWPPP to MPCA for review and approval prior to construction and obtaining coverage under the General Construction Stormwater Permit program. The NPDES/SDS CSW Permit application to discharge stormwater from construction facilities will be prepared and submitted to the MPCA to acquire this permit. BMPs will be used during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion from 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 MPCA-approved 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.

Implementing the Project VSMP and AIMP will also further minimize and mitigate soil impacts. Finally, the Project design includes installation of stormwater runoff ponds in accordance with MPCA regulations to collect and treat runoff from the Project during its operation.

4.5.2.2 Geology

Murray County's present land surface is the result of the actions of the Des Moines lobe of the Late Wisconsin Glaciation, ending about 10,000 years ago. Surface landforms consist of nearly level to undulating glacial moraine that is dissected by two nearly parallel, northwest to southeast tending end moraines, forming a rolling to steep topography. Surface materials are primarily glacial drift deposits. These deposits are composed mostly of glacial till, characterized by a matrix of sand, silt and clay with scattered pebbles, cobble, and few boulders. These deposits lay over bedrock surfaces and range in depth from 200 to 600 feet deep. The bedrock surface underlying this glacial drift is composed of cetaceous-age sediments and Sioux Quartzite rock. Metamorphic and igneous crystalline Precambrian rocks underlie the Sioux quartzite and cretaceous rocks (USDA, 1990).

Depth to bedrock generally increases from the northwest to the southwest across the Project Area. Depths between 251 to 300 feet are mapped in the northern portion of the Project Area and between 501 to 550 feet in the southwest portion of the Project Area (**Figure 12**).

Karst features are formed primarily of limestone, make the topography "porous", and make the area's water resources more challenging to protect (MPCA, 2022-e). Contaminants can quickly find routes from the surface into groundwater. Petroleum and other chemicals leaking from underground storage tanks can quickly move into groundwater. Spilled manure can cause fish kills

many miles from the release point. Chemicals used on the landscape can reappear at unexpected times and in unexpected locations.

According to the University of Minnesota, Department of Geology and Geophysics and the MNDNR Ecological and Water Resources Division's Karst Mapping, susceptible geologic features, including sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions are not present in the vicinity of the Project Area. The mapping indicates the nearest karst feature is located approximately fifty-two miles southwest of the Project Area.

Impacts and Mitigative Measures

Due to the thickness of surficial materials of approximately 251-550 feet at the Project Area, excavation or blasting of bedrock is unlikely for the Project. Karst features have not been identified at the Project Area and are not anticipated to be a concern for the Project. Further geotechnical evaluations will be completed prior to construction to inform Lake Wilson Solar if special construction methods related to soil conditions are warranted.

4.5.2.3 Groundwater

Minnesota is divided into six groundwater provinces based on bedrock and glacial geology. The aquifers within these provinces occur in two general geologic settings: (1) bedrock; and (2) unconsolidated sediments deposited by glaciers, streams, and lakes. The Project is located within the 5-Western Province, which is characterized by loam and clay loam glacial sediment with limited surficial and buried sand aquifers. Aquifers are typically limited due to the underlying cretaceous (shale and sandstone and Precambrian (igneous and metamorphic) bedrock (MNDNR, 2021a).

Based on information from Murray County Environmental Services and the Southwest Regional Development Commission, the Project Area is underlain by the Sioux Quartzite Aquifer system and Cretaceous Aquifer System. A majority of the Project Area and Preliminary Development Area is located in the Sioux Quartzite Aquifer System. The Sioux Quartzite aquifers are in the upper 100 to 300 feet of quartzite bedrock that may have loose sand zones, fractures, and joint where water is available; however, few wells in Murray County draw water from this aquifer system. Cretaceous aquifers are thin layers of sandstone concentrated near the base of Cretaceous deposits, ranging from 50 to 500 feet in thickness. Minimal wells in Murray County draw water from Cretaceous aquifers (USDA, 1990).

The availability and quality of ground water in Murray County is directly related to the thickness and type of glacial drift and type of bedrock. The four main types of aquifers in Murray County include, surficial deposits of glacial sand and gravel, buried deposits of glacial sand and gravel, Cretaceous-age bedrock, and Sioux Quartzite bedrock (USDA, 1990). Most wells in Murray County draw from the surficial deposits of glacial sand and gravel or buried deposits of glacial sand and gravel. The Minnesota Well Index Data (MDH, 2021) indicates that the wells in the

vicinity of the Project Area draw water from buried deposits of glacial sand and gravel or unspecified sources.

According to the USDA NRCS Web Soil Survey,[19] the depth to groundwater ranges from at or just below the surface to more than 80 inches depending on the soil type within the Preliminary Development Area. Depth to groundwater is shallower in the mapped hydric soils and areas delineated as wetland, and deeper in the non-hydric soil units. Depth to groundwater is also altered due to the number of drain tiles in the Preliminary Development Area. Tiled areas likely have groundwater at a deeper depth than suggested in the Web Soil Survey due to the drain tile.

A preliminary geotechnical investigation performed by Terracon Consultants, Inc included fifteen (15) soil borings within and nearby the Project Area. The borings were advanced to depths of approximately 20 to 50 feet below the existing surface elevation in October 2019. Groundwater was observed in only five of the borings, at depths ranging between 4 ft and 13.5 ft below ground surface. Borings were not conducted in wetlands because wetlands are planned to be avoided by the Project. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were performed. The possibility of groundwater level fluctuations will be considered when developing the design and construction plans for the Project. A final geotechnical study will be completed prior to construction which will be used to determine final engineering requirements.

Under the federal 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. The SDWA was updated in 1986 with an amendment requiring the development of a broader-based Source Water Assessment Program, which includes the assessment of potential contamination to both groundwater and surface water through a watershed approach. A Wellhead Protection Area (WHPA) encompasses the area around a drinking water well where contaminants could enter and pollute the well.

Public and non-public community water supply source-water protection in Minnesota is administered by the MDH through the Wellhead Protection program. WHPAs for public and community water-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 (MDH, 2021). A search for WHPAs in the MDH Source Water Protection Mapper indicated there are no WHPAs in the Project Area; the nearest WHPAs are the 127-acre City of Lake Wilson Drinking Water Supply Management Area (DWSMA) around the 42-acre City of Lake Wilson Wellhead Protection area (WPA) located just northwest of the Project Area and the 827-acre Chandler DWSMA around the 536-acre Chandler Wellhead Protection Area located 1.25 miles southwest of the Project Area.

[19] https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

The MDH uses a vulnerability rating method in which points are assigned for conditions that represent a perceived risk to a well (MDH, 2018). The evaluation includes each of the criteria noted below, where such information is available. Vulnerability assessments consider the following: geologic sensitivity; well construction; maintenance; and use. Higher point totals suggest relatively greater well vulnerability and vice versa. A numeric cutoff is used to categorize "vulnerable" from "nonvulnerable" wells. The Lake Wilson DWSMA is classified as moderate vulnerability and the Chandler DWSMA is classified as low vulnerability outside city limits and very high vulnerability in city limits by the MDH.

The MDH Well Index maps 30 wells in the database within one mile of Project Area with average depth to groundwater ranging from 4 to 200 feet below ground surface. These wells appear to be for either residential water supply or farm irrigation and are shown on **Figure 12**. **Table 25** and **Figure 12** shows the wells mapped within the Project Area from the MDH well index database. Two domestic wells are located within the Project Area. Other wells identified in the Project Area include three abandoned and sealed wells, one undefined use well, and one scientific investigation well.

Table 25: MDH Wells within the Project Area

Unique Well ID	Well Elevation (feet/amsl)	Drilled Depth (feet)	Depth to Bedrock (feet)	Well Installation Date	Well Use
247756	1647	22	NA	08/23/1978	Scientific Investigation
220586	1688	440	440	00/00/1936	Undefined
330497	1667	220	NA	11/04/2008	Sealed
813832	1634	155	NA	11/10/2015	Domestic
330495	1620	162	162	11/03/2008	Sealed
330499	1649	239	239	05/12/2009	Sealed
199414	1684	180	NA	08/03/1979	Domestic

Impacts and Mitigative Measures

Due to the relatively shallow nature of construction work to be performed for the Project, impacts to groundwater resources both at the site and surrounding areas are not anticipated. Lake Wilson Solar will be completing additional geotechnical studies closer to the construction date to further inform the Project's design, engineering, and construction techniques. As previously mentioned, there are no designated sole source aquifers or WHPAs at or near the Project Area.

Project facilities are not likely to affect the use of existing water wells. Seven wells are identified within the Project Area. The wells will be avoided if possible or properly decommissioned if avoidance is impossible and the underlying landowner consents. If an unknown well is discovered that was not mapped on available mapping resources, Lake Wilson Solar will assess whether the

well is open, coordinate with the underlying landowner and cap it, if necessary and approved by the underlying landowner, in accordance with MDH requirements.

Impacts to groundwater resources (including aquifers) are not anticipated during facility operation of the Project as water supply needs will be quite limited. The O&M Facility will require potable water for facility personnel and O&M uses and can be satisfied with a single domestic-sized water well. Lake Wilson Solar is evaluating whether connection to the Lincoln Pipestone Rural Water system is feasible and practicable. If feasible and practicable, then a well would not be needed. If a new well is deemed necessary, a domestic water well license will be acquired by an approved well drilling contractor prior to installation, construction and use of the O&M Facility water well. Water use at the O&M facility will be limited to a rest room and sink servicing the permanent staff after construction. Water use was estimated using the Metropolitan Council's Sewer Access Charge calculation system and then multiplying the sewer use number by 110% to obtain the water use estimate.[20] For the O&M building this is estimated at 350 gallons of water use per day. During construction, all restroom facilities will be temporary "porta-potty" facilities.

Construction of Project facilities is not likely to require subsurface blasting; therefore, disturbances to groundwater flow from newly fractured bedrock are not anticipated. Any dewatering required during construction will be managed in accordance with the SWPPP and MNDNR temporary dewatering permit by discharging to the surrounding surface, thereby allowing it to infiltrate back into the ground to minimize potential impacts. If dewatering is necessary, Lake Wilson Solar will obtain a Water Appropriation Permit from MNDNR if the applicable permit thresholds are expected to be exceeded during construction.

Minnesota solar projects differ greatly from commercial or residential developments as they are considered semi-impervious in nature when impervious surfaces are disconnected (MPCA, 2022-g). For the proposed Project, the panels will be mounted above the ground with a low-maintenance perennial seed mix planted below. While the Project requires grading, the existing terrain is smoothed to accommodate array installation, rather than significantly changing grades or slopes. The grading is thereby designed to maintain existing drainage patterns. As a result, the proposed perennial vegetation allows for water to filter into the soil for treatment. Accordingly, water quality concerns are minimized due to the low percentage of disconnected impervious surfaces—the sheet flow runoff from which filters through vegetation on-site prior to discharging—as described in the Minnesota Stormwater Manual (MPCA, 2022-f).

An increase in impervious surfaces has the potential to increase stormwater runoff and, in turn, reduce groundwater recharge. The Project will likely have minimal impacts on regional groundwater recharge due to the minimal increase in impervious surfaces within the overall Project Area, combined with the increase in the amount of perennial vegetation that will be established onsite and the planned stormwater treatment basins, both of which will facilitate groundwater

[20] https://metrocouncil.org/Wastewater-Water/Funding-Finance/Rates-Charges/Sewer-Availability-Charge/SAC-basics-for-local-government.aspx

infiltration. The foundations of the tracking rack system will likely be a driven steel pier and will not require concrete, although some concrete foundations may be required. The depth that the foundations will be installed at an estimated range of 10-14 feet below ground surface (depending on soil conditions) and would, therefore, not impact aquifer resources.

Project operation will not require the use or storage of large quantities of hazardous materials that might otherwise have the potential to spill or leak into area groundwater. Any hazardous materials will be labelled, stored and disposed of in accordance with all applicable requirements. Some onsite fuel storage may occur during construction. Two diesel fuel tanks are planned for the emergency generators. Any temporary fuel storage onsite and the planned fuel tanks for the generators will have appropriate containment as required by regulations. No chemicals are planned to be used for PV solar module washing activities as ionized water is typically used. Herbicides may be used for vegetation management which will follow applicable regulatory use and management requirements or as required by applicable permit(s).

4.5.3 Surface Waters

A desktop analysis of surface water features was conducted for the Project Area and within one mile of the Project Area boundary and is shown on **Figure 8**. The USFWS National Wetlands Inventory (NWI) identified 39 wetlands, including 25 freshwater emergent wetlands, 12 riverine wetlands, one freshwater pond, and one freshwater forested/shrub wetland totaling 78.6 acres of the 2,621-acre Project Area. The U.S. Geological Survey's (USGS) National Hydrography Dataset (NHD) identified one unnamed NHD waterbody totaling 0.23 acre and thirteen NHD flowlines totaling 6.3 miles within the Project Area. The Minnesota Pollution Control Agency's "Impaired Waters Viewer" (MPCA 2022-g) indicates that there are no mapped impaired waters in the project area. There are no mapped lakes or rivers within the Project Area.

The Minnesota Department of Natural Resources' (MNDNR) Public Waters Inventory (PWI) maps identified no basins and approximately 2,614 feet of one public watercourse (Judicial Ditch 14) within the Project Area (MNDNR, 1987).

In addition to the one PWI watercourse, some public mapping indicated the presence of a second PWI watercourse in portions of Section 20 that has been "Removed [from the PWI] as of Commissioner's order." The onsite wetland delineation also confirmed there was no channel or wetland in this area. Westwood contacted Tom Kresko, the MNDNR Area Hydrologist for Murray County via e mail about this potential PWI feature. Mr Kresko indicated that this feature was never mapped as a PWI watercourse and is not a PWI watercourse. Correspondence with Mr. Kresko is included in **Appendix H**.

4.5.3.1 Ditches and Drain Tile

According to the Murray County Drainage Ditch and Tile data (see **Figure 8**), the Project Area contains multiple segments of private drainage tile and lateral ditches that drain north into Judicial

Ditch 14. The eastern portion of the Project site contains segments of County Ditch 47 that drains northeast towards Summit Lake.

4.5.3.2 Wetlands and Watercourses

Westwood delineated wetlands and other watercourses in the Project Area in October 2017, July and October 2021, and July 2022. The field delineation identified 36 wetlands and six watercourses within the Project Area. Delineated wetlands comprise 38.26 acres, approximately 1.5% of the Project Area overall. The wetlands and watercourses delineated by Westwood are shown on **Figure 8** and **Figure 13**.

The results of the Westwood field delineation are described in the wetland delineation report dated October 7, 2022. The wetland delineation report and a completed Joint Project Application were submitted to the Murray County Soil and Water Conservation District and the USACE for a Boundary and Type Determination. Depending on final Project design, a Joint Application Form for Activities Affecting Water Resources in Minnesota may be submitted for the Project; the Joint Application is the accepted means for initiating review of proposals that may affect a water resource (wetland, tributary, lake, etc.) in the State of Minnesota under state and federal regulatory programs. The need for this approval will be evaluated with final Project design information.

Impacts and Mitigative Measures

The Applicant has made significant efforts to avoid all water resource impacts to the extent practicable through Project design and construction methods as shown in the Preliminary Facility Design (**Figure 4**) and Preliminary Site Plan (see **Appendix C**). No permanent impacts to water resources are anticipated during operation of the Project.

Potential temporary impacts to water resources within the Preliminary Development Area may include excavating and backfilling associated with the installation of electrical collection lines and clean fill to support temporary access roads during construction of the Project. During construction, appropriate BMPs will be implemented and maintained to additionally minimize potential impacts in accordance with an MPCA NPDES/SDS CSW Permit, SWPPP, a Spill Prevention, Control, and Countermeasure (SPCC), and VSMP that will be in place for the Project. During construction and/or operation, stormwater ponds may be used to collect and treat discharge runoff following MPCA regulations. Permanent impacts may result if direct-embedded piers require concrete foundations to address problematic soil conditions and from the establishment of permanent access roads for operations and maintenance of the Project. Permanent impacts may also be necessary to facilitate fence and wet sedimentation installation. In both cases, soils and vegetation within the wetland and/or watercourse would be disturbed. Collection lines will be directional bored under waterbodies, if needed, depending upon depths of water in the channels or wetlands at the time the construction work is performed. Any temporary or permanent impacts to water resources will be permitted as required.

4.5.3.3 Wetland Regulations

Minnesota Wetland Conservation Act

Current design avoids all wetlands and would not require any approvals under the WCA. Depending on the final Project design, construction activities may qualify for a No Loss, exemption, or require a permit under the WCA. If a permit is required, any proposed wetland impact would require full sequencing under the WCA and address wetland avoidance, impact minimization, rectification, and replacement (if applicable). The need for this will be determined as final Project design is completed.

Section 404 of the Federal Clean Water Act

Current design avoids all wetlands and would not require any approvals under Section 404 of the CWA. Depending on the final Project design, construction activities may require approvals. Under Section 404 of the federal CWA, the USACE regulates the discharge of dredged and fill material into waters of the U.S. After coordination and application submission, any required authorization from the USACE due to design changes would likely fall under one of the categories for wetland impacts of the USACE Regional General Permit (Minnesota RGP-003).

Section 401 Water Quality Certification

Projects required to obtain an Individual Section 404 Permit are also required to obtain an MPCA Section 401 Water Quality Certification (WQC) to ensure they comply with the State water quality standards in Minn. Admin. R. 7050, as amended. If the Project secures approval under the USACE Regional General Permit (Minnesota RGP-003), then Section 401 WQC is automatically granted, provided the Project follows the specific pre-determined certification requirements. Because no impacts to wetlands are proposed, the Project is unlikely to require any wetland permit from the USACE, therefore a project-specific Section 401 WQC is also unlikely to be required as part of the wetland permitting process.

Minnesota Public Waters Act and MNDNR Public Waters Permits

The MNDNR requires a Public Waters Work Permit for any alteration of the course, current, or cross section below the Ordinary High Water (OHW) level of MNDNR public waters, wetlands, and watercourses. No impacts to the MNDNR public watercourses are expected from the Project, and no borings under any Public Water Watercourses are expected. The Project as proposed avoids all wetland impact; should changes to design in the Project result in permanent, unavoidable impacts to wetlands or water resources, impacts will be mitigated in accordance with the WCA and Section 404 of the federal CWA. Additionally (and as applicable) the Project will comply with MNDNR/BWSR buffer rule around public ditches.

4.5.3.4 Floodplains

A Preliminary Hydrology Report was completed by Westwood in January 2020 for the Project. The report described the hydrology within and around the Project Area and any impacts that the hydrology may play in the design of the solar array. The modeled watershed area encompasses 78 square miles, which includes the current Project Area and the surrounding area. The hydrologic modeling in this report was created using FLO-2D modeling software. FLO-2D was used to review the overall watershed drainage to and through the Project to determine if any overland runoff causes flooding, velocity, or scour impacts to the site. The analysis shows water depths to the west of the Project Area in portions of the originally proposed project area that would be problematic for development. A large swath to the west of the Project Area is inundated with 100-year flood depths up to 5 feet. The flooding source is Judicial Ditch No. 14 and some tributaries leading to it. These areas are not within the FEMA floodplain but would be very difficult to build in. The report also noted that velocity and scour are not a major concern because the site is relatively flat.

The portions of the Project Area that have been mapped by FEMA consist of Zone X areas (i.e., areas of moderate flood hazard). The areas west of the current Project Area that are mapped as having flood depths up to five feet were originally considered for inclusion in the Project Area. However, given the potential flooding in these areas, they were dropped from the current proposed Project Area to prevent any flooding issues with the Project. In addition, all areas within the current Project Area identified as areas of concern for flooding in the Preliminary Hydrology Report were also avoided in the site layout.

4.5.3.5 Watersheds and Drainage

The Project Area is located within hydrologic unit code (HUC)-8, Des Moines River – Headwaters Watershed which covers 1,248 square miles across southwestern Minnesota including parts of Lyon, Pipestone, Cottonwood, Nobles, Jackson, and Murray County. The Des Moines River flows 525 miles through Minnesota and Iowa starting in Lake Shetek, eventually joining the Mississippi River southwest of Keokuk, Iowa. The watershed is located in the Western Corn Belt Plains ecoregion and is a tributary to the East Fork Des Moines River in Iowa. Most of the land in the watershed area is cropland.

Three HUC-10 sub-watersheds in Minnesota make up the HUC-8 Des Moines River – Headwaters Watershed: Lake Shetek, Beaver Creek, Heron Lake, Lime Creek, and the West Fork Des Moines River Main Stem. The Des Moines River flows 525 miles through Minnesota and Iowa starting in Lake Shetek, eventually joining the Mississippi River southwest of Keokuk, Iowa. The Project is further located in the southeastern portion of the HUC-12 sub-watershed boundary called the Judicial Ditch 14 Sub-watershed. Minor portions of the Project Area are located in the Beaver Creek Sub-watershed and two different Unknown MNDNR Minor Watersheds. The Judicial Ditch 14 Sub-watershed drains to the Judicial Ditch 14 and encompasses approximately 34 square miles.

4.5.4 Vegetation

The Project Area lies within the Coteau Moraines subsection of the Minnesota and Northeastern Iowa North Central Glaciated Plains Section of the Prairie Parkland Province, as defined by the MNDNR Ecological Classification System (ECS) (MNDNR, 1999). The ECS system categorizes regions of the State using associations of factors such as climate, geology, topography, soils, hydrology, and vegetation.

The MNDNR Minnesota Land Cover Classification System (MLCCS) incorporates more detailed land cover information including human-modified cover classifications; however, MLCCS data does not cover the Project Area. The National Land Cover Database (NLCD) data was used as an alternative for general land cover descriptions in the Project Area. According to the NLCD, a majority of the Project Area consists of cultivated crops (97%). **Table 21** in **Section 4.2.11.2** summarizes the land cover classifications according to the NLCD.

The Minnesota Biological Survey (MBS) includes areas of the State with varying levels of native biodiversity and may contain high quality native plant communities, rare plants, animals, and/or animal aggregations. Two MBS sites were mapped either partially or wholly within the Project Area (**Appendix J- Exhibit 2**).

MBS site Leeds 21S of moderate biodiversity significance (totaling 4.1 acres) is mapped partially within the Project Area. About 3.8 acres of the site are within the Project Area, and based on field reconnaissance, were determined to be dominated by nonnative species, which likely means rare species are not supported in this site.

MBS site Leeds 16 of below biodiversity significance (totaling 27.4 acres) is mapped wholly within the Project Area. These sites lack occurrences of rare species or natural features or do not meet MCBS standards. Field reconnaissance showed this site is partially cropped. Most of the MBS sites of biodiversity significance appear to encompass grassland or wetland habitats.

The National Conservation Easement Database (NCED) provides a comprehensive picture of privately owned conservation easement lands in the U.S. A review of this data indicated there are no NCED areas or any Reinvest in Minnesota (RIM) conservation easements within the Project Area.

Westwood conducted a Native Prairie Desktop Assessment and Field Survey (dated October 11, 2022) to identify areas of potential native prairie for the Project. Native prairie, as defined by Minn. Stat. §84.02, Subpart 5, means (1) “land that has never been plowed where native prairie vegetation originating from the site currently predominates or, (2) if disturbed, is predominantly covered with native prairie vegetation that originated from the site. Unbroken pastureland used for livestock grazing can be considered native prairie if it has predominantly native vegetation originating from the site and conservation practices have maintained biological diversity.”

Westwood used the Native Plant Communities, Potentially Undisturbed Land, Minnesota Biological Survey Sites of Biodiversity Significance, and aerial photography data layers to assess potential native prairie. Conservation Reserve Program (CRP) agreements were also reviewed. Based on the data analysis, mapping methods and techniques, polygons were created around nine areas potentially having native prairie characteristics and are summarized below. Of note, three of the nine areas are mapped as DNR native prairies and overlap MBS sites of moderate biodiversity significance, and one of the nine areas overlaps an MBS site of below biodiversity significance. The nine total areas include seven areas located either partially or wholly within the Project Area. Westwood biologists visited these sites and concluded all seven potential areas within the Project Area are not native prairie as defined by Minn. Stat. §84.02, Subp. 5. Results of the desktop inventory, field surveys, and additional research conducted to identify areas of potential native prairie are detailed in the Native Prairie Desktop Assessment and Field Survey report in **Appendix J** along with mapping of the locations in its Exhibit contents. The Native Prairie Desktop Assessment and Field Survey was provided to the MNDNR on January 11, 2023.

Impacts and Mitigative Measures

No impacts to native vegetation communities are expected to occur as a result of construction and operation of the Project. The majority of the Project infrastructure and facilities are located within areas currently in row-crop agriculture. Only one small row of trees forming a short shelterbelt are included within the Preliminary Development Area. There is no project infrastructure currently planned for this small, treed area. A limited amount of tree clearing may be necessary to prevent shading of some panels; however, the Project was designed to avoid and minimize the need for tree removal. Overall, the Project will result in a net improvement to the perennial vegetative cover in the Project Area because of revegetation efforts in former agricultural areas and the significant decrease in the use of herbicides and pesticides typical of agricultural practices through implementation of the Project AIMP and VSMP plans (discussed above), as well as the SWPPP.

Land disturbance is limited to what is necessary to establish fences, access roads, rack installations, array grading, O&M Facility, Project Substation, new Xcel Switchyard, BESS, and temporary laydown/staging areas used during construction. During construction Lake Wilson Solar will implement the SWPPP developed for the Project site and BMPs to prevent erosion and promote soil stabilization in disturbed areas, as well as implement the AIMP and VSMP plans.

To mitigate potential impacts to vegetation, Lake Wilson Solar anticipates site restoration, seeding, establishing, maintaining, and monitoring disturbed areas and areas below the PV solar modules in accordance with the AIMP and VSMP plans. Control of invasive and noxious weeds will be ongoing during the construction and operation of the Project. All equipment will be washed to remove noxious weeds and seeds before entering the site. No watercraft or tools used in aquatic ecosystems will be used during or after construction. Similarly, riparian and wetland areas will be avoided.

4.5.5 Wildlife

As noted in **Section 4.2.11.2** and **Table 21** above, vegetative cover in the Project Area consists of six main cover-types: Cultivated Crops/Hay/Pasture (95.1% of Project Area), Developed (3.1%), grassland/herbaceous cover (1.6%), Emergent Herbaceous Wetlands (0.1% of Project Area), Pasture/hay (0.2% of Project Area), and forest (<0.01%) as shown in **Figure 9**.

Overall, the Project Area is dominated by agriculture land primarily used for row crop production; mostly corn and soybeans. These are annual temporary cover types that will be utilized by a small number of common wildlife species on a limited seasonal basis. During Project development, agricultural land within the Project Area will be seeded with perennial grasses, apart from the Project Substation, O&M Facility, new Xcel Switchyard, BESS, inverter skids, and access roads, which will be converted to developed land and impervious surfaces. The conversion of row crops to perennial grasses will create more permanent habitat, which is expected to benefit wildlife.

Water resources within the Proposed Project Area that are suitable for supporting fish are largely limited to unnamed agricultural drainage ditches and Judicial Ditch Number 14 (**Figure 8**). Agricultural drainage ditches are known to support a variety of fish species including the orange-spotted sunfish (L*epomis humilis*), creek chub (S*emotilus atromaculatus*), silver redhorse (M*oxostoma anisurum*), black bullhead (*Ameiurus melas*), and Johnny darter (*Etheostoma nigrum*) (Stammler et al. 2008, Zimmerman et al. 2003). Topeka shiner (*Notropis topeka)* Critical Habitat is mapped in Murray County, but no Critical Habitat is mapped in the Project Area. The nearest Critical Habitat is mapped approximately 6 miles west of the western edge of the Project Area.

Reptile species that may use agriculture and grassland habitats typical of land cover within the Proposed Project Area include the common garter snake (*Thamnophis sirtalis*), plains garter snake (*T. radix*), and prairie skink (*Plestiodon septentrionalis*). However, due to the relative lack of plant diversity and habitat structure and the seasonal nature of cover crops, the use of cropped fields by the aforementioned species is likely limited. Reptiles that use woodland habitats include the common garter snake and redbelly snake (*Storeria occipitomaculata*). Many reptile species inhabit wetland and open water areas, including the common plains garter snake, plains garter snake, painted turtle (*Chrysemys picta*), and common snapping turtle (*Chelydra serpentina*).

Amphibian species that may use agriculture habitats within the Proposed Project Area include the northern leopard frog (*Lithobates pipiens*) and American toad (*Anaxyrus americanus*). Due to the relative lack of plant diversity and habitat structure and the seasonal nature of cover crops, the use of cropped fields by amphibians is likely limited. Northern leopard frogs, American toads, and Great Plains toads (*Anaxyrus cognatus)* may use grassland habitats within the Proposed Project Area. Many amphibian species occur in wetland and stream habitats, including the aforementioned species and other species such as the boreal chorus frog (*Pseudacris 103aculate*).

Information about bird species composition within or near (i.e., within 15 miles) the Proposed Project Area is available from regional Christmas Bird Count Surveys (CBCs) and Breeding Bird Surveys (BBSs). Familiar bird species that will utilize open fields and agricultural areas as foraging and resting grounds include Canada Goose (*Branta canadensis*), Turkey Vulture (*Cathartes aura*), Red-tailed Hawk (*Buteo jamaicensis*), Wild Turkey (*Meleagris gallopavo*), American Crow (*Corvus brachyrhynchos*), Common Grackle (*Quiscalus quiscula*), American Robin (*Turdus migratorius*), and American Goldfinch (*Spinus tristis*). Wetlands in the Proposed Project Area could support species such as Mallard (*Anas platyrhynchos*), Red-winged Blackbird (*Agelaius phoeniceus*), and Common Yellowthroat (*Geothlypis trichas*). Other common species anticipated to occur within the Proposed Project Area include Forest species such as the Downy Woodpecker (*Dryobates pubescens*), Hairy Woodpecker (*D. villosus*), Blue Jay (*Cyanocitta cristata*), Northern Cardinal (*Cardinalis cardinalis*), Black-capped Chickadee (*Poecile atricapillus*), and White-breasted Nuthatch (*Sitta carolinensis*).

Mammalian species that may use agricultural areas within the Project Area include white-tailed deer (*Odocoileus virginianus*), small mammals such as mouse [Family Muridae] and vole [Family Cricetidae] species, raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and thirteen-lined ground squirrel (*Ictidomys tridecemlineatus*). Mammals that may use woodland habitats within the Proposed Project Area include the aforementioned species as well as bats (such as the state special concern little brown bat [*Myotis lucifugus*] and state special concern big brown bat [*Eptesicus fuscus*]), eastern fox squirrels (*Sciurus niger*), and Virginia opossum (*Didelphis virginiana*). Mammals that may use wetland and open water habitats include mink (*Neovison vison*) and muskrat (*Ondatra zibethicus*).

Impacts and Mitigative Measures

The Project layout was designed to avoid those portions of the previous Project Area and Preliminary Development Area with the highest concentration of high-quality habitat and water resources as discussed in the introduction in **Section 1**. The Project footprint was reduced and dropped the western portions of the previous project area where these areas are located. BMPs outlined in **Sections 4.5.4** and **4.5.5** concerning wetlands and vegetation will serve to protect, prevent and mitigate potential impacts to wildlife within the Project Area. The SWPPP, AIMP and VSMP plans will also be implemented during construction, post-construction and operational phases of the Project. With vegetation being converted from row crop production to perennial grasses, habitat will become permanent for the life of the Project. The establishment of perennial grasses will reduce soil erosion and runoff, build soil health, reduce the use of pesticides and herbicides, and provide beneficial habitat to a variety of wildlife species.

Movement of large mammals, such as white-tailed deer, will not be impeded within the Project Area. As discussed in **Section 3.1.6** above, lightweight agricultural woven wire fencing extending approximately 8 feet above grade will be used around the Project arrays/construction units for safety and security purposes to prevent larger wildlife and the public from accessing Project electrical equipment. There will be wide corridors between fenced areas throughout the Project

Area (see **Figure 4** and **Appendix C**). The arrangement of the fenced areas of the Project array relative to existing roads and utilities provide various pathways through the Project Area which would allow wildlife to cross. These corridors will allow larger wildlife various options to cross unimpeded through the Project Area.

4.5.6 Rare and Unique Natural Resources

Project coordination was first initiated with the MNDNR in December of 2017; a meeting with the MNDNR was also held in September of 2021 to discuss the proposed Project details and address agency questions. Westwood also submitted formal MNDNR Natural Heritage Information System (NHIS) and Natural Heritage Review (NHR) data requests for earlier versions of the Project Area on July 14, 2020, October 6, 2021, and June 6, August 8, and October 10, 2022. The most recent data request for the proposed Project Area is shown in **Appendix H**. In response, the MNDNR reviewed the proposed Project and stated that no state-listed endangered or threatened species have been documented in the vicinity of the Project Area, though it stated that an exhaustive review of the area had not been completed by the agency. The MNDNR also provided recommendations to avoid impacts to ecologically significant areas (i.e., MBS Sites of Biodiversity Significance, calcareous fens, DNR rare native plant communities), state-listed species of special concern, and federally listed species, if they occur within the Project Area.

In support of the NHR request, a review of the MNDNR NHIS database licensed to Westwood (MNDNR, 2021b) was conducted for records of federal or state-listed rare, threatened or endangered species or habitats in, and within one mile of the Project Area. One vascular plant, the red three-awn (Aristida purpurea var. longiseta) was identified. No other vascular plants, vertebrate animals, invertebrate animals, animal assemblages, or terrestrial communities were identified in a one-mile buffer surrounding the Project Area boundary.

The red three-awn is a mid-height perennial grass that is considered a special concern species in Minnesota. No federal protections are afforded to the red three-awn species. Species of special concern are not protected by Minnesota's Endangered Species Statute or the associated rules. However, the NHR recommends avoiding impacts to these species. Based on the lack of suitable habitat within the Project Area as assessed during the native prairie assessment, likelihood of occurrence of this species within the Project Area is considered to be low.

Project coordination took place with the USFWS in October 2017 using an earlier version of the Project boundary. A meeting with the USFWS was also held on September 15, 2021, reviewing an earlier version of the Project Area boundary. The USFWS provided comments in October 2021. USFWS Information for Planning and Consultation (IPaC) responses were received on November 8, 2021, and June 6, August 8, and October 10, 2022. In the most recent IPaC using the current Project Area, one federally threatened species, the northern long-eared bat (Myotis septentrionalis;

NLEB)[21] and one candidate species, the monarch butterfly (Danaus plexippus), was mapped as potentially occurring within or near the Project Area. Preferred NLEB summer habitat consists of mature forests, although this species is also known to forage in wooded areas near water sources and within cleared forest tracts (MNDNR, 2018; USFWS, 2022). The Project Area is heavily dominated by agricultural land use with limited areas of individual trees or small tree stands, and according to MNDNR and USFWS (2021), there are no known NLEB maternity roost trees or hibernaculum in Murray County or any of the surrounding counties. Therefore, the probability of occurrence for NLEB is considered low.

The monarch butterfly is a candidate species with no federal protections at this time. The eastern, migratory population of monarch butterflies are common in the summer months in areas with floral resources or milkweeds. These areas include pastures, roadsides, and grasslands. Common milkweed was observed during field surveys, but broadleaf herbicide use in agricultural fields have greatly reduced the likelihood of milkweeds occurring in the Project Area.

The Bald Eagle (Haliaeetus leucocephalus) is no longer a federally-listed threatened species; however, disturbances to the Bald Eagle are regulated under the Bald Eagle and Golden Eagle Protection Act (BGEPA) (16 U.S.C. §668, 2010). Bald Eagles are highly associated with aquatic habitats (e.g., coastal areas, rivers, lakes, and reservoirs) for both breeding and wintering. Large, higher-canopy trees that are open and accessible are required for both roosting and nesting. While eagles have the potential to utilize the Project Area for stopover or foraging, the limited suitable nesting substrate and comparatively fewer water resources within the Project Area suggests a low likelihood that Bald Eagle nests would be present. Further, no Bald Eagle nests were observed in the Project Area during field surveys.

Impacts and Mitigative Measures

Based on NHR and IPaC results, no impacts to species listed as state or federally threatened or endangered, or those protected under BGEPA, are anticipated.

Although Bald Eagle nests and NLEBs are not expected to be encountered or occur within the Project Area, National Bald Eagle Management Guidelines (USFWS, 2007) will be adhered to if a nest is encountered, and all tree clearing activities will take place in the NLEB inactive season (November 1 – March 31). In the event that tree clearing is required during the active season, potential suitable roosting habitat will be assessed for characteristics that fit the USFWS (USFWS, 2022b) definition for NLEB potential roost trees to ensure the species are not present during clearing activities.

[21] On November 29, 2022, the USFWS announced a final rule to reclassify the NLEB as an endangered species. As announced on January 25, 2023, the rule is set to take effect on March 31, 2023.

Based on the NHR recommendation to avoid impacts to all ecologically signification areas, a completed native prairie assessment indicates that no impacts to areas with native plant communities are anticipated (see **Section 4.5.4**). Additionally, no calcareous fens were detected within the Project Area during wetland delineations. As indicated in **Section 4.5.4**, 3.8 acres of land mapped as an MBS site of moderate biodiversity significance is mapped within the Project Area. Of this, approximately 0.25 acre is mapped within the proposed Project fence and may be impacted; however, field reconnaissance showed this area to be dominated by non-native species.

Revegetation plans focus on establishing low-growing regionally appropriate grass-dominated vegetation within the array fields and along the buffer to stabilize the soil. This will create more permanent habitat compared to annual, row-crop agriculture.

4.6 Climate Change

4.6.1 Impact of Project on Climate Change

Recently, Minnesota has been taking more action against climate change. Executive Order 19-37 (EO 19-37), signed in December 2019, created the Governor's Advisory Council and the Climate Change Subcabinet to coordinate climate change mitigation and resilience strategies in the State of Minnesota. EO 19-37 describes climate change as, "an existential threat that impacts all Minnesotans and our ability to thrive." It also encourages State leaders and policy makers to consider equity in our State's response to climate change (MPCA, 2020).

The Next Generation Energy Act (NGEA) of 2007 set statutory goals to reduce greenhouse gas emissions in the state by 30% of 2005 levels by 2025, and 80% by 2050. Minnesota fell short of its 2015 goal of 15% and is not on track to meet the 2025 goal (EO 19-37). EO 19-37 called for a redoubling of efforts to meet or exceed our NGEA goals and increase community resilience in the face of climate change (MPCA, 2020).

The Project will further the States' clean energy goals set forth by the Governor's Office by providing a renewable source of energy that will offset other greenhouse gas emissions, primarily from coal and natural gas. The Project will beneficially impact climate change because it will reduce the need for carbon-based electric generation processes, reduce the need for and minimize the proliferation of additional transmission infrastructure, and temporarily reduce emissions from agricultural activities (e.g., use of tractors and other farm implementation, decreased use of agricultural chemicals, etc.) in the Preliminary Development Area during operation of the Project. In addition, as a result of the more than 1,000 acres of perennial grasses proposed to be established within the Project Area, the Project is expected to increase the carbon storage capacity of the land;

This is likely to result in additional CO2 being sequestered over the life of the Project compared to current agricultural land use.[22]

While solar projects do offset a large sum of greenhouse gases, it should be noted that solar projects are not entirely CO2 free. Generally, the amount of CO2 equivalent (CO2eq) produced during the lifespan of a solar project comes out to be approximately 20-50 grams per kilowatt (NREL, 2012). About 60-70% of that comes from the manufacturing of the panels and construction of the solar farm. Another 20% of the CO2eq comes from the operational processes such as O&M building operations, project lighting, monitoring equipment and emergency generators, with the remaining portion coming from decommissioning and disposal. However, the solar farm pays off this debt within approximately three years of operation (GVEC, 2022). While there is an initial carbon debt that needs to be "paid off," solar farms have a far smaller carbon debt to pay off than fossil fuels, so the carbon footprint of the area is immediately reduced.

A Greenhouse Gas emissions spreadsheet was generated for the Project to estimate the greenhouse gas emissions produced during construction and annual emissions during operations (**Appendix L)**. This spreadsheet used the types of vehicles and hours of vehicle use along with the proposed emergency generators and estimated use to estimate the fuel usage for the Project. The types of construction machinery used and the average fuel consumption of the machinery were provided by Westwood who is an experienced consultant that has worked on the development of multiple utility scale solar projects across the upper Midwest in coordination with an experienced solar construction contractor. These calculations include the fuel use by construction equipment and commuter traffic for construction personal during the Project construction. The calculations also include the annual emissions of the Project during operations, including the emergency generators, onsite vehicle traffic and Project staff commuter traffic to and from the Project Area, and estimated

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[22] Walston, et al, Modeling the ecosystem services of native vegetation management practices at solar energy facilities in the Midwestern United States, Ecosystem Services, Volume 47, 2021: https://doi.org/10.1016/j.ecoser.2020.101227; www.sciencedirect.com/science/article/pii/S2212041620301698

As modeled, Watson et al found that over the timeframe of a solar energy facility lease period (indicated as potentially 20-30 years in the article), native grassland cover for large-scale solar farms in the Midwest region had a potential carbon storage capacity of 129.3 Mg C/ha (metric ton/ha), 65% greater than row crop agricultural cover which was found to have carbon storage capacity of be 78.3 Mg C/ha. As shown in the below calculation, taking these findings, and using a basis of 1,000 acres of grassland cover as an example, the solar-grassland scenario would have the potential to sequester ~75,700 tons (83,445 short tons) of CO2 more than row-crop agricultural use:

$$129.3\ \frac{Mg\ C}{ha} \times \frac{44\ units\ CO_2}{12\ units\ C} \times \frac{1\ ha}{2.47\ acres} \times 1000\ acres = 191,943\ Mg\ CO_2$$

$$78.3\ \frac{Mg\ C}{ha} \times \frac{44\ units\ CO_2}{12\ units\ C} \times \frac{1\ ha}{2.47\ acres} \times 1000\ acres = 116,234\ Mg\ CO_2$$

191,943 CO2 – 116,234 CO2 = 75,709 Mg CO2; Mg = Megagram = Metric ton ; For more detail regarding C to CO2 conversion see the following link: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

offsite purchased electricity. These calculations estimate the Project will generate approximately 8,426 short tons of CO2 during the Project constriction phase, and 43 short tons of CO2 annually during the operational life of the Project.[23] As described above, the Project is expected to offset approximately 244,500 short tons of carbon dioxide equivalent annually, provide electricity for up to approximately 28,000 homes annually (EPA, 2022a),[24] and increase the carbon sequestration potential of the soils within the Preliminary Development Area. The Project is expected to produce several beneficial climate change effects; therefore, beyond Project design as discussed below, additional mitigative measures are not proposed.

The project will likely require a private well and onsite septic system for the onsite O&M building. The well and septic system will provide service to the 4-5 full time permanent workers onsite after project construction. The well and septic system are expected to have a negligible effect on climate change. Septic generation was estimated using the Metropolitan Council's Sewer Access Charge calculation system.[25] The septic system is expected to generate 315 gallons per day. Water use was estimated by multiplying the sewer use number by 110% to obtain the water use estimate. For the O&M building this is estimated at 350 gallons of water use per day.

Any climate change impacts of the septic system installation is expected to be negligible and will be mitigated for by best management practices which may include an increase the amount of insulation over the septic field to address climate changes that could affect the system such as repeated freeze-thaw cycles, reduced snowfall, and unseasonable snowmelt. Another potential mitigation would be the setup of a regular septage-pumping schedule with the maintainer so that pumping does not need to be demanded during wet time periods. Lake Wilson Solar will ensure a regular pumping schedule in compliance with local and state requirements.

4.6.2 Impact of Climate Change on Project

Future climate change, average annual temperature, and drought severity was modeled on the MNDNR Climate Change website using climate data from 1895-2023, for the Des Moines River Headwaters watershed (this watershed covers the project area in the websites model).[26] This model indicated that the mean precipitation over this time period was 26.67 inches annually. This model also estimated a 0.30-inch increase in precipitation per decade. Therefore, the annual rainfall is estimated to increase by 1.15 inches over the 35-year life of the project.

[23] This is just an initial estimate based on the current energy mix in the U.S. As we move forward with new regulations, increased renewables and use of electric vehicles, this estimate can reasonably be expected to decrease drastically and trend towards zero over the operational life of the Project.
[24] This is based upon the U.S. EPA Greenhouse Gas Equivalencies Calculator and 313,000,000 kWh (313,000 MWhs) annual production PVsyst model.
[25] https://metrocouncil.org/Wastewater-Water/Funding-Finance/Rates-Charges/Sewer-Availability-Charge/SAC-basics-for-local-government.aspx
[26] https://arcgis.dnr.state.mn.us/ewr/climatetrends/

From the climate data cited above, the annual mean temperature from 1895-2023 was determined to be 43.51 °F. During that time frame the annual mean temperature has increased by 0.17 °F per decade. Therefore, the mean annual temperature is expected to increase by 0.595°F over the 35-year life of the project.

The Palmer Drought Severity Index (PDSI) was also modeled using the MNDNR Climate Change website as cited above. The PDSI uses readily available temperature and precipitation data to estimate relative dryness. It is a standardized index that generally spans -10 (dry) to +10 (wet). The PDSI has ranged from – 6.18 to 9.26 over the 1895-2023 timeframe. The PDSI mean was 0.44 from 1895-2023 according to the model. The PDSI mean has increased by 0.20 per decade. Therefore, the PDSI mean is expected to increase by 0.65 over the 35-year life of the project.

Impacts and Mitigative Measures

The Project has been sited and designed with resiliency in mind as climate continues to change in Minnesota. When finalizing the Project location, as mentioned in **Section 4.5.3.3**, portions of the originally proposed November 2021 Project Area were omitted following a hydrology report that indicated inundation of the now excluded area with 100-year flood depths up to 5 feet, which would have made installing infrastructure in these areas difficult and cost prohibitive. Using the hydrology report, the Project was sited to develop areas onsite where the flood depths were minimal and areas that have the lowest potential for increase in flood depths due to climate change. This will also prevent the Project from being located in any areas that may contain ponded water in the future as precipitation increases.

The Project is not expected to have any negative effects or increase flood depths in the surrounding areas. Storm ponding onsite will be sized appropriately to account for the expected increase in precipitation and will store and treat any runoff before discharging offsite. The existing drainage patterns will be maintained and the increase in perennial vegetation onsite under the panels is expected to both increase the uptake of water onsite and slow and reduce runoff when compared to the current, cropped nature of the Preliminary Development Area.

With regards to the design of the Project, solar modules and related facilities will be designed to withstand any potential weather event that would reasonably be expected to occur in or near the Project Area. Lake Wilson Solar has reviewed the climate history for the Project location and intends to purchase equipment designed to ensure the highest level of operability reliability across the range of anticipated environmental conditions for the lifetime of the Project such as temperature, precipitation, wind, mechanical loading, etc.

The structural, civil, and electrical works will comply with all applicable local and state building codes in addition to codes and standards set by technical society and standards developing organizations. The design safety factor used on snow and wind loads (to de-risk extreme weather events) will be based on recommendations from these standards. Similarly, the final tracking system components and pile sizes and depths will be designed to meet building codes for wind and

snow loads. Potential tracking technologies will be assessed in the context of other Project attributes, such as resource forecast and expected operating profile.

Standard safety features in modern solar tracking systems include protective settings or modes known as "stowing" that are enabled during various extreme weather events, such as high wind or snow events. During extreme weather events, the trackers can enable these settings and rotate the modules to an angle that best protects the equipment from damage from environmental factors; rotating to reduce the degree of load experienced on the modules and underlying structures. In this way, the tracking system works in tandem with the modules to mitigate risks to equipment from extreme weather events. Lake Wilson Solar intends to utilize trackers that have the ability to rotate as described. Any solar modules selected will meet international standards for hail ratings and operating temperature ranges.

Lake Wilson Solar is taking into account the potential for increased precipitation, as identified using the MNDNR model as discussed above, in designing and sizing applicable stormwater management ponds for operation of the Project. In addition, the establishment of perennial, native vegetation under all the planned panels is expected to increase the residence time of water onsite by slowing the runoff rate and increasing the uptake of water onsite when compared to the current, cropped conditions. Further, the cessation of row cropping in wetlands is expected to result in the re-vegetation of cropped wetlands, which will also increase the residence time of water onsite by slowing the runoff rate and increasing the uptake of water onsite by vegetation in undeveloped areas of the Project. This will also lower the amount of nutrients leaving the site compared to row crop agriculture from both the reduction in fertilizer and pesticide application, and the slowing of runoff brought about by the perennial vegetation. This slowing of runoff and reduction in the amount of nutrients leaving the site is expected to have a direct, positive effect on the water quality of any surface waters receiving runoff from the site, and also expected to positively benefit onsite wildlife and plant communities.

4.7 Potential Cumulative Impacts

Cumulative impacts are combined, incremental effects of human activity. While an individual activity may be insignificant by itself, minor impacts in combination with other actions may cause a larger issue in a region or to an important resource. A review of the Murray County website, and known MnDOT District 8 projects, did not reveal any projects proposed with similar timing and within close proximity to the Project Area that would be expected to interact negatively, or create significant cumulative impacts with the proposed Project. Additionally, responses concerning the Project from other State, County, Township and local agencies have not identified other proposed projects or activities that are planned to be initiated or completed in the near future.

Impacts and Mitigative Measures

Other planned projects in the Project vicinity have not been identified by Lake Wilson Solar that would contribute to potential cumulative impacts with the Project; therefore, no mitigative measures are proposed.

4.8 Unavoidable Impacts

The Project has been thoughtfully sited and designed to avoid natural environment effects to the degree possible and practicable. However, with all construction projects, impacts to the natural environment are not entirely avoidable; temporary and minor impacts will occur in some circumstances. Lake Wilson Solar has taken steps to minimize the long-term effects of these impacts by implementing mitigation measures where warranted.

Impacts and Mitigative Measures

Environmental effects related to the Project and efforts to avoid, minimize and mitigate these effects are discussed in detail within this Application. Environmental impacts that are not entirely avoidable, but will be minimized and mitigated, are summarized above and below. The majority of these unavoidable impacts will be temporary in nature, will occur during Project construction, and will be rectified through implementation of the SWPPP, VSMP and AIMP plans, which include BMPs, revegetation and site restoration activities.

The primary unavoidable impacts that will resolve during Project construction include the following:

- Construction-related noise;
- Dust related to construction traffic;
- Construction-related traffic;
- Temporary and limited wildlife displacement within construction areas; and
- Exposed soils from grading activities and potential for soil erosion and sedimentation.

While temporary, the primary unavoidable impacts that are anticipated during the operational life of the Project include the following:

- Aesthetic changes to the landscape (agricultural landscape to solar facilities);
- Land use change from predominately row-crow agriculture to solar panels/electric storage/transmission facilities and perennial vegetation; and
- Infrequent vehicle trips from maintenance vehicles traveling to and from the site.

Beyond the above-described mitigative measures that will be implemented for the Project, no other mitigation is proposed.

5.0 Agency and Public Outreach

Prior to preparing and filing this Application, Lake Wilson Solar completed extensive and comprehensive engagement with local, state and federal regulatory stakeholders to introduce the Project, request comments and gain feedback. Additionally, Lake Wilson Solar contacted the eleven recognized Minnesota Tribal Nations and the Minnesota Indian Affairs Council Cultural Resources stakeholders for comments (see below summary). Lake Wilson Solar will continue to engage with all interested stakeholders throughout the CN and SP application processes.

On November 11, 2021, Lake Wilson Solar sent a Project introduction letter and map showing a previously proposed Project Area to federal and state agencies, Minnesota Tribal Nations, and local cities and townships requesting feedback on the Project, its' location, resources in the Project vicinity, required permits and approvals, known constraints and other potential concerns.[27] An updated letter with the current Project Area was re-sent to all federal and state agencies, Minnesota Tribal Nations, and local cities and townships on July 29, 2022. This letter also requested feedback on the Project, its' location, resources in the Project vicinity, required permits and approvals, known constraints and other potential concerns. The agency list, sample of the outreach letters, and responses received thus far, are included in **appendices H and K**. The agencies and stakeholders contacted are summarized in **Table 26** and **Table 27** along with dates of follow up correspondence. A summary of correspondence and meetings with stakeholders are included in the table below. Lake Wilson Solar will continue to work with federal, state and local agencies, and Minnesota Tribal Nations as the Project advances.

Table 26: Summary of Correspondence

Agency	Correspondence Date and Summary
Federal	
USACE, St. Paul District	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
USFWS – Minnesota Wisconsin Field Office	October 31, 2017 (T&E review, consultation code 03E19000-2018-SLI-0096); October 31, 2017 (T&E review, consultation code 03E19000-2018-SLI-0095); December 11, 2017 (T&E review, consultation code 03E19000-2018-SLI-0179); December 11, 2017 (T&E review, consultation code 03E19000-2018-SLI-0178); June 22, 2020 (T&E review, consultation code 03E19000-2020-SLI-1642); September 15, 2021 (Introductory Meeting); September 27, 2021 (transmittal of USFWS requested information); November 2, 2021 (initial agency response); November 5, 2021 (Introductory Letter);

[27] Note that the Project introduction/request for comment letter was both emailed (November 5, 2021) and sent via U.S. Postal Service to the 11 Minnesota Tribal Nations and the Minnesota Indian Affairs Council Cultural Resources.

	July 29, 2022 (revised Introductory Letter); August 1, 2022 (T&E review, project code 2022-0069675); October 6, 2022 (T&E review, project code 2023-0001883)
Federal Aviation Administration	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
State	
Minnesota Historical Society – SHPO	October 6, 2017 (SHPO Data Request); January 2, 2018 (SHPO Data Request); September 1, 2021 (SHPO Data Request); November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
MNDNR	December 4, 2017 (NHIS Data Request Form); December 21, 2017 (NHIS review, correspondence #ERDB 20180233); December 21, 2017 (NHIS review, correspondence #ERDB 20180232); July 14, 2020 (NHIS Data Request Form); November 16, 2020 (NHIS review, correspondence #ERDB 20180232-0002); September 27, 2021 (T&E Review Request); October 6, 2021 (NHIS Data Request); October 6, 2021 (T&E Review); September 15, 2021 (Introductory Meeting); November 2, 2021 (DNR Early Coordination Comments); November 5, 2021 (Introductory Letter); June 29, 2022 (Formal Natural Heritage Review); July 29, 2022 (revised Introductory Letter); July 29, 2022 (Mapped PWI watercourse verification); August 1, 2022 (Conservation Planning Report); August 22, 2022 (Formal Natural Heritage Review); October 10, 2022 (Formal Natural Heritage Review); January 11, 2022 (Native Prairie Assessment Report Transmittal)
Minnesota Pollution Control Agency (MPCA)	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Minnesota Department of Agriculture (MDA)	September 17, 2021 (Introductory Meeting); November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter); December 29, 2022 (AIMP Review)
Minnesota Department of Transportation – District 6 (MnDOT)	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Minnesota Department of Commerce (DOC)	September 14, 2021 (Introductory Meeting); October 12, 2022 (EERA Presentation)
Minnesota Department of Employment & Economic Development (MDEED)	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Minnesota Department of Health	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)

Minnesota Public Utilities Commission (MPUC)	September 14, 2021 (Introductory Meeting); September 27, 2021 (Battery Storage Presentation); July 19, 2022 (Interagency Vegetation Management Planning Work Group Meeting); October 12, 2022 (Update Meeting); December 6, 2022 (Interagency Vegetation Management Planning Work Group VSMP Review)
Local	
Murray County Board of Commissioners	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Murray County Administrator	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Murray County Environmental Services	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Murray County Engineer	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Murray County Economic Development Coordinator	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Murray County Parks Director	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Murray County SWCD	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Leeds Township	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Chanarambie Township	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
City of Lake Wilson	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
City of Chandler	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
City of Hadley	July 29, 2022 (Introductory Letter)
Murray County Area Schools	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Murray County Community	November 28, 2017 (Community Presentation); July 20, 2021 (Community Presentation)

Federal written correspondence has included the USFWS's and MNDNR's responses, with the USFWS providing comments pursuant to the Endangered Species Act and the Bald and Golden

Eagle Protection Act due to the possible impact upon federal trust resources. Lake Wilson Solar used the IPaC and results are in **Section 4.5.6.**

State of Minnesota correspondence has included responses from the MNDNR. Ms. Joanne Boettcher recommended referencing MNDNR's Commercial Solar Siting Guidance; using GIS data layers; establish native, pollinator friendly vegetation; submitting an updated NHIS review request for any change in Project footprint; and wildlife friendly erosion control and invasive species prevention best management practices. Thorough field investigations, minimizing impacts to wetland or mucky soils, avoidance of the native prairie remnants, and stringent erosion control efforts were also recommended.

Lake Wilson Solar referenced the MNDNR's Commercial Solar Siting Guidance throughout the application process and has included several GIS data layers in figures throughout this application. These layers were also referenced and native prairie remnants avoided when designing the Project. As seen in the VSMP, native, beneficial habitat species will be planted, and invasive species prevention best management practices will be used (**Appendix F**). Lake Wilson Solar is committed to stringent erosion control. This will be reflected in the SWPPP that will be prepared for the Project. Additionally, minimizing impacts to wetland or mucky soils is outlined in sections 4 and 5 of the AIMP (**Appendix E**).

On November 11, 2021, Lake Wilson Solar sent an introductory letter to the 11 Minnesota Tribal Nations and the Minnesota Indian Affairs Council. No responses were received. On July 29, 2022, Lake Wilson Solar sent an updated introductory letter with the revised layout. Lake Wilson Solar received one response from the Shakopee Mdewakanton Sioux Community by email on August 9, 2022 indicating that they did not have any concern with the Project. No other responses have been received from Tribal Nations as of the date of this Application. Error! Reference source not found.**7** includes a summary of tribal correspondence to date. Lake Wilson Solar will continue to update the Minnesota Tribal Nations on the Project and will keep the Nations informed during the Project development process. All Tribal Correspondence can be found in **Appendix K**.

Table 27: Summary of Tribal Correspondence

Tribes	Correspondence Date and Summary
Lower Sioux Tribal Historic Preservation Office	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Upper Sioux Tribal Historic Preservation Office	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Prairie Island Tribal Historic Preservation Office	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Shakopee Mdewakanton Sioux Community	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter – response received August 9, 2022)
Bois Forte Tribal Historic Preservation Office	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Fond du Lac Tribal Historic Preservation Office	November 5, 2021 (Introductory Letter); November 17, 2021 (revised Introductory Letter); July 29, 2022 (revised Introductory Letter)
Grand Portage Tribal Historic Preservation Office	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Leech Lake Tribal Historic Preservation Office	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Mille Lacs Tribal Historic Preservation Office	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
Red Lake Nation Tribal Historic Preservation Office	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)
White Earth Nation Tribal Historic Preservation Office	November 5, 2021 (Introductory Letter); November 17, 2021 (revised Introductory Letter); July 29, 2022 (revised Introductory Letter)
Minnesota Indian Affairs Council	November 5, 2021 (Introductory Letter); July 29, 2022 (revised Introductory Letter)

In addition to the above outreach and responses, Lake Wilson Solar held various meetings with State and local representatives to introduce the Project and review comments and questions. A summary of the completed meeting notes and upcoming events are included in Error! Reference source not found.**8** below. Meetings notes are included in **Appendix H**.

Table 28: Summary of Agency Meeting Notes

Date	Outreach Type	Attendees/Contacts	Notes
July – October 2017	Email Correspondence	Lake Wilson Solar Development team, Lori Gunnink, Murray County Commissioner.	Email correspondence with Lori Gunnink.
10/19/2017	In Person Meeting	Invenergy Regulatory Affairs Staffer, MN Department of Agriculture	Short Term Invenergy Reg Affairs Staffer met with MN Department of Agriculture about solar on agricultural land.
11/27/2017	In Person Meeting	Murray County members including Zoning Officer Jean Christoffels; Invenergy and Westwood representatives.	Presentation to Murray County with Invenergy and Westwood representatives. Murray County staff present included Zoning Officer Jean Christoffels.
11/28/2017	In Person Meeting	Invenergy, John Wachtler from EERA and Tricia Debleecker with MPUC.	Invenergy development team representative made a presentation to John Wachtler with DOC EERA and Tricia Debleecker with MPUC.
July 2019	Email Correspondence	Invenergy, Murray County members.	Invenergy engaged with Murray County to propose mods to their proposed solar ordinance.
12/17/2019	Email Correspondence	Invenergy & Lori Gunnink, Murray County Commissioner.	Email to provide an update of the proposed Project.
6/4/2021	Email Correspondence	Invenergy & Lori Gunnick and Jean Christoffels	Email to provide Project update and set up a meeting.
6/18/21	Virtual Teams Meeting	Lori Gunnink and Jean Christoffels with Murray County, and representatives from Invenergy and Fredrikson & Byron law.	Lori and Jean with Murray County met with reps from Invenergy and Fredrikson & Byron for personnel introduction and project updates.
9/14/21	Virtual Teams Meeting	Lake Wilson Solar Development team, DOC EERA & MPUC staff.	Lake Wilson intro presentation with EERA & MPUC.
9/15/21	Virtual Teams Meeting	Lake Wilson Solar Development team, USFWS and MNDNR staff.	Lake Wilson intro presentation with MNDNR/USFWS.
9/17/21	Virtual Teams Meeting	Lake Wilson Solar Development team, MDA staff.	Lake Wilson intro presentation with MDA.
9/27/21	Virtual Teams Meeting	Lake Wilson Solar Development team, DOC EERA and MPUC.	Storage discussion/presentation with Dept. of Commerce, EERA, and MPUC.
11/17/21	In Person Meeting	Lake Wilson Solar Development team, Jean Christoffels and Lori Gunnink, Murray County.	Meeting with Jean and Lori in person to discuss project details.

Table 28: Summary of Agency Meeting Notes

Date	Outreach Type	Attendees/Contacts	Notes
4/6/22	In Person Meeting	Lake Wilson Solar Development team, Murray County representatives	Meeting with Jean and Lori in person to discuss project details and to present updates on the advancement of the Project
7/19/22	Virtual Teams Meeting	Lake Wilson Solar Development team, MN interagency Vegetation Management Planning Work Group	Lake Wilson Solar presented updates to the draft VSMP based on comments previously received from the work group on the draft VSMP.
9/7/22	In Person Meeting	Lake Wilson Solar, Murray County representatives	Lake Wilson Solar presented project updated and discussed questions with including Commissioner Lori Gunnink, the County Zoning officer, County Highway Engineer, County Ditch Inspector, County Soil & Water, and Leeds Township chair representatives.
9/12/22	Email Correspondence	Lake Wilson Solar Development team representative and Murray County Ditch Inspector	Coordination regarding setbacks from county drain tile
1/5/23	Email Correspondence	Lake Wilson Solar Development team representative and Murray County Zoning Officer	Coordination regarding if there are any planned expansion projects for water, sewer, or other services.

Lake Wilson Solar has conducted meetings with agencies at the federal, state, and local levels to introduce the Project, provide information, receive feedback, and assist in designing a Project that respects agency concerns/comments and has the support of the community. Meeting notes are provided in **Appendix C**. As applicable, Lake Wilson Solar has made a point of completing outstanding action items soon after these meetings were held. The general feedback on the Project has been positive. Lake Wilson Solar has provided fact sheets, articles, and other resources, specifically to state and local agencies, to maximize the understanding of the Project and help inform this Application.

As discussed above, the MDA and other State agency staff have been provided drafts of the Project AIMP and VSMP to review and comment prior to filing the Application. In September 2021 the DOC EERA and MNDNR advised Lake Wilson Solar of VSMP guidance which was formally issued in March 2021. Lake Wilson Solar has compiled a VSMP for the Project (see **Appendix F**) in accordance with the issued guidance, as well as comments received from the interagency Vegetation Management Planning Work Group in February, July and December 2022. As

discussed above, comments on draft AIMP documents from the MDA were received in December 2021 and January 2023 and used by Lake Wilson Solar to revise the AIMP.

Several meetings have occurred with landowners; while there have been some questions, Lake Wilson Solar has provided Project details, has been forthcoming in responding to questions and concerns and is committed to easing concern and supplying interested and/or effected parties with Project updates and applicable information.

6.0 Completeness Checklist

The following **Table 29** summarizes Application contents and the location of required information.

Table 29: Completeness Checklist

Authority	Required Information	Location in this Application
2022 MN Statutes 216E.04	**Alternative Review of Applications**	
Subdivision 1	An applicant who seeks a site permit or route permit for one of the projects identified in this section shall have the option of following the procedures in this section rather than the procedures in section 216E.03. The applicant shall notify the commission at the time the application is submitted which procedure the applicant chooses to follow.	1.0
Subdivision 2, (8)	Large electric power generating plants that are powered by solar energy.	1.0
MN Rules 7850.1900, Subpart 1.	**Site Permit for Large Electric Power Generating Plant/Route Permit for a HVTL**	
A.	A statement of proposed ownership of the facility as of the day of filing and after commercial operation.	1.2.1 and 1.2.2
B.	The precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated.	1.2.1 and 1.2.2
C.	At least two proposed sites for the proposed large electric power generating plant and identification of the applicant's preferred site and the reasons for preferring the site; at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and reasons for the preference.	Alternatives not required under alternative process (Statutes 216E.04, Subd. 2 and 3)
D.	A description of the proposed large electric power generating plant and HVTL and all associated facilities, including the size and type of the facility.	2.0, Figures 2, 3, and 4, Appendix C
E.	The environmental information required under Subpart 3.	4.0
F.	The names of the owners of the property for the proposed site.	1.2.1 and 1.2.2
G.	The engineering and operational design for the large electric power generating plant and HVTL.	3.0; Figures 2, 3, and 4, Appendix B
H.	A cost analysis of the large electric power generating plant and HVTL, including the cost of constructing and operating the facility that is dependent on design and site.	2.6
I.	An engineering analysis of the site, including how the site could accommodate expansion of generating capacity in the future.	2.7 and 3.1

Authority	Required Information	Location in this Application
J.	Identification of transportation, pipeline, and electrical transmission systems that will be required to construct, maintain, and operate the facility.	2.0, 2.3.2 and 3.1.9
K.	A listing and brief description of federal, state, and local permits that may be required for the project.	1.4, Table 3
L.	A copy of the Certificate of Need for the project from the Public Utilities Commission or documentation that an application for a Certificate of Need has been submitted or is not required.	Exemption language included in 1.4.2
MN Rules 7850.1900, Subpart 3.	**Environmental Information**	
A.	A description of the environmental setting for the site.	4.1
B.	A description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services.	4.2; Figures 5-14; Appendices B-L
C.	A description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining.	4.3; Figures 10 and 10a; Appendices B, C and F
D.	A description of the effects of the facility on archaeological and historic resources.	4.4, Appendix I
E.	A description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna.	4.5, Appendices F, and J
F.	A description of the effects of the facility on rare and unique natural resources.	4.5.6
G.	Identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route.	4.7, 4.8
H.	A description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigation measures.	4.7, 4.8

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8.0 Abbreviations and Definitions

AIMP	Agricultural Impact Mitigation Plan
Alternating Current (AC)	The direction of current flowing in a circuit is constantly being reversed back and forth.
Annual Average Daily Traffic (AADT)	A measure used primarily in transportation planning and transportation engineering. Traditionally, it is the total volume of vehicle traffic of a highway or road for a year divided by 365 days.
APLIC	Avian Power Line Interaction Committee
Applicant	Lake Wilson Solar LLC
Application	Site Permit Application
AQI	Air Quality Index
ARMER	Allied Radio Matrix for Emergency Response
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BMPs	Best Management Practices
BSWR	Minnesota Board of Water and Soil Resources
Bus	An electrical conductor that serves as a common connection for two or more electrical circuits; may be in the form of rigid bars or stranded conductors or cables.
CAA	Clean Air Act
Certificate of Need (CN)	A document that includes forecast information upon which the alleged need for development of a new Large Electric Power Generating Plant (LEPGP) is based.
CO	Carbon Monoxide
Commission or MPUC	Minnesota Public Utilities Commission
Conductor	A material or object that permits an electric current to flow easily.
Conservation Reserve Program (CRP)	A land conservation program administered by the Farm Service Agency (FSA). In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality.
CSW	Construction Stormwater
CWI	County Well Index
dBA	A-weighted decibels. An adjustment applied to instrument-measured sound levels in effort to account for the relative loudness perceived by the human ear, as the ear is less sensitive to low audio frequencies.
Decibel (dB)	A logarithmic unit used to express the absolute level of sound pressure, using the ratio between power and intensity.
Direct Current (DC)	The unidirectional flow of electric charge. Direct current is produced by sources such as batteries and solar cells.

DOC EERA	Department of Commerce, Energy Environmental Review and Analysis (DOC EERA)
Easement	A permanent right authorizing a person or party to use the land or property of another for a particular purpose. In the case of this Project, this means acquiring certain rights to build and maintain a transmission line. Landowners are paid a fair price for the easement and can continue to use the land for most purposes, although some restrictions are included in the agreement.
Ecological Classification System (ECS)	A system ecological mapping and landscape classification developed by the Minnesota Department of Natural Resources and the U.S. Forest Service.
Electric (E) Field	The field of force that is produced as a result of a voltage charge on a conductor or antenna.
Electromagnetic	The term describes the relationship between electricity and magnetism; a quality that combines both magnetic and electric properties.
Electromagnetic Field (EMF)	The combination of an electric (E) field and a magnetic (H) field.
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
GPS	Global Positioning System
Grounding	To connect electrically with a ground; to connect some point of an electrical circuit or some item of electrical equipment to earth or to the conducting medium used in lieu thereof.
HUC	Hydrologic Unit Code
Inverter	An electronic device or circuitry that changes direct current (DC) to alternating current (AC).
IPaC	Information for Planning and Consultation
kV	Kilovolt
kVA	Kilovolt-ampere
L10	Ten Percent of Any Hour
L50	Fifty Percent of Any Hour
Large Electric Power Generating Plant (LEPGP)	Electric power generating equipment and associated facilities designed for or capable of operation at a capacity of 50,000 kilowatts or more.
Generator Interconnection Agreement (GIA)	The process service providers follow to interconnect generation resources with the MISO regional transmission operator system. This business practice identifies the qualification criteria, forms, submission procedures along with expected steps and timing leading up to interconnection.
Local Government Unit or LGU	A sub-State level administrative unit (e.g., City, County)
LRR	Land Resource Regions

Magnetic (H) Field	The region in which the magnetic forces created by a permanent magnet or by a current-carrying conductor or coil can be detected. The field that is produced when current flows through a conductor or antenna.
MBS	Minnesota Biological Survey
MBTA	Migratory Bird Treaty Act
MCBS	Minnesota County Biological Survey
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
Megawatt hours (MWh)	Equal to 1,000 kilowatts of electricity used continuously for one hour. It is about equivalent to the amount of electricity used by about 330 homes during one hour.
Megawatts (MW)	A megawatt is a unit for measuring power that is equivalent to one million watts.
mG	MilliGauss
MISO	Midcontinent Independent System Operator
MLCCS	Minnesota Land Cover Classification System
MLRA	Major Land Resource Areas
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
National Pollutant Discharge Elimination System Permit (NPDES)	As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point and nonpoint sources that have potential for the discharge of pollutants into waters of the United States
NCED	National Conservation Easement Database
NEMA	National Electrical Manufacturer Association
NIEHS	National Institute of Environmental Health Sciences
NHIS	Natural Heritage Information System
NLEB	Northern Long-eared Bat
NO2	Nitrogen Dioxide
NPC	Native Plant Community
NRCS	National Resources Conservation Service
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWP	Nationwide Permit
O&M	Operations and Maintenance
O3	Ozone. A very reactive form of oxygen that combines readily with other elements and compounds in the atmosphere.
Off-Highway Vehicle (OHV)	Vehicles such as racing motorcycles, trail bikes, minibikes, dune buggies, all–terrain vehicles, jeeps, and snowmobiles. These vehicles are operated exclusively off public roads and highways on lands that are open and accessible to the public.

OSA	Office of the State Archaeologist
Photovoltaic (PV)	A method of converting solar energy into direct current electricity using solar modules composed of a number of solar cells to supply usable solar power.
PM	Particulate Matter
POI	Point of Interconnect
PPA	Power Purchase Agreement
Preliminary Development Area	The 1,527.8-acre area where Lake Wilson Solar LLC proposes to build the Lake Wilson Solar Project.
Project Area	The 2,620.8-acre area of privately-owned land for which Lake Wilson Solar LLC has leases and purchase options to allow siting and construction of the Project.
PWI	Public Waters Inventory
Reinvest in Minnesota (RIM)	The Reinvest in Minnesota (RIM) Reserve Program is administered by the Minnesota Board of Water and Soil Resources. It protects and improves water quality, reduces soil erosion, and enhances fish and wildlife habitat on privately owned lands by retiring environmentally sensitive lands from agricultural production. Conservation practices are established by planting native vegetation and restoring wetlands. Other benefits include flood control and groundwater recharge.
Right-of-Way	The land area within an approved transmission line route over which the Applicant has an easement agreement to safely construct, operate, and maintain facilities.
RSEA	Regionally Ecological Significant Areas
SCADA	Supervisory Control and Data Acquisition
SDS	State Disposal System (SDS)
SDWA	Safe Drinking Water Act
SGHAT	Solar Glare Hazard Analysis Tool
SHPO	State Historic Preservation Office
SO2	Sulfur Dioxide
SOBS	Sites of Biodiversity Significance
Solar module (module)	A set of photovoltaic (PV) solar modules electrically connected and mounted on a supporting structure.
SSA	Sole Source Aquifer
SSURGO	Soil Survey Geographic Database
State Scientific and Natural Areas (SNAs)	Public land established for the preservation of natural features and rare resources of exceptional scientific and educational value.
State Wildlife Management Areas (WMAs)	Public land established to protect those lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses.
Stormwater Pollution Protection Plan (SWPPP)	The SWPPP includes a description of all construction activity, temporary and permanent erosion and sediment control BMPs, permanent stormwater management, and other pollution prevention techniques to be implemented throughout the life of the construction project. .

Substation	A substation is a high voltage electric system facility. It is used to switch generators, equipment, and circuits or lines in and out of a system. It also is used to change AC voltages from one level to another. .
SWAP	State Wildlife Action Plan
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VSMP	Vegetation and Soil Management Plan
Voltage	A unit of electrical pressure, electric potential or potential difference expressed in volts. The term used to signify electrical pressure. Voltage is a force that causes current to flow through an electrical conductor. The voltage of a circuit is the greatest effective difference of potential between any two conductors of the circuit.
Wetland Conservation Act (WCA)	Legislation designed to maintain and protect Minnesota's wetlands and the benefits they provide. To retain the benefits of wetlands and reach the legislation's goal of no-net-loss of wetlands, the Wetland Conservation Act requires anyone proposing to drain, fill, or excavate a wetland first to try to avoid disturbing the wetland; second, to try to minimize any impact on the wetland; and, finally, to replace any lost wetland acres, functions, and values. Certain wetland activities are exempt from the act, allowing projects with minimal impact or projects located on land where certain pre-established land uses are present to proceed without regulation
WHPA	Wellhead Protection Area
Wildlife Management Area (WMA)	Wildlife Management Areas are part of Minnesota's outdoor recreation system and are established to protect those lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses.
WNS	White-Nose Syndrome