LOUISE SOLAR PROJECT

Application to the Minnesota Public Utilities Commission for a Large Electric Generating Facility Site Permit

MPUC Docket No. IP-7039/WS-20-647
February 11, 2021

EDF renewable energy

Application to the Minnesota Public Utilities Commission for a Site Permit for the 50 MW Louise Solar Large Electric Generating Facility

Louise Solar Project

Mower County, Minnesota

MPUC Docket Number: IP-7039/WS-20-647

Prepared for:

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Prepared by:

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February 11, 2021

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Project Location:	Mower County
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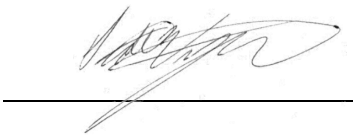
Signature:	
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Definitions and Abbreviations

AIMP	Agricultural Impact Mitigation Plan
Alternating Current (AC)	The direction of current flowing in a circuit is constantly being reversed back and forth. See also Direct Current.
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.
Applicant	Louise Solar Project, LLC
Application	Site Permit Application
AQI	Air Quality Index
ARMER	Allied Radio Matrix for Emergency Response
Avian	Of or relating to birds
A-weighted scale (dB(A)	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.
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BMPs	Best Management Practices
BWSR	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 in Minnesota
Commission	Minnesota Public Utilities Commission
CN	Certificate of Need
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.
CWI	County Well Index
dBA	A-weighted decibels
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.

Easement	A permanent right authorizing a person or party to use the land or property of another for a particular purpose.
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 describing 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
GAP	Gap Analysis Program
GIS	Geographic Information System
Grading	To level off to a smooth horizontal or sloping surface.
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.
Habitat	The place or environment where a plant or animal naturally or normally lives and grows.
Inverter	An electronic device or circuitry that changes direct current (DC) to alternating current (AC).
IPaC	Information for Planning and Conservation via the U.S Fish & Wildlife Service
kV	kilovolt
L 10	Ten Percent of Any Hour
L 50	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.
Large Generator Interconnection Agreement (LGIA)	The process service providers follow to interconnect generation resources with the Minnesota transmission system. This business practice identifies the qualification criteria, forms, submission procedures along with expected steps and timing leading up to interconnection.
Local Government Unit (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 A milligauss is a unit of measurement of the density of a magnetic field. Magnetic fields depend on current.
MISO	Midcontinent Independent System Operator
Mitigate	To lessen the severity of or alleviate the effects of.
MLCCS	Minnesota DNR 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
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
NPCs	Native Plant Communities
NRCS	National Resources Conservation Service, formerly known as the Soil Conservation Service (SCS).
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWP	Nationwide Permit
O&M	Operations and Maintenance
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	Minnesota Office of the State Archaeologist
PEM	Palustrine Emergent Wetland
Photovoltaic (PV)	A method of converting solar energy into direct current electricity using solar panels composed of a number of solar cells to supply usable solar power.
POI	Point of Interconnect
PPA	Power Purchase Agreement
Preliminary Development Area	Approximate 325-acre area where Louise Solar Project, LLC proposes to build the Louise Solar Project facilities.
Project Area	Approximately 613-acre area of privately-owned land for which Louise Solar Project, LLC has leases and purchase options to allow siting and construction of the Project.
PV	Photovoltaic
PWI	Public Waters Inventory

Raptor	A member of the order Falconiformes, which contains the diurnal birds of prey, such as the hawks, harriers, eagles and falcons.
Right-of-Way	The physical land area within the approved Route Width over which land rights are actually required to safely construct, operate, and maintain a transmission line.
Route Width	The area in which the utility is allowed by the Public Utilities Commission to locate the necessary Right-of-Way and complete final design of the transmission facilities.
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act
SGCN	Species of Greatest Conservation Need
SHPO	Minnesota State Historic Preservation Office
Solar module (module)	A set of solar photovoltaic (PV) panels electrically connected and mounted on a supporting structure.
SSA	Sole Source Aquifer
SSURGO	Soil Survey Geographic Database
State Scientific and Natural Areas (SNAs	Preserves for natural features and rare resources of exceptional scientific and educational value.
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. The SWPPP includes a combination of narrative plans and standard detail sheets that address the foreseeable conditions at any stage of construction.
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. Some substations are small with little more than a transformer and associated switches. Others are very large with several transformers and dozens of switches and other equipment.
SWAP	State Wildlife Action Plan
SWPPP	Stormwater Pollution Prevention Plan
TEP	Mower County Technical Evaluation Panel
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish & Wildlife Service
USG	Unhealthy for Sensitive Groups
USGS	U.S. Geological Survey
VMP	Vegetation 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	Wetlands are areas that are periodically or permanently inundated by surface or ground water and support vegetation adapted for life in saturated soil. Wetlands include swamps, marshes, bogs and similar areas.
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 Minnesota Wetland Conservation Act, pursuant to Minnesota Administrative Rules 8420, 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

Completeness Checklist

Completeness Checklist		
Authority	**Required Information**	**SPA Section(s)**
2014 Minnesota Statutes 216E.04	**Alternative Review Of Application**	
Subdivision 1	Alternative Review - 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(1) Subdivision 2(8)	The requirements and procedures for alternative review apply to the following projects: Large electric power generating plants with a capacity of less than 80 megawatts Large electric power generating plants that are powered by solar energy.	1.0
Minn. Rules 7850.1900, Subpart 1	**Site Permit For Large Electric Power Generating Plant**	

Completeness Checklist		
Authority	**Required Information**	**SPA Section(s)**
A.	A statement of proposed ownership of the facility as of the day of filing and after commercial operation.	1.2.3
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, 1.2.2, and 1.2.3
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.	Alternatives not required under alternative process (2014 Minnesota Statutes 216E.04, Subdivisions 2 and 3)
D.	A description of the proposed large electric power generating plant and all associated facilities, including the size and type of the facility.	2.0, Maps 3 and 4
E.	The environmental information required under subpart 3.	4.0
F.	The names of the owners of the property for each proposed site.	Appendix E
G.	The engineering and operational design for the large electric power generating plant at each of the proposed sites.	3.0; Map 3 and 4
H.	A cost analysis of the large electric power generating plant at each proposed site, including the costs of constructing and operating the facility that are dependent on design and site.	2.4
I.	An engineering analysis of each of the proposed sites, including how each site could accommodate expansion of generating capacity in the future.	2.5
J.	Identification of transportation, pipeline, and electrical transmission systems that will be required to construct, maintain, and operate the facility.	3.1
K.	A listing and brief description of federal, state, and local permits that may be required for the project at each proposed site.	1.4, Table 2
L.	A copy of the Certificate of Need for the project from the Public Utilities Commission or documentation that an application for a	1.4.1

Completeness Checklist		
Authority	**Required Information**	**SPA Section(s)**
	Certificate of Need has been submitted or is not required.	
Minn. Rules 7850.1900, Subpart 3	**Environmental Information**	
A.	A description of the environmental setting for each site or route.	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
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
D.	A description of the effects of the facility on archaeological and historic resources.	4.4
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
F.	A description of the effects of the facility on rare and unique natural resources.	4.5.7
G.	Identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route.	4.1 – 4.5
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.	4.1 – 4.5

1.0 Introduction and Summary

Louise Solar Project, LLC (Louise Solar or Applicant), a wholly owned subsidiary of EDF Renewables, Inc. (EDFR), proposes to construct and operate a 50 MW photovoltaic (PV) solar energy generating facility and associated systems. The proposed Project is planned to be constructed in Lodi and Adams Townships, Mower County, Minnesota (Map 1). The solar Project is situated on approximately 613 acres of landowner signed land, of which approximately 325 acres is currently proposed for use. References to the "Project Area" within this application refers to all land within the Solar Project boundary under agreement with a landowner (613 acres); whereas references to "Preliminary Development Area" refers to portions of the Project Area hosting solar equipment (325 acres), defined as areas within the proposed fence as shown on Figure 1.

The proposed Project consists of solar panels mounted on racking systems and pile foundations. A single-axis tracking system will allow the solar panels to track the sun from east to west maximizing energy production. Energy from the solar panels is directed through an underground electrical collection system to inverters where the power is converted from direct current (DC) to alternating current (AC) power. The power is then transmitted to a step-up transformer located at the project substation from 34.5 kV to 161 kV. Generated power is then carried to ITC Midwest's Adams Substation located immediately adjacent to the eastern Project Area boundary via a proposed above-ground, 161-kV transmission line where it connects to the energy grid. The short transmission line will be approximately 700-1,000 feet in length with several pole structures. Solar panels will be accessible via a network of gravel access roads for maintenance purposes, and the portions of the project occupied by equipment will be surrounded by security fencing. Stormwater from the site will be managed through a series of planned stormwater ponds.

Construction of the project requires a site permit and a certificate of need from the Minnesota Public Utilities Commission. Louise Solar respectfully submits this Site Permit Application (Application) to the Minnesota Public Utilities Commission (Commission) for a Site Permit in accordance with the Minnesota Power Plant Siting Act (Minnesota Statutes §216E) and Minnesota Administrative Rules Chapter 7850. The Site Permit is the only site approval needed for construction of the Project (Minnesota Statutes §216E.10, subd. 1). A Certificate of Need (CN) application will be submitted separately to the MPUC. The project is targeting a construction schedule that facilities an in-service date in 2022 or 2023.

The Project is a large energy facility (LEF) as defined in Minnesota Statutes §216B.2421, subd. 2(1) and a large electric generating facility (LEGF) as defined in Minnesota Rules 7849.0010, subp. 13, and therefore requires a Site Permit from the Minnesota Public Utilities Commission (Commission or MPUC) prior to construction. On December 10, 2020, Louise Solar provided the Commission notice that it is seeking approval for its application under the alternative review process provided in Minnesota Statutes §216E.04, subd. 2(8) and Minnesota Rules 7850.2800-7850.3900. Additionally, Louise Solar provided a request to the Minnesota Department of Commerce (MDOC) Energy Environmental Review and Analysis for a solar energy generating system size determination on August 4, 2020 in accordance with Minnesota Statutes §216E.021. The size determination response from the MDOC was issued on September 10, 2020, and is provided in Appendix B.

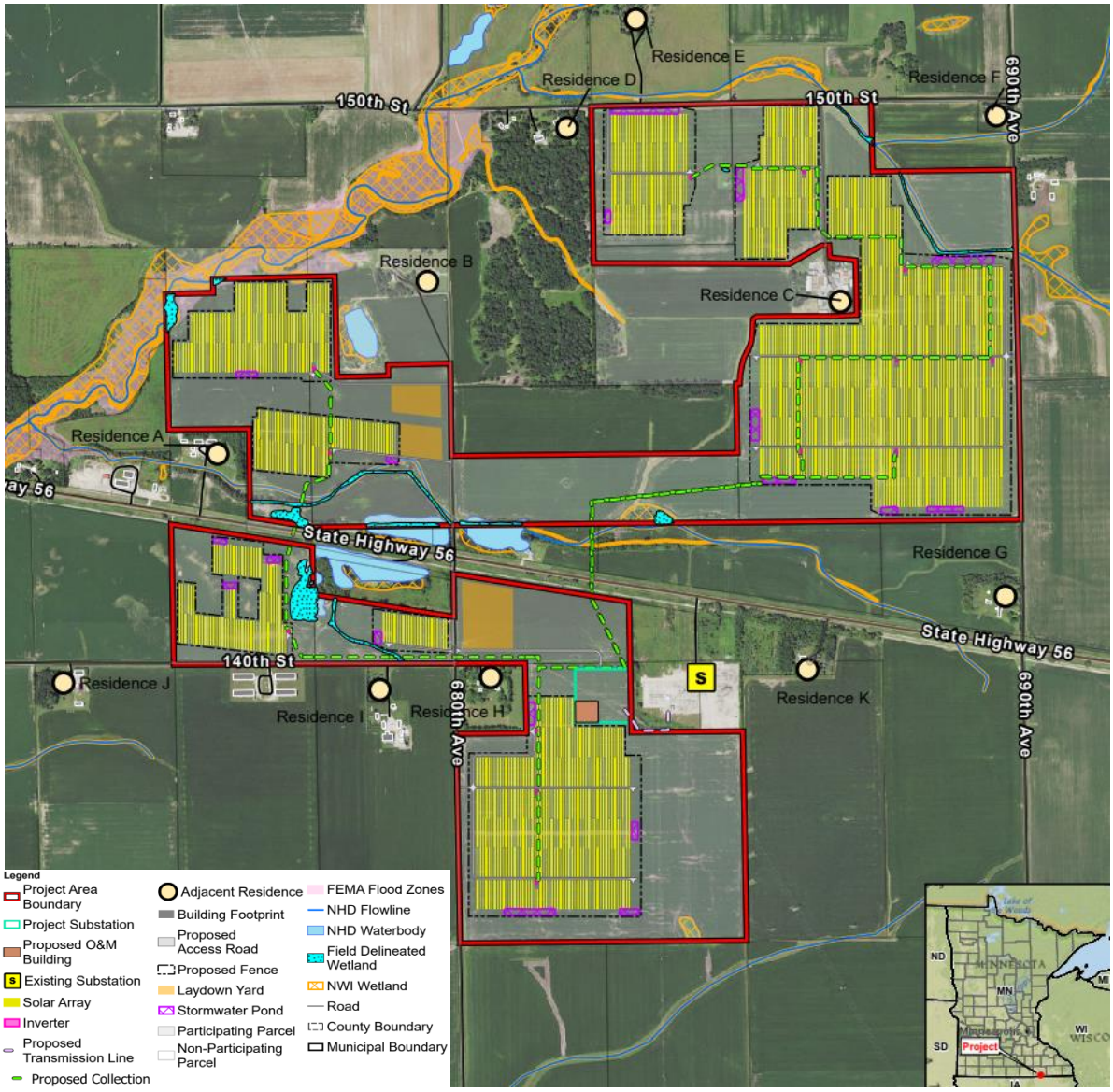

Figure 1: Project Location and Preliminary Layout

1.1 Purpose and Need

The Project is needed to meet the growing commercial and industrial customer (C&I) demand for additional renewable energy resources, to accommodate the Solar Energy Standard set forth in Minnesota Statutes and to meet other clean energy requirements in Minnesota and neighboring states. The Project will provide cost-effective solar energy and help meet the Minnesota Renewable Energy Objectives (Minnesota Statutes §216B.1691). The Applicant is working towards securing a Power Purchase Agreement (PPA) or Develop, Build, Sale (DBS) agreement for the output of the Project.

The Project will provide approximately 50 MW Alternating Current (AC) of capacity and roughly 112,593 megawatt hours (MWh) annually of reliable, deliverable on-peak energy. The power generated by the Project will be offered for sale to wholesale customers, including Minnesota

utilities and cooperatives that have identified a need for additional renewable energy and capacity, and commercial and industrial customers that have set clean energy goals. According to the Environmental Protection Agency's (EPA's) Greenhouse Gas Equivalencies Calculator, Louise Solar will offset approximately 79,618 metric tons of Co_2, the equivalent of 9,187 homes' energy consumption for one year.

The Applicant proposes to interconnect the Project at ITC Midwest's existing Adams Substation in Mower County, Minnesota (Map 1). The Midcontinent Independent System Operator (MISO) interconnection request for the Project is DPP 2016 FEB – J523. The Applicant has executed a Generator Interconnection Agreement (GIA) with MISO dated February 22, 2019. This interconnection will provide sufficient outlet to accommodate all of the solar energy generation from the Project.

1.2 Applicant Information

1.2.1 Permittee and Contact Information

The Permittee for the Site Permit will be:

Louise Solar Project, LLC
10 NE 2nd Street, Suite 400
Minneapolis, MN 55413

The contact persons regarding this Application are:

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1.2.2 Ownership at Time of Filing

Louise Solar is an independent power producer and wholly owned subsidiary of EDFR. EDFR is a renewable energy development company that will construct, own and operate the proposed Project. EDFR is a world leader in renewable energy electricity generation with its United States headquarters located in San Diego, California. EDFR North America is a market leading independent power producer and service provider that delivers grid-scale power, including wind, solar photovoltaic, and storage. EDFR develops, builds and operates clean energy power plants in more than 20 countries. EDFR's gross installed capacity is 12,607 MW worldwide, with net installed capacity standing at 8,123 MW and gross capacity under construction of 5,041 MW.

1.2.3 Proposed Ownership after Commercial Operations

Louise Solar will own, operate and maintain the Project following the start of commercial

operations. Although not planned at this time, EDFR and Louise Solar reserve 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 will likely require approval by the Commission. Any future buyer or assignee will be required to meet Site Permit conditions and PPA obligations.

1.3 Project Schedule

The Project has two possible commercial operation dates (COD) and subsequent schedules, Q4 2022 (Track 1) or Late Q3/early Q4 2023 (Track 2) which are described below. In order to meet the above CODs, the following schedules are anticipated for the various phases of development. The specific track to be taken will be determined by a number of factors including, but not limited to, timing and completion of power purchase agreement arrangements, interconnect facilities, equipment availability and permitting timelines.

Table 1: Project Schedule

Activity	Description	Timeline
Land Acquisition	Acquire leases, easements and purchase agreements necessary for development of the Project.	Tracks 1 and 2: Acquired in 2018. Several acres are under purchase option to support the project substation.
Site Permit and Certificate of Need	Site Permit and CN permit issuance for the Project.	Tracks 1 and 2: Anticipated Q4 2021.
Other Permits	Acquisition of all federal, state, local, and tribal government permits and approvals necessary for construction and operation of the Project.	Tracks 1 and 2: The Applicant is working with applicable regulatory authorities to obtain the necessary permits/approvals by the end of the first quarter of 2021.
Equipment Acquisition	Procurement of project equipment including, but not limited to, panels, trackers, inverters, and transformers. Final contractor selections will be made contingent on the Louise Solar Project site permit application being approved by the Commission in association with Docket No. IP-7039/WS-20-647.	Track 1: Between Q2 2021 and Q1 2022. Track 2: Between Q2 2022 and Q1 2023.
Construction	The Applicant will oversee the primary contractors performing construction of the Project. These construction activities will include access road building, solar array assembly, electrical, transmission, and communications installation work. The Applicant anticipates beginning construction of the Project soon after being granted	Track 1: Begin Q1/Q2 2022 and end in Q4 2022. Track 2: Begin Q4 2022 and Q1 2023, and end late Q3 or early Q4 2023.

Activity	Description	Timeline
	a CN and Site Permit by the MPUC and fulfilling necessary pre-construction compliance requirements.	
Testing and Commissioning	Testing and commissioning of project related equipment.	Track 1: End of construction and prior to the start of commercial operation - Q4 2022.
		Track 2: End of construction and prior to the start of commercial operation - Late Q3/early Q4 2023.
Operation	Commercial operation of the solar facility following construction and testing/commissioning activities are completed.	Track 1: Q4 2022.
		Track 2: Late Q3/early Q4 2023.

1.4 Required Project Permits

Project development will likely require several federal, state, and local permit approvals prior to construction. Potential permits, with respect to their prospective applicability and expected timing, are detailed below in Table 2.

Table 2: Potential Permits/Approvals

Agency	Permit	Applicability	Permit Status & 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
U.S. Environmental Protection Agency	Spill Prevention, Control, and Countermeasures Plan	Project facilities with oil storage of more than 1,320 gallons	To be obtained prior to construction, as needed
State			
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 and filed concurrent with the Site Permit Application
	Site Permit	Required for LEFs 50 MW or greater	To be obtained prior to construction

Agency	Permit	Applicability	Permit Status & Timing
Minnesota Pollution Control Agency	Section 401 Water Quality Certification	Required for Section 404 Individual and Nationwide Permits.	To be obtained prior to construction, as needed
Minnesota Pollution Control Agency	National Pollutant Discharge Elimination System General Permit and Stormwater Pollution Prevention Plan	Construction activity that disturbs one or more acre of land.	To be obtained prior to construction
Minnesota Department of Health	Well construction permit	Installation of a water supply well.	To be obtained prior to construction (for O&M building), as needed
Minnesota Department of Labor and Industry	Electrical inspection of installed equipment	Necessary to comply with state electrical codes	Inspection to be conducted during construction and prior to operation
Minnesota Department of Natural Resources	Water Appropriation/ Dewatering Permit	Required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year (dewatering)	To be obtained prior to construction, as needed
Minnesota DNR, Division of Lands & Minerals	Utility Crossing License	Required to cross state land with utility infrastructure.	To be obtained prior to construction, as needed
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 register properties, or require Section 106 compliance.	Obtain concurrence on Phase I inventory prior to construction
Minnesota Department of Transportation	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 construction, as needed
	Access (Driveway) Permit	Required for construction of a driveway/access road utilizing MNDOT rights-of-way.	To be obtained prior to construction, as needed
	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

Agency	Permit	Applicability	Permit Status & Timing
County/Local			
Mower County	Conditional Use Permit	Required for construction of a solar energy facility or transmission line (greater than 35 kV) in Mower County.	A state site permit for "large energy facilities", including transmission lines, preempts local zoning, building codes and land use rules put forth by counties, townships and other special purpose governments.
	Septic System Permit	Required prior to installation of any septic system in Mower County.	To be obtained prior to construction, as needed
	Moving Permit	Required for transporting oversized and overweight loads on County roadways.	To be obtained prior to construction, as needed
	Application for Driveway/ Entrance	Required for moving, widening or creation a new driveway access to County roads.	To be obtained prior to construction, as needed
	Excavation and/or obstruction permit	Required to work and place facilities within public road right-of-way.	To be obtained prior to construction, as needed
Mower County Soil and Water Conservation District (SWCD)	Minnesota Wetland Conservation Act Approval	Activities affecting water resources	To be obtained prior to construction, as needed

At 161 kV, and less than 1,500 feet in length, the project's high-voltage transmission line will not exceed the following thresholds for a separate route permit: (1) any high-voltage transmission line with a capacity of 200 kilovolts or more and greater than 1,500 feet in length, (2) any high-voltage transmission line with a capacity of 100 kilovolts or more with more than ten miles of its length in Minnesota or that crosses a state line.

1.4.1 Certificate of Need

Pursuant to Minn. Stat. § 216B.243, all large energy facilities (LEF) must receive a certificate of need (CN) from the Minnesota Public Utilities Commission. Since the proposed Project meets the criteria for a LEF (50 megawatts of generation or greater), a CN will be required for the Project. Exemptions are available for solar and wind generation facilities (§ 216B.243, subd. 8), such as if the system is owned and operated by an independent power producer and the electric output of the system is not sold to an entity that provides retail service in Minnesota, a regional transmission organization, or independent system operator. The Project does not qualify for an exemption at this time because power from the Project is being offered for sale to wholesale customers, including Minnesota utilities and cooperatives.

The Applicant will submit a CN application to the MPUC for construction of the proposed large solar energy facility under docket number IP-7039/CN-20-646. On August 5, 2020, the Applicant submitted a request to the MPUC for exemption from certain CN data content requirements specific to the operation and regulation of facilities proposed by utilities. The exemption request was considered and approved by the Commission on September 21, 2020.

The proposed Project transmission line is planned to be a 161 kV line spanning less than 1,500 feet and thus will not trigger the need for a Route Permit from the Commission. The planned Project transmission line is further exempt from CN requirements because it does not meet the voltage and length requirements of a large energy facility under Minnesota Statutes §216B.2421, subd. 1, as described above.

1.4.2 Site Permit

The Project falls within the definition of a Large Electric Generating Facility in the Power Plant Siting Act, and thus, requires a Site Permit from the Commission prior to construction. Pursuant to Minn. Stat. § 216E.04, subd. 2(8), Louise Solar seeks approval of its application under the alternative review process provided for under Minn. Stat. § 216E.04 and Minnesota Administrative Rules 7850.2800-7850.3900. The Applicant filed a Notice of Intent to Submit a Site Permit Application under the Alternative Permitting Process to the Commission on December 10, 2020.

1.4.3 Other Potential Permits and Approvals

The Applicant will obtain all permits, licenses, and approvals that are required following issuance of the CN and Site Permit. The permits or approvals as being potentially applicable for the construction and operation of the Project are shown in Table 2 above. Copies of agency correspondence concerning approvals are included in Appendix B, Agency Correspondence.

1.4.4 Request for Joint Proceeding with Certificate of Need

As described above, Louise Solar has applied for a Certificate of need for the Project in Docket No. IP-7039/CN-20-646. Minnesota Statute Section 216B.243, subd. 4 and Minn. R. 7849.1900, subp. 4, permit the Commission to hold joint proceedings for a certificate of need and site permit in circumstances where a joint hearing is feasible, more efficient, and may further the public interest. As such, Louise Solar respectfully requests that the Commission order joint proceedings for the review of Louse Solar's Certificate of Need and Site Permit Applications. Holding joint proceedings is in the public interest because it will make it easier for members of the public to participate in applicable meetings and hearings, provide a comprehensive record regarding potential benefits, impacts and minimization measures and improve administrative efficiency for agency staff reviewing these applications.

1.4.4.1 Local Approvals

Pursuant to Minnesota Statutes 216E.10, Subd. 1, the issuance of a site permit, and subsequent purchase and use of the site for large electric power generating plant purposes, is the sole site approval required to be obtained. The Site Permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government. Consequently, if the Site Permit is obtained, county and local permits listed in Table 2 would not be pursued unless expressly indicated by the issued Site Permit.

The Applicant has consulted with local officials from 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 public and regulatory outreach is described in Section 5.0 below.

2.0 Project Description

The following provide a description of the Project Area and proposed Project infrastructure including land control, Project design, interconnection, equipment selections, prohibited areas, alternatives, costs, and potential future expansions.

2.1 Overall Project Description

The Project Area is comprised of approximately 613 acres of agricultural land located in the boundaries of Lodi and Adams Townships in Mower County, Minnesota (Map 1). The Applicant has secured site control for 613 acres of agricultural land for the proposed Project. The final Project design is expected to occupy approximately 325 acres or less. The excess acreage allows for planned buffers and flexibility in overall design. The Project resides adjacent to ITC Midwest's existing Adams Substation, which will provide a relatively short approximate 700-1,000 -foot length 161kV transmission connection between the proposed solar facility and existing substation.

The Applicant filed a Generator Interconnection Agreement (GIA) application with Midcontinent Independent System Operator (MISO) identified as J523. MISO is an independent, not-for-profit organization that delivers electric power across 15 U.S. states. Approval from MISO through a GIA is required to connect the Louise Solar Project to the electrical transmission system. The Applicant entered the interconnect request into the MISO Definitive Planning Phase (DPP) study process in February 2016, and has an executed GIA with MISO (dated February 22, 2019).

The Applicant has designed an efficient 50 MW solar PV system using single-axis trackers. Energy losses and wiring requirements have been minimized by strategically placing inverters and optimizing the electrical collection system.. The Project uses 325 acres of the 613 acres of the Project Area, minimizing impacts to land and vegetation by reducing the amount of land needed to generate 50 MW of energy and by reducing the length of the transmission line needed to connect the Project to the Adams Substation.

While equipment selection has not been finalized, the Applicant used the Canadian Solar 445W Solar Module (CS3W-445MB-AG) mounted on single axis trackers with the SMA Solar Technology 4200 UP-US inverter in the provided site layout. The Canadian Solar 445W Module is a high efficiency mono-crystalline 144-cell, bifacial module that delivers power at a low cost per watt, and an extended life expectancy from one of the leading companies in the solar industry. While the current design anticipates Canadian Solar technology, other panels and manufactures are under consideration. Any changes in technology moving forward are anticipated to build upon current Project efficiencies presented in this Application.

The Project's main components include PV panels mounted on a single axis tracking system, solar inverters, and a Project transmission line. The racking system foundations will use driven piers or posts and are not anticipated to require concrete; however, some concrete foundations may be needed depending on location and specific soil conditions. Associated facilities include electrical cables, conduit, switchgear, step up transformers, supervisory control and data acquisition (SCADA) system, and metering equipment. The solar facility will be fenced and gated for security. After construction is complete, disturbed areas will be seeded with a beneficial seed mix to enhance soil and water retention and reduce stormwater runoff and erosion throughout the Project Area. The Applicant will work collaboratively with the Minnesota Department of Natural Resources (MNDNR) to maximize the opportunity to establish and

manage the vegetation at the Project site pursuant to the Agricultural Impact Mitigation Plan (AIMP; Appendix C) and the Vegetation Management Plan (VMP; Appendix D).

At approximately 700-1,000 feet long, the proposed 161 kV transmission line will provide the physical interconnection between the Project substation and the 161 kV bus at the existing ITC Midwest Adams Substation. The transmission line will include several wood or steel direct embedded posts approximately 70-100 feet in height. The post structures are anticipated to consist of a standard horizontal braced-post design.

The Project is sited in Lodi and Adams Townships in Mower County. Because the Site Permit supersedes local permits, no zoning or land use permits are required for construction of the Project from Mower County or associated townships. According to Mower County zoning map data (Mower County, 2019), lands within the Project Area are zoned Agricultural (Map 13). Mower County Zoning Ordinance Section 14-18.7 states that solar farms (exceeding 1 MW nameplate capacity) are allowed in the Agricultural district upon approval of a conditional use permit (CUP). Mower County Zoning Ordinance Section 14-51 states that transmission lines exceeding 35 kV must acquire a CUP prior to construction. Louise Solar will pursue a CUP from Mower County for the short transmission line prior to construction. Per the Mower County Ordinance, the Project uses are compatible with local land use regulations for solar energy facilities and transmission lines. The County has determined that these types of land uses are acceptable in the Agricultural Zoning District upon approval of a CUP. See Section 1.4.2 regarding the Site Permit and preemption of local permits and zoning.

The Applicant believes that the selected Project location in Mower County is advantageous for solar development based upon a good solar resource, willing landowner participants, consistency with local land use designations and zoning, the excellent proximity to existing electric transmission infrastructure, and minimal impact to natural and cultural resources.

2.2 Facility Description

2.2.1 Location

The Applicant is proposing to build a solar electric generating facility and accompanying transmission line within the boundaries Lodi and Adams Townships in Mower County, Minnesota (Map 1). Other proposed Project infrastructure will include a Project substation, racking systems, O&M building, underground electrical collection system, inverters, a security fence/gate, a temporary laydown yard, up to four weather stations, and gravel access roads. Table 3 summarizes the Section, Township and Range of areas included within the respective political boundaries. Map 1 depicts the location of the proposed Project, Project substation and ITC Midwest's existing Adams Substation.

Table 3: Project Location

Political Boundary	Section, Township, Range
Adams Township	Section 12, Township 101N, Range 16W
Lodi Township	Sections 7 and 18, Township 101N, Range 15W

A list and map showing participating landowners is provided in Appendix E as required by Minnesota Rules 7850.1900, subp. 1 and participating parcels are shown on Map 2.

2.2.2 Interconnection Facilities

As described in Section 1.4., a separate Route Permit is not required for the Project. The planned 161kV Project transmission line will be approximately 700-1,000 feet long and will connect the project substation to the existing Adams Substation. The anticipated route of the transmission line is shown on Maps 3 and 4. The transmission line will likely exit from the southeastern portion of the Project substation until it meets the northern Project Area boundary immediately south of the Adams Substation. The transmission line will run east along the Project Area boundary for roughly 200 feet before turning north into the Adams Substation. The Project transmission line will enter the Adams Substation between two existing transmission lines on the substation's south side.

2.2.3 Size and Capacity

The Applicant has 100% land control for the Project, which is approximately 613 acres of private land under lease (Project Area). The Applicant estimates that approximately 325 acres of the 613 acres is necessary to accommodate the final design of the 50 MW Project (Preliminary Development Area). The Preliminary Development Area is generally defined as the area within the security fencing and includes the access roads extending beyond the Project facility fenced area. The Applicant filed a solar size determination request for the Project with Minnesota Department of Commerce, Energy Environmental Review and Analysis (EERA) on August 4, 2020. Maps 3 and 4 depict the preliminary layout and associated infrastructure of the proposed Project. Additional information on the proposed facility design and layout can be found in Section 3.1.

2.3 Prohibited and Exclusion Sites

Minnesota Rules 7850.4400, subp. 1 prohibits power generating plants from being sited in prohibited areas, including: 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 its land use districts; state parks; nature conservancy preserves; state scientific and natural areas (SNA); and state and national wilderness areas. The Project is not located in any of the aforementioned prohibited areas (Map 5).

In addition, Minnesota Rules 7850.4400, subp. 3 requires applicants to avoid siting power generating plants in several exclusion areas unless there is no feasible and prudent alternative. These exclusion areas include: state registered historic sites; state historic districts; state Wildlife Management Areas (WMA); county parks; metropolitan parks; designated state and federal recreational trails; designated trout streams; and state water trails. The proposed Project facilities are not located within exclusion areas (Map 5).

2.3.1 Prime Farmland

Subject to certain exceptions, Minnesota Rules 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. The Project Area is sited on approximately 150 acres of prime farmland, and 166 acres of prime farmland if drained (Map reference and a detailed discussion in Section 4.3.1). Given the 50 MW net generating capacity of the Project, this rule would allow use of up to 25 acres of prime farmland for the Project. According to the Soil Survey Geographic (SSURGO, 2020) Database, approximately 140 acres of prime farmland and 163 acres of prime farmland if drained (considered together as all prime farmland totaling 303 acres of the roughly 325 acre Preliminary Development Area) are located within the Project Area. These acreages of prime farmland would be taken out of production for

the anticipated 35-year life of the Project, but would not be permanently removed. In May 2020, the Minnesota Department of Commerce issued *Solar Energy Production and Prime Farmland: Guidance for Evaluating Prudent and Feasible Alternatives* (Department of Commerce Energy, Environmental Review and Analysis, 2020). The only exception to Minnesota Rules 7850.4400, subp. 4 is if there is no "feasible and prudent" alternative. The guidance document is intended to assist solar developers in defining feasible and prudent siting alternatives. The following sections describe the various factors that were considered with respect to project siting and prime farmland. Louise Solar evaluated a number of alternatives. For the reasons described below, Louise Solar submits that an exception to the prime farmland exclusion is warranted as the site represents the only feasible and prudent alternative. While the project does not require an alternatives analysis, one is provided below for sake of evaluating prime farmland.

2.4 Project Area Selection and Constraints Analysis

The Project, and the Adams substation, are located in the southeastern quadrant of Mower County, approximately 3.5 miles north of the Iowa border. The nearest county, Fillmore, is located roughly 11 miles to the east.

In 2014 and 2015, EDF conducted a detailed analysis to identify the current point of interconnect (POI) and solar site location for development. Aspects of the analysis and site search are discussed in more detail in the sections that follow. EDF's search was limited to the southern half of the state due to the good solar resource and relatively open farmland in the region. Within the southern portion of the state, EDF screened for substations and transmission lines with available capacity, which revealed a relatively narrow subset of possible POIs. Based on internal modeling, these sites were also anticipated to have low or no network upgrade requirements. EDF then screened available land within approximately 3 miles of the identified POIs due to the financial limitations of constructing a longer transmission line (construction cost, easement acquisition cost, and electrical losses). Three miles of transmission was determined to be the upper limit of what a project of this size can support. Lands within the 3-mile radius of the POI were determined potentially suitable if they were: cleared and otherwise undeveloped, not currently encumbered by other easements (wind farms, etc.), contained minimal wetlands, streams, transmission lines, pipelines, roads, or other obstacles that would limit the buildable land or lead to irregularly shaped development areas. EDF also screened the areas for geotechnical risks, habitat for endangered species, proximity to culturally sensitive areas, other potential environmental risks such as pollutants, steep slopes, flood zones, current land use conflicts, and a clear and uncontested title. Once the potential project areas passed the above constraints tests, EDF approached landowners to negotiate voluntary leases and easements.

EDF identified the Adams substation as having available capacity and low interconnection costs. The Project site was chosen over others for its proximity to the POI, supportive landowners, and no competition with other potential renewable energy projects (i.e., available land not currently participating in one of the several adjacent wind projects). There has been considerable wind development in this area of Minnesota historically, which limits the ability to site the proposed solar Project at another location while remaining close enough to the Adams Substation.

It is important to note that the Solar Energy Production and Prime Farmland Guidance was issued after the project had executed a GIA, secured 100% site control and begun site studies. Few projects made it through the 2016 MISO DPP interconnect process, and fewer have a signed GIA with such low costs for interconnection. With that said, the primary siting factors driving the location of the solar facility were generally as described in the solar guidance document: 1)

best available solar source, 2) access to the grid (access to transmission or reasonably affordable interconnection), 3) a developable site (favorable ground slope and limited environmental liability), and 4) willing landowners. These factors were considered when identifying the site, and are discussed further in the sections that follow.

2.4.1 Factors Driving Choice of Region

The Guidance recommends that the developer offer an explanation of the particular constraints driving the project to be built in a region of the state that conflicts with prime farmland, and that application should: 1) describe the solar resource in the proposed region vs. otherwise compliant areas reviewed, 2) describe the process of determining available interconnection points, and 3) describe efforts in investigating developable sites (sites with appropriate topography and willing participants) in otherwise compliant areas.

The highest solar resource in Minnesota is located in the Southern one third of the state. The average expected Global Horizontal Irradiance in Mower County is among the highest in the state, and within approximately 3.5% of the highest solar irradiance in southwestern counties. This, coupled with the lower expected interconnection costs and transmission congestion makes this area of Minnesota ideal for solar. The National Renewable Energy Laboratory (NREL) Direct Normal Solar Resource of Minnesota map is provided below, and demonstrates the strong solar resource in southern Minnesota (Figure 2).

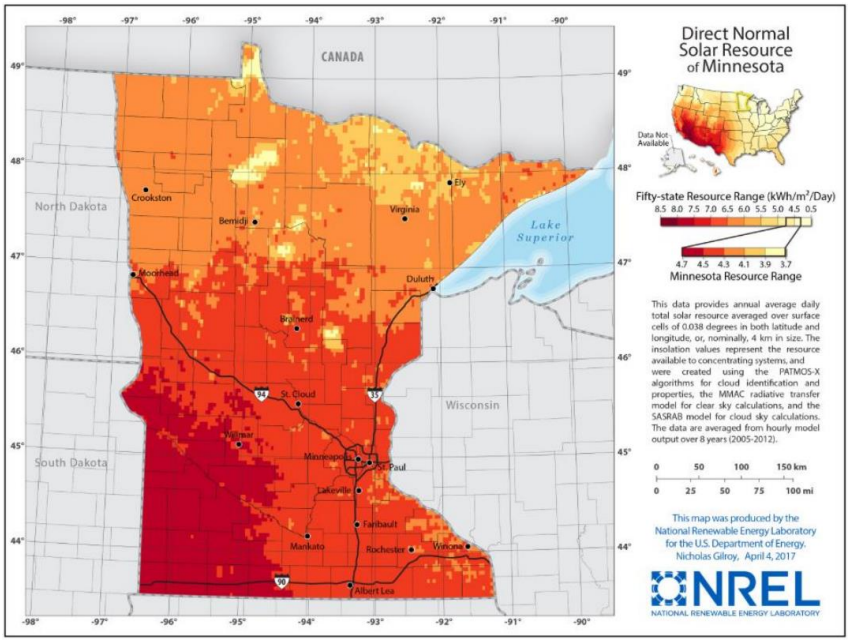

Figure 2: Direct Normal Solar Resource of Minnesota, Source: NREL, 2017

While southwestern Minnesota has slightly higher solar resource than the southeastern portions of the state, the expected interconnection costs and transmission congestion in the western part of the state was expected (and proved to be) much higher. EDFR selected the Louise project location to optimize solar resource and low interconnection costs. Louise has among the lowest interconnection costs of any solar project in Minnesota on a $/Watt basis, and is the only solar project in the state from either of the 2016 MISO DPP study groups to continue through the MISO queue to execute a GIA. The Project is currently situated to connect to the Adams Substation with a short (approximately 700-1,000 -foot) transmission line. Adding additional high voltage overhead transmission would significantly increase costs. A project of this size

would not be financially viable with more than 2-3 miles of high voltage transmission, and 2.5 miles of overhead transmission would approximately double the expected interconnection costs for the project. Siting the Project in close proximity to an existing substation allows the Applicant to make efficient use of existing equipment, minimize line loss (due to relatively close proximity to the POI) and avoid the need for large transmission construction and expense. Additionally, recent public meetings at the Minnesota Public Utilities Commission (MPUC) in regards to other proposed solar projects have indicated that access to the grid is limited for large solar projects due to interconnection constraints and transmission, and that grid access should be a consideration in the feasible and prudent decision-making process. The future goal is likely to co-locate solar projects, and other forms of generation, as closely as possible to the substations for efficiency. There is a benefit to the public interest and rate payers, consistent with state policy regarding renewable energy, to have renewable energy sited in close proximity to the POI.

Prior to selecting the area of interest for the solar project, the Applicant evaluated potential environmental constraints. A critical issues analysis was performed for the footprint and surrounding area. At that time, it was determined that no prudent alternative locations within a geographically reasonable distance existed and, the best location to site the project was adjacent to the POI.

Lastly, the Applicant met with landowners within proximity to the Adams Substation to gauge interest in Project participation. Louise Solar ultimately signed leases and/or purchase options with landowners that own relatively flat, unobstructed, generally contiguous parcels of land, with limited environmental constraints directly adjacent to and within close proximity of the Adams Substation. All landowners are willingly participating through voluntary agreements for the Project.

2.4.2 Factors to Consider When Prime Farmland is Present

Approximately 98 percent of soils in Mower County are classified as prime farmland as defined under 7 CFR 657.5(a). The remaining 2 percent of soils not classified as prime farmland are generally associated with vegetated drainages and wetlands generally not suitable for siting solar. Percentages of agricultural lands and prime farmlands within the Project Area and Preliminary Development Area vary slightly from the percentages represented in Mower County overall as represented in other sections of this application.

The Applicant completed a GIS evaluation of regional prime farmland and farmland of statewide importance to a distance of approximately 10 miles surrounding the Adams Substation to address Minnesota Rules 7850.4400, subp. 4 prime farmland limitations (Map 6). The selected distance was determined based on transmission line costs and losses, and a reasonable geographic scope for the alternatives analysis. Moving further away from the POI would not result in less impact to prime farmland. In the case of this Project, where the POI is so close to the proposed solar facility, increasing the distance would ultimately result in longer transmission, an enlargement of the Project's overall footprint, a corresponding increase in prime farmland conversion, and increase in Project cost. Consequently, the proposed Project facility is consistent with Minnesota Statutes § 216E.02 which "declares it to be the policy of the state to locate large electric power facilities in an orderly manner compatible with environmental preservation and the efficient use of resources. In accordance with this policy the commission shall choose locations that minimize adverse human and environmental impact while insuring continuing electric power system reliability and integrity and insuring that electric energy needs are met and fulfilled in an orderly and timely fashion."

Prime farmland, and its sub-categories, are mapped throughout Mower County except along larger waterway drainages and wetlands. Accordingly, there is no reasonably sized area in Mower County, or within ten miles of the Adams Substation that could facilitate solar development of approximately 325 contiguous acres not defined as prime farmland.

Avoidance of other prohibited areas played a significant role in influencing site selection. As shown on Map 5, the project is situated between the cities of Adams to the west, and Taopi to the east. Care was taken to ensure the project was sited outside of potential future expansion areas for both of these cities, and on parcels owned by willing landowners. Secondly, this portion of the state contains a sizeable number of active wind farm projects, with lands leased for that use. Site selection was limited to parcels that were not already participating in an active wind project lease. Wind projects in close proximity to the Louise Solar Project include the Mower County Wind Energy Center directly northeast, the G. McNeilus Wind Farm immediately southwest, and Prairie Star to the north.

Additionally, within Mower County and close proximity to the Adams Substation, the Applicant avoided known physical and environmental constraints that may prohibit or make solar development more challenging. Identified constraints are listed below and are also shown on Map 5.

- Airports and landing strips (2-mile buffer),
- Active and inactive mining operations,
- Existing gas pipeline and transmission corridors,
- FEMA Floodplains,
- Farmsteads,
- Public roadways and trail systems,
- Public lands such as state parks, scientific and natural areas, and wildlife management areas,
- MNDNR Sites of Biodiversity Significance,
- MNDNR mapped native prairie, and native plant communities (NPCs),
- MNDNR and USFWS rare species records and critical habitats, and
- Jurisdictional wetlands, waters, and MNDNR Public Waters.

The project has been thoughtfully sited to avoid impacts to important physical infrastructure and identified sensitive resources, and on the closest available land to the POI. The result is a project that makes efficient use of available land and the solar resource while minimizing adverse impacts to the environmental and existing infrastructure.

Louise Solar made good faith consideration of alternative site configurations and technologies in their search prior to landing on the current project location; however, no other sites or configurations were determined feasible and prudent. There are no alternate sites within a reasonable distance that could be reached with overhead transmission, and a project of this size can support no more than 2-3 miles of overhead transmission and remain financially viable. Louise Solar has designed the project in a way that takes advantage of level topography which will reduce overall grading. Access roads and widths have been minimized to the degree practicable, and existing access points will be used where feasible. The arrays have been sited as closely together as possible while avoiding existing constraints and maximizing energy generation. Additionally, Louse Solar has minimized the space between module rows to that which is required to effectively maintain the Project, and allow safe passage between rows by

maintenance crews. These combined efforts reduce the overall project footprint, and minimizes disturbance to prime farmland soils.

Alternative technologies, such as panel/rack designs that allow siting on steeper slopes, were reviewed along with wind technologies, but were not found to be feasible and prudent. There are no alternate sites within a reasonable distance that could be developed using an alternative design such as fixed tilt, which can accommodate steeper slopes. Reasonable distance for this project was defined as being within 2-3 miles of the Project substation, beyond which the costs of transmission become unworkable.

This area of Mower County has already seen a significant build-out of wind projects, and as such, additional wind development would not be a viable alternative due to relative lack of land and interconnection in the area. The Project location was originally explored for siting a 50MW wind project, which was submitted into the MISO interconnect queue. The study results for that wind project showed modest upgrade costs. EDF did not continue developing that wind site due to a lack of land and waking from nearby existing facilities. Instead, the site was recognized as being more favorable to a solar project due to the identified transmission capacity and ability to site a project close to the POI, and without the need for lengthy overhead transmission.

Therefore, there is no feasible and prudent alternative available near the Adams Substation or otherwise in Mower County to construct the Project and not impact prime farmland. A finding that there is no feasible and prudent alternative to avoidance of prime farmland for the Project is consistent with past Commission decisions for large solar generating systems sited in prime farmland due to the fact that areas surrounding the proposed Project substation also contain similar amounts of prime farmland as the proposed site. The amount of prime farmland taken temporarily out of crop production as a result of the Project represents approximately 0.0008 percent of agricultural lands in Mower County.

2.4.3 Mitigation and Offsetting Benefits

While the Project as described above has been sited and designed to minimize impacts to prime farmland, Louise Solar prepared an Agricultural Impact Mitigation Plan and a Vegetation Management Plan to further mitigate project impacts such as soil compaction, topsoil mixing, soil erosion, invasive and noxious weed species, and rutting. These plans are described in greater detail below.

2.4.3.1 Agricultural Impact Mitigation Plan

In consideration of temporary impacts to agricultural acres, the Applicant has developed an AIMP (Appendix C) detailing methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation cover that will help to ensure the Project is designed, constructed, operated and ultimately decommissioned and restored in a manner allowing the land to be returned to its original, and possibly improved quality of, agricultural use in the future. It should be noted that the Project would only temporarily displace the current agricultural activities on prime farmland, that improvements can be removed at the conclusion of Project's useful life cycle, and restored to a condition better to or, at a minimum, similar to its present condition with little or no long-term impact post-decommissioning. Moreover, conversion of the Project Area to non-row-crop uses during the life of the Project will have beneficial environmental effects such as soil building while soils "rest", erosion control, habitat for wildlife and pollinators, and protection of groundwater and surface water through reduction of the application of harmful agricultural pollutants such as nitrogen and other herbicides and pesticides commonly used in current crop management practices.

2.4.3.2 Vegetation Management Plan

Louise Solar has prepared a VMP for the project (Appendix D). The purpose of the plan is to outline how disturbed soils, and those formally tilled within the project area, will be planted, stabilized, and managed following project construction activities. The plan describes the overall strategy for establishing and maintaining vegetation using potential adaptive management approaches such as mowing and herbicide treatments and grazing. The plan takes into consideration methodologies and approaches for installing appropriate seed mixes, monitoring and management of invasive and noxious weed species, and erosion control. Establishing perennial vegetation within the Project Area will provide multiple benefits over the course of the Project's life, including reductions to agricultural fertilizer and pesticide applications, improvements to groundwater and surface water quality, soil stabilization, and "resting" of the soils. Allowing the soils to rest for a period of 25-35 years will allow microbes and soil fauna to recover, ultimately generating improved soil conditions for future agricultural activities.

2.5 Alternatives Considered but Rejected

Pursuant to Minnesota Statutes 216E.04, Subd. 2 and 3, and as specified in Minnesota Rule. 7850.2800-7850.3900, projects less than 80 MW in energy generation size qualify for the alternative review process, which eliminates the obligation for an applicant to propose alternative sites within a site permit application. Accordingly, other than the prime farmland alternatives analysis discussed above, no alternative sites were considered by the Applicant for the proposed Project.

2.6 Cost Analysis

Total engineering, procurement, and construction (EPC) costs for constructing the Project are estimated to be approximately $52,350,000. Table 4 provides estimates for EPC and other anticipated expenses associated with Project construction. Operating costs for the Project are estimated to be approximately $1.2 million dollars on an annual basis, including labor, materials, and property taxes.

Table 4: Estimated Project Costs

Project Components	Cost ($ millions)
Engineering, Procurement, Construction Contractor	$52.35
Development Expense	$2.5
Interconnection	$1.2
Financing	$1.5
Transmission	$0.5
Substation	$4.0
Project Total:	**$62.05**

2.7 Future Expansion

The Applicant's interconnection request is for 50 MW, and there are no plans for future expansion of the facility at this time.

3.0 Engineering and Operational Design

Solar energy generation begins with the installed solar panels converting energy from sunlight into direct current (DC) electrical power. Blocks of panels are electrically connected in series and terminate at an inverter. Inverters convert the DC power from the panels to AC power. The power is then stepped-up at a transformer from 34.5 kV to 161 kV, transmitting generated power to the existing transmission infrastructure at the Adams Substation.

3.1 Design

The Project's primary components include PV panels mounted on a linear axis tracking system (Figure 3), centralized inverters, and a Project substation. For descriptive purposes, an individual tracker row is used as a basic unit of the Project. A tracker row is made up of panels mounted on a flat beam oriented north-south, with a break in the middle where the gear box is located. The tracker rows, which tilt east-west to follow the sun throughout the day, are connected together in groups and, depending on the manufacturer, served by a single motor. The racking system consists of all the components involved in fastening the panels to the tracker rows, plus the tracker beams, gearboxes, motors, and pier foundations.

Associated facilities include electrical cables, conduit, switchgears, step-up transformers, SCADA systems, and metering equipment. The Project will include an operations and maintenance (O&M) facility, temporary laydown yards/staging areas, and internal Project access roads. The Project will include a perimeter fence and will be gated at access points which will include security locks. The Project will be re-vegetated with low-growing seed mixes (e.g., short grasses or low-growing forbs, low-growing wetland seed mixes (where appropriate) or some other low-growing perennial cover) and described in the AIMP and the VMP (see Appendix C and D).

Figure 3: Typical solar tracker row design.

3.1.1 Photovoltaic Arrays and Solar Field

The solar array at the Project will consist of PV solar panels, a racking system, inverter skids, security fencing, and up to four weather stations (Maps 3 and 4).

The Applicant proposes to use panels affixed to tracking mechanisms that would allow the panels to "track" the sun from east to west on a daily basis. The panels and tracking rack system are generally aligned in rows north and south with the PV panels facing east toward the rising sun in the morning, parallel to the ground during mid-day, and then west toward the setting sun in the afternoon. The panels are rotated by a small motor connected to the tracking rack system to slowly track with the sun throughout the day. The tracking rack system allows the Project to optimize the angle of the panels in relation to the sun throughout the day, thereby maximizing production of electricity and the capacity value of the Project.

When the sun is directly overhead, the PV panels will be at a zero degree angle (level to the ground) and four to six feet off the ground. The tracker rows will follow the sun from approximately 60 degrees east to 60 degrees west through the course of the day. At 60 degrees (tilted to the highest position), the edge of the panels will be a maximum of 15 feet off the ground. The design will involve no spinning machinery, no thermal cycle, and no water use (except for infrequent module washing; refer to the Operations and Maintenance discussion in Section 3.1.4). The Project will require approximately 146,692 PV panels to make up the 50 MW-AC solar facility.

To the extent practical, the racking system foundations will be a driven pier and will not require concrete, although some concrete foundations may be required depending upon site specific soil conditions and geotechnical analysis.

A specific solar module has not yet been selected for the Project. Several are under consideration, including panels manufactured by Canadian Solar, First Solar, Hanwha, JA Solar, Jinko, LONGi, Risen, Seraphim, Talesun, and Trina. All panels under consideration are mono- or poly-crystalline models. The Applicant 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, time frame, or budget. Several racking and trackers are under consideration, including: the ATI DuraTrack, GameChange Solar's Genius Tracker, NEXTracker's NX Horizon, PV Hardware's Axone/Monoline, and Soltect's SF7/SF7 Bifacial model (Figure 4). Racking infrastructure and trackers will be selected closer to the procurement stage to ensure performance standards are met.

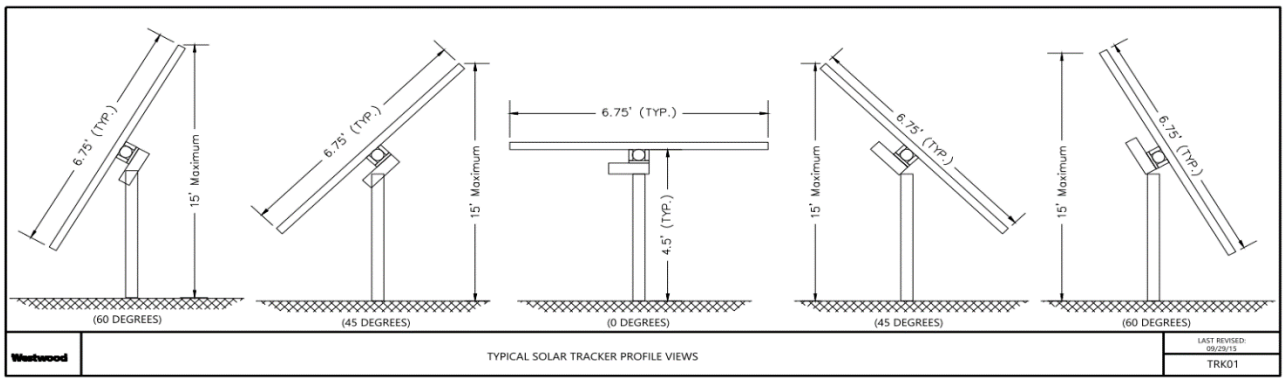

Figure 4: Typical solar tracker profile.

New solar panels are being introduced to the market regularly (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. 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.

3.1.2 Project Substation

The Project substation is proposed for an area west of the existing Adams Substation, which is in the southern part of the Project boundary (Maps 2 and 3). The Project substation is estimated to occupy approximately three acres of land and will include a 34.5/161 kV step-up substation with metering and switching gear required to connect to the Project to the transmission grid. It will be designed in accordance with regional utility practices and codes.

The Project substation will include a parking area and will be accessible to operations and approved parties at all times using the Project's access roads. It will consist of supporting structures for high voltage electrical structures, breakers, transformers, lightning protection, and control equipment according to the specifications of the Interconnection Agreement with MISO and ITC Midwest. The Project substation location will be graded and the ground surface dressed with crushed rock, and secondary containment areas for the transformer will be installed as necessary. The fenced area of the Project substation footprint will be approximately 521' x 506' in size (subject to final substation layout) and be surrounded by a minimum 20-foot buffer. Underground 34.5 kV collector lines from the Project will deliver solar generated energy to the Project substation. The collector system voltage will then be stepped up from 34.5 kV to 161 kV and transmitted to the Adams Substation via a short (approximate 700-1,000 -foot) Project transmission line.

The area within the Project substation will be graveled to minimize vegetation growth in the area and reduce fire risk. The substation will be fenced with either a 6-foot chain-link fence with top guard angled out and upward at 45 degrees with 3-4 strands of smooth wire (no barbs), or 8' chain link for security and safety purposes. Posts for fencing around the Project substation will be spaced approximately 10 feet on center. Corner posts will be augured 3.5 feet and embedded in concrete for structural support. Tangent posts will be direct buried 3.5 feet similar to corner posts.

3.1.3 Associated Facilities

The solar panels deliver DC power to the inverters through cabling that will typically be located in an underground trench or ploughed in place (at least four feet deep and one to two feet wide – Figure 5). 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 the AIMP.

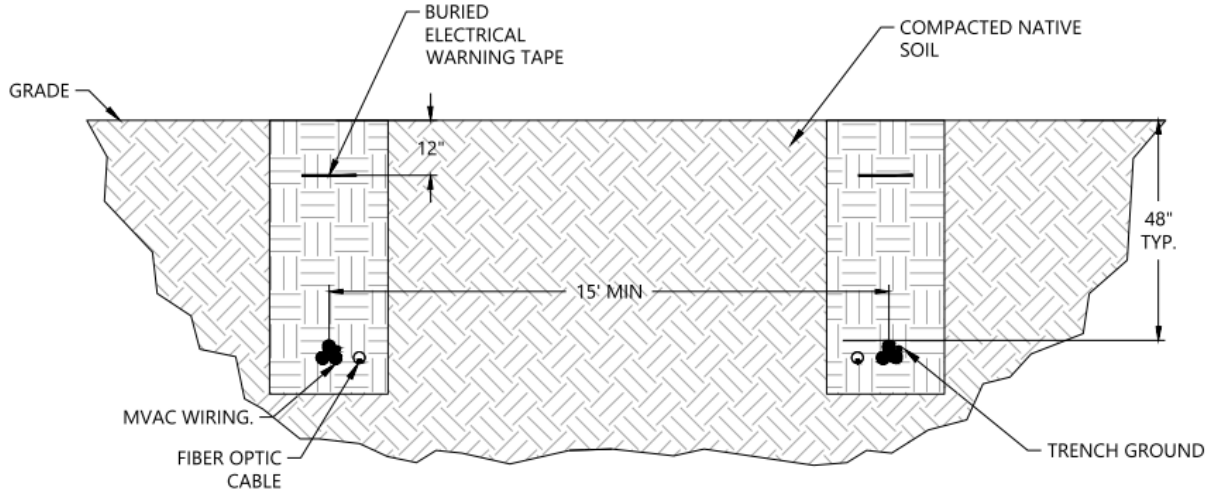

Figure 5: Typical solar collection trenches for cables.

Each inverter pad will also include one or more transformers to which the inverters will feed electricity (Figure 6). Inverters convert the DC output of the panels to AC, which is required for delivery to the electrical grid. After the inverter has converted the electricity, the electricity is stepped-up via a transformer from low-voltage to medium or intermediate voltage (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. Several inverter models are under consideration, including units manufactured by FIMER, Power Electronics, SMA, Sungrow, and TMEIC. The Applicant is considering the costs and performance of each option as well as environmental and safety standards when making its final selection. For the purposes of generation estimates, the Applicant has modeled the SMA Solar Technology 4200 UP-US inverter. The Project's preliminary design assumes below-ground cabling to represent the maximum potential impacts and has proposed 14 central inverters and associated concrete pads. These concreted pads provide the foundation for the inverter, transformer, and the SCADA system. The concrete pads will be poured onsite or precast and assembled off-site.

The 161-kV Adams substation owned by ITC Midwest Cooperative is located near the east side of the proposed site, outside of the Project boundary. The substation serves as a connection for multiple high voltage lines that run across the proposed site and will serve as the point of interconnection (POI) between the Project's step-up substation and the regional transmission system. The Project substation will transform the electric voltage from the intermediate level of 34.5kV to the interconnection voltage of 161kV.

Louise will construct, own and operate a 161-kV transmission line between ITC Midwest's Adams substation (Gen-Tie Line) and the Project's step-up substation. The step-up substation includes a 161-kV circuit breaker, 34.5-kV/161-kV generator step-up transformer, relay and protective equipment, supervisory control and data acquisition equipment, telecommunication equipment and metering equipment. There will be a single dead-end structure within the Project substation and several additional pole structures to enter the Adams Substation. The gen-tie line will be approximately 700-1,000 feet in length. The exact length and position of the line and poles will be determined by on-going engineering. The final placement and design of the gen-tie will incorporate feedback from ITC Midwest and the owners of several transmission lines which currently enter the Adams substation from the south and that Louise Solar's gen-tie may need to

cross before entering the Adams substation. An approximate location for the gen-tie is provided in the Site Plan in Appendix F. Poles will be made of wood or steel and approximately 70-100 feet in height (Figure 6). The type of conductor will be determined following the completion of detailed electrical design.

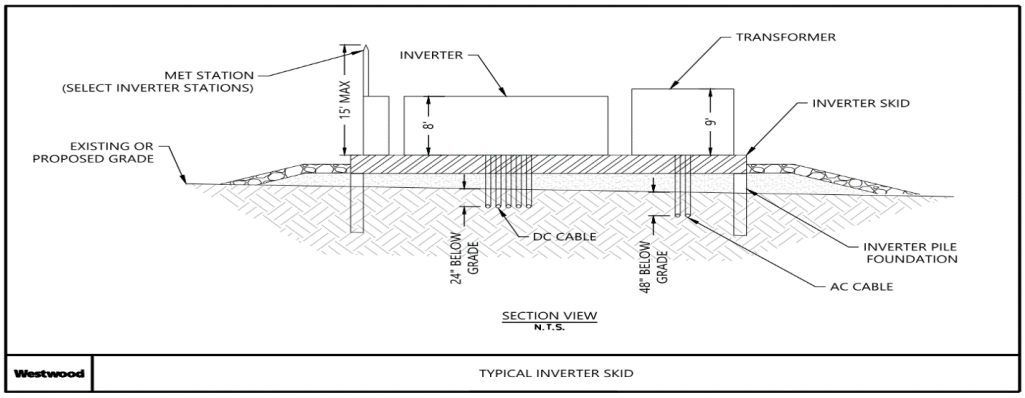

Figure 6: Typical solar inverter skid.

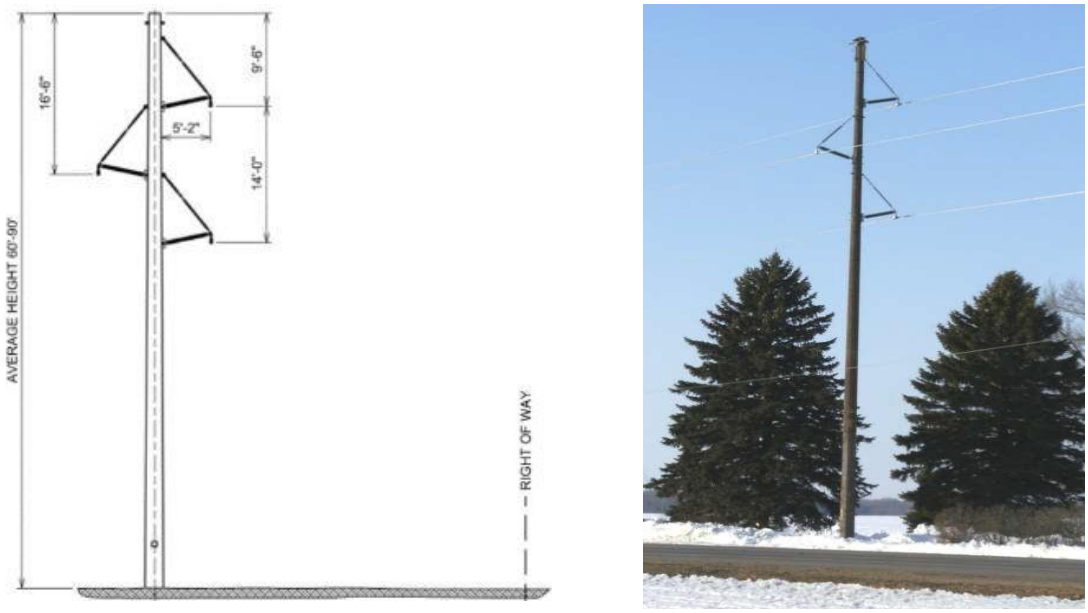

Figure 7: Typical overhead gen-tie structure.

3.1.4 Operations and Maintenance Area

An O&M facility is proposed for the Project where solar panels and other equipment will be remotely monitored using a SCADA system, maintenance of equipment can be conducted, equipment can be stored, and employees can park. The location of the O&M facility is currently planned on approximately 1-acre in the southwest corner of the project substation location (Map 3).

3.1.5 Transportation/Pipelines/Electrical Transmission

The Project will include approximately 3.9 miles of graveled access roads that lead to the inverters and other infrastructure for operation and maintenance (Maps 3 and 4). The final length of the access roads will depend on the equipment selected and final engineering. These roads are typically 12-16 feet wide along straight portions of the roads and wider along curves at internal road intersections (approximately 45 feet –Figure 8). Access roads may be temporarily wider during construction, and then reduced in width for long term site access upon completion. The northeastern unit of the Project will be accessed from 150th Avenue and 690th Avenue, while the northwestern and southern portions of the Project will be accessed from State Highway 56, 140th Street, and 680th Street. These proposed entrances will have locked gates.

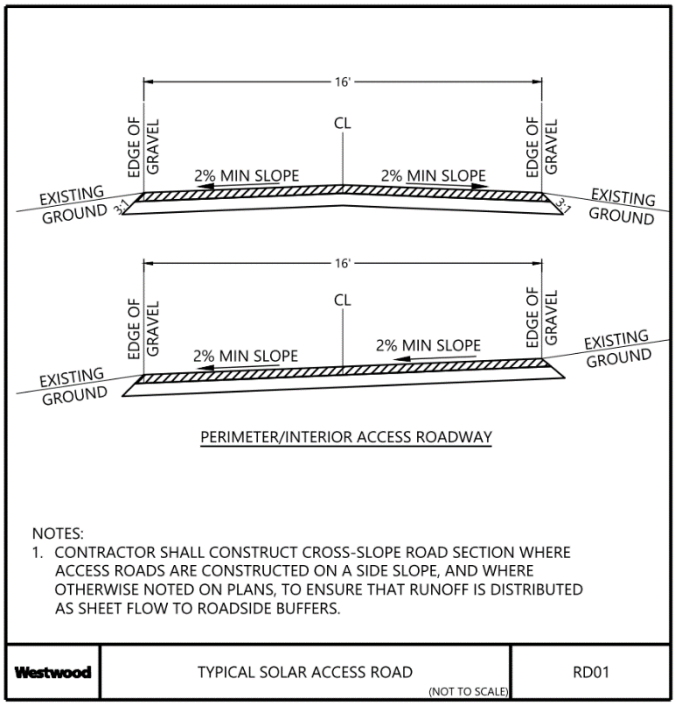

Figure 8: Typical solar access road profile.

Some upgrades or other changes to the public roads may be required for construction or operation of the Project. The Applicant will work with Mower County to facilitate upgrades to meet required standards and with landowners for final design considerations. Upgrades or changes could include, but are not limited to, road improvements, additional aggregate, and driveway changes.

Road improvements may require a road use and repair agreement with Mower County; the Applicant will continue to coordinate with County and State road authorities as the Project develops. Driveway changes using County roadways will require an entrance permit from Mower County, which will be obtained prior to construction. Entrances using Minnesota State Highway 56 will require submittal of an application for access (driveway) permit from the Minnesota Department of Transportation (MnDOT).

No pipelines will be built, accessed or needed to accomplish the project. As discussed in detail within Section 3.1.5, the project will require construction of a short, 700-1,000-foot 161-kV transmission line to transmit generated power from the project substation to the ITC Midwest Adams Substation.

The Applicant 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. The Applicant 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. A separate permit will be needed from Mower County for the short transmission line.

3.2 Project Layout

The Project's final layout will optimize electrical generation and efficiency of the solar Project while avoiding and minimizing 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 Maps 3 and 4.

3.2.1 Setbacks

The setback regulations and setback distances for solar energy systems in Mower County are provided in Table 5 and are also shown on the Preliminary Civil Site Plan in Appendix F. As noted in the table below, several of the Project setbacks to the solar arrays are short of the County's setback requirements as stated in Mower County Zoning Ordinance Section 14, 18.7 (Special Requirements for Solar Farms and Gardens). The Applicant sited the project with the County's setback in mind; however, land constraints such as existing gas pipeline and transmission line easements, wetlands, trees and others make it difficult for arrays to be sited further away from road rights-of-way, side/rear property lines of lands not included as part of the solar farm, and dwellings not owned by an owner/benefactor of solar farm. Louise Solar project is committed to working with Mower County to meet setback requirements where feasible.

Table 5: Mower County Setbacks

Feature	Setback (feet) to solar array	Project Design (feet) (at closest to array)
Municipal Boundary	500	>500
Rural Subdivision/Plat Boundary	500	>500
Federal/State Wildlife Areas	500	>500
Hunting Preserve	500	>500
Shooting Range	500	>500
Federal, State, or County Highways Right-of-way (ROW)	100	42.6
Trail ROW	100	>100
Side/Rear Property Line Setback of lands not included as part of the solar farm	100	40.4
Dwelling (not owned by owner/benefactor of solar farm)	500	352

Additionally, the Applicant imposed their own internal setback best management practices into the Project design as detailed in Table 6. Setbacks are calculated as distance from the nearest solar array.

Table 6: Proposed Applicant Initiated Setbacks

Feature	Project Design to solar array (feet)
Agriculture or Accessory Building	>100
Active Rail Roads	>30
Electric Transmission Line/Gen-tie	92.6
Gas Pipeline	>60
Project Boundary setback	45.3
Site of Biodiversity significance	>50
Native Prairie	>50
Streams (NHD or validated modeled streams)	>50
Surface water (ponds, lakes, sinks)	>50
Wetlands/Playas	>50

3.2.2 Facility Preliminary Development Area

Table 7 describes the Project facilities' estimated acreage within the approximately 325- acre Preliminary Development Area based on the preliminary design configurations.

Table 7: Estimated Project Facility Acreages in Preliminary Development Area

Project Facilities	Acres
Access Roads	9.93
Inverters	0.11
Project Substation	5.04
Project O&M	1.00
Temporary Laydown Areas	12.24
Solar Panels (includes vegetated spacing between panels)	287.16
Collection Lines	2.71
Sediment Basins, Riprap, Berms	6.50
Unused Area (acreage within the Preliminary Development Area with no facilities)	288.7
Project Total	**613.4[1]**

[1] *Approximately 91 acres of solar panels, access roads, inverters and substation were considered to calculate the post-construction impervious surface runoff areas within the completed Stormwater Management Study.*

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, construction, and post-construction activities for the Project include:

- Pre-construction
  - Geotechnical investigation;
  - Underground utility discovery;
  - Design substation;
  - Design solar array, access roads, and electric collection system; and
  - Procure necessary facility components (solar panels, tracking system, and transformers).
- Construction
  - Site preparation, grubbing, and grading;
  - Construct laydown areas and set up temporary job site trailers;
  - Civil construction of access roads;
  - Construct fencing;
  - Install PV pile foundation posts;
  - Tracker installation;
  - PV module installation;
  - Install below-ground or above-ground collection system;
  - Install electrical enclosure/inverter; and
  - Construct transmission line.
- 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

Construction will begin after the necessary permits are received and the electrical interconnection process is finalized. Project construction will begin with workforce mobilization and the initial site preparation work including grading, vegetation removal, and any necessary tree removal. Preliminary engineering analysis indicates that approximately 104 acres of the total Project Area will require grading. A total of 11,000 cubic yards of cut and fill is estimated for the Project overall. Mass grading of the site will not be employed, and will generally occur to "flatten" various areas of the site to facilitate installation of panels, inverters, access roads and the Project substation.

In this first phase of construction, general site improvements will be made such as access improvements and preparation of the staging/laydown areas. Temporary staging/laydown areas will be approximately 5-10 acres, and will be located both on the northern and southern portions of the Project Area. Roughly 12 acres have been identified in the site plan for optionality. The staging/laydown areas will be used for storage of construction materials and shipped equipment 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 electrical collection cables) will be installed next along 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 substation foundation and future access roads will have already been completed. The grounding grid and underground conduit will be installed in conjunction with the foundations for the transformer, control housing, and high voltage structures. The substation equipment will then be delivered to the site and installed on the prepared foundations. Secondary containment areas for the transformer will be constructed as necessary and finish grading will occur around the 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.

Onsite construction personnel will consist of laborers, craftspeople, supervisory personnel, construction management personnel, civil and construction trades, as well as administrative and support staff. Louise Solar will issue a Request for Proposal (RFP) to Balance of Plant (BOP) contractors to construct the Project. Louise Solar will include preferences for contractor bids that utilize local, union 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 BOP contractor selected will be required to work with labor unions, local subcontractors, and other vendors to implement a project construction staffing model that maximizes local hiring and local economic benefits for the Project, 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 approximately 350-400 jobs during the construction and installation phases, and up to 21 indirect and 2 full time permanent jobs during the operations phase. The Applicant estimates that there will be between 10 and 20 semi-trucks used daily for equipment delivery during construction. This volume of traffic will only occur for several weeks during tracker and module delivery; truck traffic will decrease once these components are delivered. 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 Inspections and Commissioning

Equipment inspections will be conducted prior to commercial operations of the proposed 50 MW Project. 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 Site 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. Disturbed areas will be reseeded and re-vegetated with specific seed mixes in accordance with the Project's VMP; see Appendix D) and the Stormwater Pollution Prevention Plan. These seed mixes are designed to be used with the vegetation management practices of mowing, grazing, and selective herbicide application. 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, hydro-mulch and sediment control logs until vegetation has established. Additionally, a cover crop will be planted with the native mixes to stabilize the soil and prevent erosion during the time it takes for the native seeds to establish. The Applicant anticipates that the post-construction clean-up and site restoration activities will take approximately two to four months.

The VMP provides a guide to site preparation, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation. The required restoration management is designed to continue for three years. The VMP outlines vegetation management tasks during the establishment and perpetual maintenance phases including monitoring for and treating invasive species, mowing, and re-seeding.

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

The VMP outlines several vegetation maintenance strategies that may be implemented at the Project including mowing, herbicide use, and grazing. Mowing may be used when vegetation reaches a height of approximately 20 inches to bring it back to a height of roughly 6-8 inches, and will help control weed species until natives become established. Herbicides will be employed where it is determined that mowing alone will not accomplish perennial weed control. Alternatively, sheep may be used experimentally where grazing proves to be a more viable long-term management strategy.

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 the Applicant, EDFR, an affiliate, or contractor. Primary tasks include scheduled monthly and quarterly inspection(s) of electrical equipment, vegetation management as well as snow removal on access drives.

The expected service life of the Project is 35 years or longer based on the useful commercial lifespan of panels, and the Applicant estimates that the Project will result in up to two full-time permanent positions to operate and maintain the Project facilities. A maintenance plan will be created for the Project to ensure the performance of the solar facilities, including a scheduled

check of the main items and a predictive maintenance approach of the devices subjected to derating/degradation. Derating/degradation refers to the known process of components losing some efficiency or otherwise degrading over the course of the Project's life cycle; like all technology and physical components, a certain amount of this is unavoidable, and the Applicant will plan for it and maintain the facility as needed. Once construction is complete, the solar facility will see one truck 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 8.

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 panels 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 (SCADA)

Performance monitoring of the Project will consist of a real-time and continuous assimilation of the data acquired by the onsite meteorological station, energy meter and SCADA. The SCADA system provides data on solar generation and production, availability, meteorology, and communications. The solar arrays will communicate directly with the SCADA system for remote performance monitoring, energy reporting and troubleshooting. 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, including:

- PV panels: visual check of the panels, tracking system and surrounding grounds to verify the integrity of the panels and tracking structure, the presence of animals and nests, etc.;
- Inverters, transformer 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 transmission line, structures and components (maintenance of structures may be performed by other parties);
- Solar Project substation: scheduled visual inspections.

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; either traditional mowing, herbicides, or sheep grazers will be used), fence and gate inspection, lighting system checks, and PV module washing at Applicant's direction (if required; minimal to no washing is anticipated to be needed at Project).

3.3.4.5 Maintenance Frequency

Table 8 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 8: Operations and Maintenance Tasks and Frequency

Plant Device	Task	Preliminary Frequency
Photovoltaic (PV) Field	PV Panels visual check	Annually
	Wiring and junction boxes visual check	Annually
	Overview aerial thermal scan	Annually
	Advanced diagnostics	At Owner's Direction
	PV strings and sting boxes faults	Annually
	PV panels washing	As needed
	Vegetation Management (if necessary at site)	Up to three times a year depending on site conditions, and compatible with plant design.
Electric Boards	Case visual check	Annually
	Fuses check	Annually
	Visual Torque check	Annually
	Grounding check	Annually
Inverter	Case visual inspection	Annually
	Air intake and filters inspections	Annually
	Conversion stop for lack of voltage	Annually
	AC voltage and current check	Annually
	Fuses check	Annually
	Visual Torque check	Annually
Support Structures	Visual check	Annually
Photovoltaic (PV) Field	PV Panels visual check	Annually
	Wiring and junction boxes visual check	Annually
	PV strings measurement of the insulation	Annually
	PV strings and sting boxes faults	Annually
	PV panels 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
Electric Boards	Case visual check	Annually

Plant Device	Task	Preliminary Frequency
	Fuses check	Annually
	Surge arresters check	Annually
	Torque check	Annually
	DC voltage and current check	Annually
	Grounding check	Annually
Inverter	Case visual inspection	Annually
	Air intake and filters inspections	Annually
	Conversion stop for lack of voltage	Annually
	AC voltage and current check	Annually
	Conversion efficiency inspection	Annually
	Data logger memory download	Annually
	Fuses check	Annually
	Grounding check	Annually
	Torque check	Annually
Support Structures	Visual check	Annually
	PV panels torque check on random sample	Annually

3.4 Decommissioning and Repowering

At the end of the Project's useful life, the Applicant 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.

3.4.1 Decommissioning

At the end of commercial operations, the Applicant will be responsible for removing all of the solar arrays and other associated facilities. At the end of the Site Permit terms, the Applicant reserves the right to extend operations of the Project by applying for an extension of the permit, if necessary, and continuing operation. Should the Applicant 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 at the end of its useful life, approximately 35 years or longer, would include removing the solar arrays (panels, racking and steel foundation posts), inverters, fencing, access roads, above-ground portions of the electrical collection system, lighting, substation, transmission and the O&M facility (if on-site). 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 is provided in Appendix G, and is generally summarized below.

Timeline

Decommissioning is estimated to take approximately 20 weeks to complete and the decommissioning crew(s) will ensure that all equipment and materials are recycled or disposed of properly.

Financial Resource Plan

The Applicant 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, the Applicant will review and update the original decommissioning plan approved by the Commission in the 15th year. At that time, the Applicant will either enter into a surety bond agreement and create an escrow account, or create a reserve fund for decommissioning purposes. The Applicant will abide by the applicable permit condition(s) and ensure the Project is decommissioned in accordance with the Site Permit. In addition to MPUC permit conditions, the Applicant has included an obligation to decommission the Project components in the applicable real estate agreements.

Removal and Disposal of Project Components

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

- **Panels:** Panels will be inspected for physical damage, tested for functionality, and disconnected and removed from racking. Functioning panels will be packed and shipped to an offsite facility for reuse or resale. Non-functioning panels will be packed, palletized and 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. During decommissioning, the area around the foundation posts may be compacted by equipment and, if compacted, the area will be de-compacted 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 up to a depth of four feet. 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 to a density of approximately 90 percent of Standard Proctor density. Topsoil will be redistributed across the disturbed area. Overhead lines will be removed from the project and taken to a recycling facility. Underground cables below a depth of four feet will be left in place.

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

- **Equipment Foundation and Ancillary Foundations:** The ancillary foundation for Louise Solar are pile foundations for both equipment skids and met stations. As with the solar array steel foundation posts, the foundation piles will be pulled out completely. Duct banks will be excavated to full depth. All unexcavated areas compacted by equipment used in decommissioning will be de-compacted in

a manner to adequately restore the topsoil and sub-grade material to a density of approximately 90 percent of Standard Proctor density. All materials will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at the Applicant'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 the Applicant's sole discretion, consistent with applicable regulations and industry standards. The surrounding areas will be restored to pre-construction conditions to extent feasible.
- **Access Roads:** Facility access roads will be used for decommissioning purposes, after which removal of roads will be discussed with the Landowner, using the following process:

    1. After final clean-up, roads may be left intact through mutual agreement of the landowner and the Applicant unless otherwise restricted by federal, state, or local regulations.
    2. If a road is to be removed, aggregate will be removed and shipped from the site to be reused, sold, or disposed of appropriately, at the Applicant'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 constructed with geotextile fabric and eight inches of aggregate over compacted subgrade. Any ditch crossing connecting 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.

Restoration/Reclamation of Facility

The Applicant will restore and reclaim the site to approximately the pre-construction condition consistent with the site lease agreement. The Applicant assumes that most of the site will be returned to farmland and/or pasture after decommissioning, and will implement appropriate measures to facilitate such uses. If no specific use is identified, the Applicant will vegetate the site with a seed mix approved by the local soil and water conservation district or similar agency. The goal of restoration will be to restore natural hydrology and plant communities to the greatest extent practicable while minimizing new disturbance and removal of native vegetation. The decommissioning effort will implement best management practices (BMP's) to minimize erosion and to contain sediment on the Project to the extent practicable with the intent of meeting this goal include:

1. Minimize new disturbance and removal of native vegetation to the greatest extent practicable.
2. Removal of solar equipment and all access roads up to full depth, backfill with subgrade material and cover with suitable topsoil to allow adequate root penetration for plants, and so that subsurface structures do not substantially disrupt ground water movements.
3. Any topsoil that is removed from the surface for decommissioning will be

stockpiled to be reused when restoring plant communities. Once decommissioning activity is complete, topsoil will be re-spread to assist in establishing and maintaining plant communities.
4. Stabilize soils and returning them to agricultural use according to the landowner direction.
5. During and after decommissioning activities, install 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.
6. Remediate any petroleum product leaks and chemical releases prior to completion of decommissioning.

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

Post-Restoration Monitoring
Decommissioning of the site will comply with permits for NPDES/SDS CSW Permit, 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, the Applicant's Field Representative assigned to decommissioning monitoring will stay in contact with the landowner, 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 panels, 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. The Applicant 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 site permit application may be necessary and will be sought out if required.

4.0 Environmental Information

For existing conditions within the portions of land under the Applicant's control, area calculations are based on the Project Area (~613 acres). This reflects the fact that final design may necessitate development in areas within the overall Project Area and not simply the Preliminary Development Area as previously defined. Additionally, for any discussions of resources that are located outside of the facility (such as parks, trails and other natural resources), the Project Area boundary is used in order to discuss the proximity of these features to the Project. For approximating areas of temporary impact from the proposed solar facilities, the Preliminary Development Area is used (approximately 325 acres), which is the area needed for construction and operation of the facility based on preliminary design.

4.1 Environmental Setting

The Project is located in a rural area approximately one mile east of Adams and 1.3 miles west of Taopi, Minnesota. Residences are scattered throughout the rural area where the land use is dominated by agricultural fields, predominately corn and soy. With the exception of Minnesota State Highway 56, the State Highway which bisects the northern and southern sections, roads that surround the Project Area are local county or township roads. The Project Area is bordered on the north by 150th Street, on the southwest by 680th street and 140th street, and the east by 690th street. Similarly, the Project Area is not bordered by a street on the southern edge, but the Project is bisected by 680th Street. ITC Midwest's Adams Substation, where the Project will tie into the grid, is situated immediately adjacent to the southern portion of the Project Area, with numerous existing overhead power lines terminating at the substation and partially intersecting portions of the Louise Project Area boundary. The Project and interconnection location are located on relatively flat terrain conducive to solar development.

According to the NRCS Land Resource Region (LRR) and Major Land Resource Area (MLRA), this area is in the East Iowa and Minnesota Till Prairies and northern part of the Central Feed Grains and Livestock Region (USDA, 2019). This MLRA is in the northern part of the till plains and is characterized by Eastern Iowa and Minnesota Drift Plains, rolling loess prairies, lower St. Croix and Vermillion valleys, and Rochester/Paleozoic Plateau Upland. The area is generally flat, agricultural land with few wooded areas. The nearest section of the North Branch Upper Iowa River is located one mile away from the North-Eastern boundary of the Project. Unnamed ponds and a drainage system are located between the northern and southern portions of the Project Area.

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, 2020). Through the ECS, the State of Minnesota is split into Ecological Provinces, Sections, and Subsections. The Project is located within the Minnesota and Northeast Iowa Morainal Section of the Eastern Broadleaf Forest Province (222M). The Project is located in the Oak Savanna Subsection.

The Oak Savanna Subsection is part of a loess plain over bedrock or till in South-Eastern Minnesota and North Eastern Iowa. Elevation ranges from 300 to 400 meters. With a near level to gently sloping till plain, the land is primarily used for agriculture. Glacial drift is generally less than 100 feet thick within the Oak Savanna Subsection. Soils are made up of a mosaic of Mollisols and Alfisols, making sections of wet soils and well-drained soils. Annual precipitation ranges from 28 inches in the north to 31 inches in the south. The growing season generally lasts 146 to 156 days. Fire is the most important disturbance in the subsection, but tornados and high wind event also create significant disturbances. Pre-settlement vegetation was primarily bur oak savanna, areas of tallgrass prairie and maple-basswood forest were also common. Currently, the predominant land use in this subsection is agriculture; there are few remnants of pre-settlement vegetation remaining (MNDNR, 2020).

4.2 Human Settlement

4.2.1 Public Health and Safety

The Project is located in rural Adams and Lodi Townships which according to the 2010 U.S. Census, have populations of approximately 787 and 268 persons, respectively (U.S. Census Bureau, 2010). If emergency personnel were needed at the Project site, multiple services would likely respond, depending on the situation. These include the Mower County Sheriff, Adams volunteer

fire department, and services from Austin including the fire department, Hazelton General Hospital ambulance, and police department, all of which are within approximately 15 miles of the Project Area.

There are three towers shown in the Mower County Allied Radio Matrix for Emergency Response (ARMER) participation plan located in the cities of Elkton, Hayfield and Leroy. According to the Minnesota Department of Health, the ARMER system is Minnesota's primary two-way public safety radio system for state agencies including police, fire, emergency medical services, county, federal and tribal governments. The radio system operates by talking to other ARMER towers via line of site transmission. To function properly and provide coverage over the entire service area, multiple towers are needed. Communication can be interrupted if very tall objects obstruct the line-of-sight between ARMER towers, which would generally be above 175 feet in Mower County. There are no ARMER towers within one mile of the Project, and the nearest ARMER tower is located in the city of Elkton, which is approximately 7 miles north of the Project Area based on the Mower County ARMER Participation Plan.

Impacts and Mitigation

Construction and operation of the Project will have minimal impacts on the security and safety of the local population. The Applicant is gathering information to coordinate with emergency and non-emergency response teams for the Project, including law enforcement agencies (Mower County Sheriff, Adams volunteer and City of Austin fire departments), Adams police department and ambulance services from Hazelton General Hospital and 911 services. The type and number of responding agencies will depend on the incident requiring emergency services. The Applicant 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 will comply with local, state, and federal regulations regarding installation of the Project facilities and standard construction 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 Project facilities to prevent public access.

While there are ARMER communication towers in the Project vicinity, and one within approximately 7 miles, the Project is not anticipated to impact the operation of these communication systems as Project facilities are proposed at heights below the line-of-sight of the towers (i.e., below 175 feet). The Applicant anticipates the tallest solar facilities, the transmission power poles, will be less than 150 feet tall and will therefore not interfere with the operation of the ARMER towers.

4.2.2 EMF

Electromagnetic fields (EMF(s)) arise from the movement of an electrical charge on a conductor such as transmission lines, power collection (feeder) lines, substation transformers, house wiring, and electrical appliances (NIEHS, 2002). The intensity of the electric portion of EMF is related to the potential, or voltage, of the charge on a conductor, and the intensity of the magnetic portion of the EMF is related to the flow of charge, or current, through a conductor. The general consensus is that electric fields pose no health risk to humans (National Radiation Laboratory, Ministry of Health, New Zealand, 2008). Additionally, epidemiological studies of various other diseases, in both children and adults, have failed to show any consistent pattern of harm from EMF (Minnesota State Interagency Working Group, 2002).

The primary sources of EMF from the Project will be from buried electrical collection lines, the gen-tie transmission line and from the transformers installed at each inverter. EMF from

electrical collection lines, transmission lines, and transformers dissipates rapidly with distance from the source (National Institute of Environmental Health Sciences [NIEHS], 2002). The internationally accepted guideline for general public exposure to electric fields is 4.2 kV/m and 833 milliGauss (mG) for magnetic fields (NIEHS, 2002).

Impacts and Mitigation

EMFs from underground electrical collection and feeder lines dissipate very quickly and relatively close to the source because they are installed below ground to a depth of approximately 48 inches, and are heavily insulated and shielded. Consequently, the electrical fields that emanate from buried lines and transformers are generally considered negligible, and magnetic fields often decrease significantly within approximately three feet of stronger EMF sources (such as transmission lines and transformers) (NIOSH 2011). Canadian wind farm studies of collection lines of similar voltage found magnetic fields associated with buried electrical collection lines to be within background levels at one meter above ground (McCallum et al., 2014). Underground collection lines and inverters have been sited well away from existing homes, with nearest inverter and 34.5 kV collection lines more than 500 feet and 100 feet, respectively, from a residence (Maps 3 and 4). By siting the facilities in this manner, it is anticipated that EMF related to underground collection and inverters will be maintained at background levels (levels typically found around normal household appliances). According to the World Health Organization, electric fields immediately under power lines generally drop to levels that are found in areas away from high voltage power lines within 50 to 100 meters.

The Project will have a planned approximate 700-1,000-foot long 161 kV overhead gen-tie transmission line running from the Project substation to the Adams Substation. Several evaluations have concluded that transmission lines of a similar voltage are unlikely to have EMF impacts. As an example, evaluations were conducted on the North Star Solar Project's 115 kV transmission line in Chisago County. The maximum electric field associated with that transmission line measured at one meter above ground was calculated to be 0.739 kV/m, dissipating to 0.188 at 50 feet. The peak magnetic field directly below the transmission line was calculated to be 42.47 mG one meter above ground, dissipating to 14.7 mG at 50 feet. Additionally, the NIEHS reports electric fields directly below a 161 kV transmission line to be 1.0 kV/m, dissipating to 0.5 kV/m at 50 feet. Similarly, average magnetic fields directly below the transmission line were reported at 29.7 mG before dissipating to 6.5 mG at 50 feet (NIEHS, 2002). The levels generated by the proposed Project 161 kV transmission line are anticipated to be similar, and well below the internationally accepted guideline for general public exposure.

Stray voltage is a natural phenomenon that is the result of low levels of electrical current flowing between two points that are not directly connected. Electrical systems, including farm systems and utility distribution systems, must be adequately grounded to ensure continuous safety and reliability, and to minimize this current flow. Potential effects from stray voltage can result from a person or animal coming in contact with neutral-to-earth voltage. Stray voltage does not cause electrocution and is not related to ground current, EMF, or earth currents. All electrical components in the Project, including inverters and transformers, will be grounded in accordance with National Electric Safety Code. Soil resistivity measurements will be taken on site as part of the Project's geotechnical analysis, and that data will be used to help design grounding systems. For these reasons, the potential for stray voltage as a result of the Project will be negligible. Should a fault occur during operation of the Project, it would be quickly identified by Project monitoring systems and corrected.

Project electrical facilities will be designed, constructed, and operated in compliance with company, local, state, North American Electric Reliability Corporation (NERC) and the National Electric Safety Code (NESC) standards and guidelines. This will include appropriate signage and fencing of the solar facility. Risks associated with EMF as a result of the Project are anticipated to be negligible, and no additional mitigation measures are proposed.

4.2.3 Displacement

There are no residences, business, or structures such as barns or sheds located within the Project Area and none will be displaced by the Project (Map 3).

Impacts and Mitigation

Maps 3 and 4, show buildings and homes located near, but outside, the Project Area. Because there are no structures in the Project Area, there will not be any displacement. Consequently, no mitigation is proposed.

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 scale (dB(A)) 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.

Common sound sources within an agricultural and/or rural environment include, but are not limited to, sound from farm equipment such as tractors and combines, sound generated from traffic on roadways, sounds from birds, and wind rustling through the vegetation. Typically, the ambient acoustic environment of a rural or agriculturally-oriented community has equivalent continuous sound levels (Leq, which is an energy-based time-averaged noise level) ranging from 30 dB(A) to 60 dB(A).

The background noise in the vicinity of the Project facilities is typically a result of farming equipment/operations, wind, and vehicles. A comparison of typical noise-generating sources is outlined in Table 9.

Table 9: Common Noise Sources

Sound Pressure Level (dBA)	Common Noise Source
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Rock and Roll Concert
110	Pneumatic Chipper
100	Jointer/Planer
90	Chainsaw
80	Heavy Truck Traffic
70	Business Office
60	Conversational Speech

Sound Pressure Level (dBA)	Common Noise Source
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

Source: MPCA, 2008

The MPCA has the authority to adopt noise standards pursuant to Minnesota Statutes §116.07, subd. 2. The adopted standards are set forth in Minnesota Rules Chapter 7030. The MPCA standards require A-weighted noise measurements. Different standards are specified for daytime (7:00 AM to 10:00 PM) and nighttime (10:00 PM to 7:00 AM) hours. The noise standards specify the maximum allowable noise volumes that may not be exceeded for more than 10 percent of any hour (L10) and 50 percent of any hour (L50). The Project Area is considered a Noise Classification Area 1 (NAC 1) with daytime noise allowances of 60 decibels (dBA) and nighttime noise allowances of 50 dBA according to the Minnesota Statutes §116.07 and Minnesota Rules Chapter 7030 noise ordinance. Table 10 indicates the MPCA state noise standards.

Table 10: MPCA State Noise Standards - Hourly A-Weighted Decibels

Noise Area Classification	Daytime (7:00 a.m. – 10:00 p.m.)		Nighttime (10:00 p.m. – 10:00 a.m.)	
	L_{10}	L_{50}	L_{10}	L_{50}
1 – Residential	65	60	55	50
2 – Commercial	70	65	70	65
3 – Industrial	80	75	80	75

Source: Minn. R. §7030.0040

During construction, noise will be emitted by the construction vehicles and equipment, including pile drivers for installation of piers. The amount of noise will vary based on what type of construction is occurring at the Project on a given day. These noise impacts will be temporary and limited to daytime hours. Construction associated noise will likely be perceptible at adjacent residences although none are located within the Project Area. Noise will be generated from construction equipment such as bulldozers, bobcats, and scrapers.

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
Grade	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

Equipment	Max Sound Pressure Level at 25 meters (82 feet) dBA	Max Sound Pressure Level at 15 meters (50 feet) dBA
Small Crane	74	83
Trencher	72	83
Compactor	69	80
Forklift	75	85
Boom Truck	75	84
Small Pile Driver	73	84

Source: Federal Highway Administration Construction Handbook, 2017.

According to the Federal Highway Administration Construction Handbook, 2017, the majority of the construction equipment that could be used on the site 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 harvest. The Applicant anticipates impact driving of the pilings to be the most significant source of construction noise at roughly 101 dBA at 50 feet (FHWA, 2017). The noise from construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. The average distance from area homes to the proposed Project solar arrays is roughly 700 feet. Construction activities will likely be sequenced across the Project, with site preparation occurring at some array locations and pile driving at others. Additionally, construction and staging activities are scheduled to occur during daytime hours.

The main sources of noise from the Project during operation will be from the inverters and the project substation transformer, although some minor noise may be generated from the short transmission line in the form of corona (crackling) or from wind blowing through the conductors and structures. All electrical equipment will be designed to National Electrical Manufacturer Association (NEMA) Standards. The Applicant plans to use SMA Solar Technology, or equivalent, inverters, which were modeled for the project.

The Applicant conducted a noise propagation and modeling assessment for the proposed inverters and proposed Project substation transformer (Appendix H). Predicted noise levels were determined using Cadna-A noise propagation and modeling software. The Applicant modeled the distance from the noise generation sources until rural background noise levels of 40 dBA were reestablished. Rural background noise levels are congruent with the ANSI S12.9-13/Part 3 Category 6: Very Quiet Rural Residential with a typical daytime ambient noise level of approximately 40.0 dBA.

According to provided SMA Solar Technology inverter specifications, the step up location inverters are expected to produce approximately 67 dBA at 1 meter from the noise source during peak production. The main power transformer located at the proposed Project substation is expected to produce approximately 95 dBA at 1 meter from the power source.

Predicted noise levels were determined using an aggregate of output levels from the inverter skid transformers and inverters. Based on the modeling, the inverter skid locations throughout the Project Area reestablished typical rural background sound levels of 40.0 dBA on an average of 9.08 meters (29.8 feet) from the location centers.

The transformer within the Project substation located on the southeast portion of the Project Area reestablished rural background sound levels of 40.0 dBA on an average of 86.8 meters (284.85 ft) from the transformer center. The modeled noise impacts on the eastern transformer boundary are 40.4 dBA and are not expected to impact the surrounding area.

Impacts and Mitigation
Construction noise will be temporary in duration, limited to daytime hours and relatively minimal, and will return to background levels of 40 dBA during the day and 34 dBA at night once construction is finalized. The nearest noise receptor is Residence C (Map 3), situated approximately 206 feet from the nearest solar array. Noise levels modeled at the receptors were at or below the ANSI s12.3/Part 3 Category 6: Very Quiet Rural Residential with a typical daytime ambient noise level of approximately 40.0 dBA. Receptors G, H, and I, were modeled with impacts above the established ambient levels of 1.5 dBA, 8.5 dBA, and 0.5 dBA, respectively. However, these levels were not significant enough to create a noise environment over 40 dBA during the day and 34 dBA at night, well within the state's noise standards of 60 and 50 dBA. On average, homes are more than 700 feet away from the proposed arrays. During construction, the Applicant plans to limit construction to daylight hours. Equipment used for construction will be in good working condition and properly muffled to reduce sound generation to the greatest extent practicable.

Project noise modeling of proposed Project inverter and substation equipment determined that ambient levels were generally reestablished within the Project boundary, and therefore no increased sound levels are expected outside the Project Area or at nearby occupied dwellings. Additionally, any minor corona or wind-related noise from the short transmission line is not expected to be heard at nearby residences given the closest is well over 1,000 feet away and separated from the transmission line by a row of mature trees. Because no noise impacts from operation of the solar Project are expected, no additional mitigation is proposed.

4.2.5 Radio and Television Interference
No radio and television towers are located within the Project Area. One communication tower registered with the FAA was identified within one mile of the Project Area (Map 9). The registered tower is located immediately adjacent to the Adams Substation and is 79 feet tall according to Federal Communications Commission (FCC) records.

Impacts and Mitigation
Corona from transmission line conductors can generate electromagnetic "noise" at the same frequencies that radio and television signals are transmitted, which can cause interference with the reception of signals depending on the frequency and strength of the radio and television signal. Tightening loose hardware on the transmission line usually resolves the problem.

If radio interference from transmission line corona does occur, satisfactory reception from AM radio stations previously providing good reception can be restored by appropriate modification of (or addition to) the receiving antenna system. AM radio frequency interference typically occurs immediately under a transmission line and dissipates rapidly within the right-of-way to either side.

FM radio receivers usually do not pick up interference from transmission lines because:

- 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 inherent in FM radio systems make them virtually immune to amplitude type disturbances.

A two-way mobile radio located immediately adjacent to and/or behind a large metallic structure (such as a steel tower) may experience interference because of signal-blocking effects. Movement of either mobile unit so that the metallic structure is not immediately between the two units should restore communications. This would generally require a movement of less than 50 feet by the mobile unit adjacent to a metallic tower.

Television interference is rare 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. If television or radio interference is caused by or from the operation of the proposed facilities in those areas where good reception is presently obtained, the Applicant will inspect and repair any loose or damaged hardware in the transmission line, or take other necessary action to restore reception to the present level, including the appropriate modification of receiving antenna systems if deemed necessary.

If radio or television interference occurs due to the Project, the Applicant will work with the affected landowner/business to restore reception to pre-Project quality.

4.2.6 Aesthetics

Siting utility-scale solar projects in rural environments can change the overall aesthetics of the landscape by introducing a commercial-like facility into an otherwise agricultural setting. Similar to wind farms, solar arrays may be viewed by some as a disruption to the existing agricultural landscape, and by others as a welcomed complimentary use to farming practices (harvesting solar energy, soil resting and pollinator-friendly habitats). Consequently, aesthetics related to utility-scale solar is largely one of personal perspective and preference.

Land use in the Project Area is characterized as agricultural with more than 96% converted to row crop agriculture. Aside from agricultural fields, the landscape also supports a patchwork of woodlands, wetlands and drainages. The topography of the Project Area is generally flat with slopes ranging from 1 to 5 percent. The Project Area is surrounded by farmsteads with residences and outbuildings. Most of these farmsteads are at least partially surrounded by woodlands or shelterbelts, which fractionally prevents uninterrupted views of the surrounding landscape.

The Adams Substation is located immediately adjacent to the Project Area to the east and is not surrounded by woodlands or otherwise obstructed by vegetation or trees. Additionally, there are multiple transmission lines within or adjacent to the Project Area that interrupt natural agricultural views as shown on Map 7. At least six transmission lines extend south of the Adams Substation and even more to the north. Additional transmission lines run east and west just south of the project area, with other lines transecting the northern portion of the Project Area. Views in the area are also naturally interrupted by Trunk Highway 56 located between the northern and southern portions of the project, and other county and township roadways. The transmission lines, substation and surrounding roadways are the current man-made focal points, along with multiple wind turbines at several operating wind farms. Wind farms in close proximity to the Louise Solar Project include the Mower County Wind Energy Center directly east (~0.3-mile), the G. McNeilus Wind Farm immediately southwest (~1 mile), and Prairie Star to the north (~3.3 miles).

There are no residences or businesses within the Project Area; however, there are eleven residences and several agricultural buildings on parcels adjacent to the Project Area (see Map 3). Table 12 provides distances to the nearest residences to the Project, including approximate

distance to the Preliminary Development Area boundary and approximate distance to the edge of preliminary solar array locations.

Table 12: Proximity of Residences to Louise Solar Facility

Residence	Distance to Development Boundary (feet)	Distance to Solar Arrays (feet) 1	Distance to Nearest Inverter (feet) 1
A	242	346	515
B	764	954	1,107
C	118	206	604
D	225	413	1,245
E	834	888	1,547
F	510	1,169	1,721
G	754	977	1,687
H	101	447	634
I	818	440	977
J	150	1,144	2,156
K	815	1,624	2,033

[1] Based on preliminary Project layout.

Residence A is located adjacent to the west-central portion of the Project Area north of County Highway 56. This residence has existing vegetative screening around two sides of the farmstead, including the north and east sides adjacent to the Project.

Residence B is located adjacent to the northwestern portion of the Project Area. The residence faces east and has existing vegetative screening along the north and east sides of the property.

Residence C is located adjacent to the central portion of the Project Area. The residence is surrounded by existing vegetative screening along the sides of the farmstead.

Residence D is located adjacent to the northwest portion of the Project Area south of 150th Street. The residence is surrounded by existing vegetative screening along the sides of the farmstead.

Residence E is located adjacent to the northern portion of the Project Area north of 150th Street. The residence faces south and has existing vegetative screening along the north side of the property.

Residence F is located adjacent to the north-eastern portion of the Project Area southwest of 150th Street and 690th Avenue. The residence faces south and has existing vegetative screening along the north side of the property.

Residence G is located adjacent to the south-eastern portion of the Project Area northwest of County Highway 56 and 690th Avenue. The residence is surrounded by existing vegetative screening along the sides of the farmstead.

Residence H is located adjacent to the south-western portion of the Project Area southeast of

140th Street and 680th Avenue. The residence is surrounded by existing vegetative screening along the sides of the farmstead.

Residence I is located adjacent to the south-western portion of the Project Area south of 140th Avenue. The residence faces east and has existing vegetative screening along the west side of the property.

Residence J is located adjacent to the south-western portion of the Project Area south of 140th Avenue. The residence faces east and has existing vegetative screening along the west side of the property.

Residence K is located directly north and east of the Adams Substation, immediately south of County Highway 56, and south of the Project Area boundary. The main access to the residences faces north and is surrounded on all sides by existing vegetative screening.

Impacts and Mitigation

Aesthetics and views in and near the Project Area will be modified, however, as mentioned, aesthetics related to utility-scale solar tends to be one of personal preference and perspective. Approximately 325 acres of agricultural land will be converted to solar panels, inverters, access roads, a Project substation, security fencing and a short 161 kV transmission line. The facilities will look somewhat different from the existing landscape. However, some of these features such as gravel roads, electric transmission and distribution lines and substations already exist on the landscape. A portion of the Preliminary Development Area will be covered with rows of solar panels as shown in Map 3. The panels are constructed of dark, light-absorbing materials and covered with an anti-reflective coating to reduce reflection. Glint and glare from the panels are reduced by using dark colors to absorb rather than reflect light. During manufacturing, panels are coated to reduce light reflection. Typically, solar panels only reflect 2 percent of light.

It is expected that there will be minimal visual impacts from the Project and associated facilities. Locations where visual impacts may potentially be the greatest are adjacent to residences and along public roadways and trails. The solar arrays will be visible from adjacent roadways, parcels and state trail, but given their relative low profile, and the fact they will be fenced for security, they will not be visible from significant distances. The short, 700-1,000-foot transmission line will be visible from a greater distance than the panels, but the change is likely to be barely perceptible given its short length and proximity to the Adams Substation and other existing transmission lines. Trees will be avoided with equipment installation which will maintain natural visual barriers from surrounding parcels and homes. The average distance from nearby homes to sited solar panels based on the preliminary layout is nearly 700 feet. As described above, all of the nearest 11 residences are at least partially surrounded by natural vegetation screening, which should help block direct views of the solar facility to some extent. Louise Solar has coordinated with adjacent landowners, and they have not expressed concerns regarding aesthetic aspects of the project. Visual renderings showing current conditions, and an additional rendering showing how the facility is anticipated to look from three separate vantage points around the Project Area are included below.

Operational lighting will be required at gates and perimeter areas as necessary for safety and security. If practicable, lighting will be motion-activated and down lit to minimize impacts and effects. Impacts to light-sensitive land uses are not anticipated given the rural Project location coupled with minimal required lighting for operations.

View 1: Existing condition looking south from State Highway 56.

View 1: Proposed condition looking south from State Highway 56.

View 2: Existing condition looking southwest from 680th Avenue.

View 2: Proposed condition looking southwest from 680th Avenue.

View 3: Existing condition looking northwest from 690th Avenue.

View 3: Proposed condition looking northwest from 690th Avenue.

4.2.7 Socioeconomics

As calculated using NREL's Jobs and Economic Development Impact (JEDI) model, the Project is expected to produce beneficial socioeconomic effects to the area. The Project is anticipated to generate around $125,000 of property tax annually. It is also expected to support 350-400 jobs during the construction and installation phases, and up to 21 indirect and 2 full time permanent jobs during the operations phase. Temporary construction jobs within Mower 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, Louise Solar will annually generate $2.7 million in economic output by supporting approximately 21 indirect jobs and distributing nearly $2 million in direct earnings.

Adverse impact to socioeconomics will be limited to the temporary loss of the agricultural production on the land currently farmed. However, these temporary losses are negated by the payments to the landowners from the Project.

Impacts and Mitigation
No measures to mitigate socioeconomic 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 lease or purchase contracts with the Applicant and are compensated for the use of the land based upon these agreements.

The Project is in a rural area within Adams and Lodi Townships and no incorporated communities are located within the Project Area (Maps 1 and 13). The incorporated communities that are geographically closest to the Project Area are Adams (one mile west), Taopi (1.3 miles east), Elkton (6.3 miles north), and Rose Creek (7.1 miles northwest). The nearest larger city is Austin, Minnesota which is approximately 15 miles northwest of the Project.

Table 13 presents population and economic information gathered from the U.S. Census Bureau 2010 Census about Minnesota and Mower County (U.S. Census Bureau, 2010). The 2010 U.S. Census gathered a wide variety of data points. The discussion herein 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 of the Project Area, and represent the socioeconomic characteristics that potentially could be affected by construction and operation of the Project, include: total population, vacant housing units, per capita income, the percentage of the population below poverty level, and the unemployment rate (see Table 13).

Based on the 2010 U.S. Census, the population of Mower County is 39,163 persons, which represents less than 1 percent of the total population of Minnesota. The per capita income of Mower County is $29,116, which is lower than the state average. The unemployment rate in Mower County (4.5 percent) is higher than the state average of 3.9 percent. The percentage of individuals classified as living below the poverty level in Mower County is two percent higher than the state average at 11.6 percent and 9.6 percent, respectively. The primary industries in Mower County are classified as Manufacturing (10 percent), Health Care and Social Assistance (9 percent), and Retail Trade (5 percent). It should be noted that the current situation with Covid-19 has likely affected demographic statistics of the project area related to population, primary occupations, and income and unemployment rates.

Table 14 provides race and ethnicity percentages near the project area from available U.S. Census Bureau statics. Based on these statistics, there is no indication that minority or low-

income populations are concentrated within the Project Area, or that the Project will be placed in an area occupied by a minority group. The Applicant also evaluated the Minnesota Areas of Environmental Justice Concern interactive map created by the Minnesota Pollution Control Agency (MPCA) which identifies areas of environmental justice 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: 1) the number of people of color is greater than 50%, or 2) more than 40% of the households have a household income of less than 185% of the federal poverty level. Additionally, communities within Tribal boundaries are also considered areas of concern for Environmental Justice.

According to the 2010 U.S. Census Bureau, approximately 1,199 vacant housing units exist in Mower County. In the nearest metropolitan area, Austin, Minnesota, there are approximately 527 vacant housing units (U.S. Census Bureau, 2010). In addition, according to the City of Austin's website (austinmn.com) numerous hotels, guest houses, and campgrounds are available in the greater Austin area. These residences and temporary housing statistics suggest the local area would support an influx of construction workers if needed.

Table 13: Socioeconomic Characteristics of the Project Vicinity

State/County	Total Population (2010)	Vacant Housing Units	Per Capita Income (U.S. Dollars)	Individuals Below Poverty Level (percent)	Unemployment Rate (percent)
Minnesota	5,303,925	259,974	36,245	9.6	3.9
Mower	39,163	1,199	29,116	11.6	4.5

Sources: U.S. Census Bureau, 2010.

Table 14: Race and Ethnicity Population Statistics near the Project Area

State/County	White Alone (%)	Black or African American Alone (%)	American Indian or Alaska Native Alone (%)	Asian Alone (%)	Native Hawaiian/ Pacific Islander Alone (%)	Two or more Races (%)	Hispanic or Latino (%)	Total Minority (%)[1]
Minnesota	79.1	7.0	1.4	5.2	0.1	2.6	5.6	20.9
Mower	76.7	3.9	0.7	5.3	0.5	1.9	12.2	23.2

[1]*The Total Minority column is calculated by subtracting the percentage of white alone (non-Hispanic and Latino) from the total population. Sources: U.S. Census Bureau, Quick Facts – Minnesota and Mower County, 2019.*

Impacts and Mitigation

The Project is designed to be socioeconomically beneficial to the landowners, local governments, and communities. Landowner compensation is established by voluntary leases or purchase agreements between the landowners and the Applicant's lease or purchase of the land.

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 Mower 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. Most of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code. Louise Solar will issue an RFP to BOP contractors to construct the Project. Louise Solar will include preferences for contractor bids that utilize local, union 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 BOP contractor selected will be required to work with labor unions, local subcontractors, and other vendors to implement a project construction staffing model that maximizes local hiring and local economic benefits for the Project, while ensuring the Project is safely built on time and on budget.

Based on a review of the MPCA's interactive Environmental Justice map, and applicable statistics from the U.S. Census Bureau, it was determined that the project is not located within an area identified as a concern for Environmental Justice, and therefore no impacts to minority communities are anticipated.

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 two long-term personnel. The Project anticipates that sufficient temporary lodging and permanent housing will be available within Mower County, and within the Austin area, to accommodate construction laborers and long-term personnel.

In general, the socioeconomic impacts associated with the Project will be positive; therefore, no mitigation measures are proposed. Wages will be paid, and expenditures will be made to local businesses and landowners during the Project's construction and operation. The Project will provide production tax payments to Mower County of approximately $105,000-$115,000 annually over 35 years or longer. Additionally, Adams and Lodi Townships will receive approximately $25,000-$30,000,000 annually over 35 years. In addition, lease and purchase payments paid to the landowners will offset potential financial losses associated with removing a portion of their land from agricultural production.

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 (2010), the population of Mower County derives from a mostly European heritage accounting for approximately 80% of the population, followed by 11% Hispanic, and 9% African American, Native American and Asian American. The region surrounding the Project has cultural values tied to the area's German, English, 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. Construction of the proposed Project is not expected to conflict with the cultural values and heritage of the area.

Impacts and Mitigation
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
Recreational opportunities in Mower County primarily include softball, hiking, camping, hunting, bicycling, snowmobiling, golfing, and fishing, and opportunities to explore museums, parks, nature centers, numerous landmarks, and caves.

Information from the MnDNR, Mower County and other federal GIS databases were reviewed to identify recreational resources within and near the Project. There are no designated public (federal, state, or local) recreational lands within the Project Area boundaries Map 8. According to the MnDNR Recreational Compass, there are no state forests, national forests, or national wildlife refuges within close proximity to the Project boundaries. Additionally, there are no state-owned Off-Highway Vehicle (OHV) trails and no MnDNR Scientific & Natural Areas identified within a mile of the Project boundaries (MnDNR 2014). Also, no lakes with public access are located in the Project Area.

Primary recreational resources identified within roughly 5 miles of the Project Area boundary area shown in Table 15 and Map 8.

Table 15: Recreational Resources

Resource	Approximate Distance to Project Area Boundary
Shooting Star State Trail	108 feet
Snowmobile Trail 176	0.53 miles
Adams Park Pavilion	1.3 miles
Mower Walk-In Access (WIA) #593	2.02 miles
Rustic Retreat WMA	3.26 miles
Shooting Star Prairie SNA	4.12 miles

The nearest public recreational resource to the Project is the Shooting Star State Trail. The trail is positioned on an old railroad right-of-way, and provides biking, running, and walking opportunities for area residents. The trail is currently paved between LeRoy and Austin. Additionally, a portion of nearby snowmobile track 176 is located about 0.5 miles from the Project Area boundary.

The nearest MnDNR WMA is the Rustic Retreat WMA, located over three miles east of the Project Area; and the nearest state park is the Lake Louise State Park, located eight miles southeast. Similarly, there are no county or city parks within one mile of the Project Area.

Impacts and Mitigation
Construction and operation of the Project is not anticipated to impact recreational opportunities near the Project Area. Use of the Shooting Star State Trail could be interrupted for short periods while deliveries are made to the southern portion of the site at the intersection of Highway 56 and 680th Avenue, but these are anticipated to be temporary and short in duration. The

Applicant will coordinate with DNR staff should there be the need to close the trail for any length of time. The panels and short transmission line will also be partially visible from the Shooting Star State Trail corridor, but are not anticipated to negatively impact the overall experience of the users. Electrical collection lines connecting the northern and southern portions of the Project will be bored beneath the trail, and will therefore not interrupt normal use of the trail or otherwise create impacts. Utility crossing licenses are needed to bore beneath the state trail will be coordinated with MnDNR staff prior to construction.

No significant impacts to recreational opportunities are anticipated and therefore no mitigation measures are proposed.

4.2.10 Public Services and Infrastructure

Public Services and Utilities

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.

Mower County provides police services to the area where the Project is proposed, and the Adams Volunteer Fire Department provides fire protection services to the Project Area.

The Project is located in an area where private wells and septic systems are used at rural residences. Review of the Minnesota Department of Health (MDH) County Well Index identified no wells within the Solar Project boundary. Numerous wells are located immediately outside of the Project boundary (Map 7).

There are numerous telephone services and broadband providers in Mower County (DEED 2020). Telephone services are primarily provided by Frontier Communications, and cable/internet by Mediacom.

The Project is located adjacent to the existing ITC Midwest's Adams Substation. Electrical distribution lines are located along roadways near the Project Area, and several high voltage transmission lines (100-345 kV) cross the Project Area in route to the Adams Substation. Approximate locations of these transmission lines are displayed on Map 7. A natural gas pipeline is located immediately southwest of the Project Area. A second gas line runs east to west through the northern portion of the Project Area.

No AM, FM, microwave, television, or other radio towers were identified in the Project Area according to publicly available FCC sources. One communications tower was identified within one mile of the Project boundary, immediately adjacent to the Adams Substation.

Roadways

Access to the Project will be via existing township, county or state roads. With the limited possible exception of minor field access or driveway changes, which may be needed depending on final design, no changes to existing roadways are planned. The major roadway in the area is State Highway 56, which bisects the proposed Project. Other roads that surround the Project Area are local county or township roads. The Project Area is bordered on the north by 150th Street and 690th Avenue to the west. Annual Average Daily Traffic (AADT) counts based on Minnesota Department of Transportation's (MNDOT's) 2016 Publication of traffic volumes for

Mower County are provided in Table 16 and displayed on Map 7 – Existing Infrastructure and AADT (MNDOT, 2016).

Table 16: Annual Average Daily Traffic in the Project Vicinity

Roadway	Year	AADT Traffic Volume Total
State Highway 56 (between Adams and Taopi)	2016	1,350
County Road 6 (110th Street; approximately 2.5 miles south of Project Area)	2016	475
County Road 18 (670th Ave; 0.5-miles west of Project Area)	2012 (and older)	490

Source: MNDOT, 2016

There will be several access points to the Project. The northern units of the Project will be accessed from 150th Street and 690th Avenue, and the Applicant will likely seek driveway access from State Highway 56. Access from State Highway 56 is not currently being contemplated for the southern portions of the Project; access to the southern arrays will likely be from 140th and 680th Streets. Louise Solar may utilize the existing driveway to the ITC Adams substation (from State Highway 56) for access to the Project substation.

Other Transportation Infrastructure

There are no railroads that cross the Project Area, so rail traffic will not be affected. Historic railways near the project have been abandoned or converted to public trail systems.

According to the Federal Aviation Administration (FAA), there is one FAA-registered airport located within three nautical miles of the Project Area: Gilgenbach's Private Airport is located 2.25 miles south of the Project. This airport operates one turf runway.

Impacts and Mitigation

Public Services and Utilities

The Applicant 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. Louise 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 and overhead utilities; if conflicts are unavoidable Louise 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 Adams Substation via a 161 kV transmission line of less than 1,500 feet. The Project will not impact existing transmission lines. During interconnection, customers may experience short outages when the Adams Substation 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 (ITC Midwest). Limited, temporary impacts to service may occur during interconnection of the Solar Project Substation via the short 161kV transmission line to the Adams Substation, but these outages are anticipated to be of short duration and closely coordinated with utilities and landowners.

Both gas pipelines have been avoided by project facilities. Should any crossings be proposed, encroachment agreements will be executed and utility locations will be marked prior to construction to avoid impacts from construction and operation activities.

Roadways

Access to the Project will be via existing state, county and township roads. With the limited possible exception of minor field access or driveway changes depending on final design, no changes to existing roadways will occur. The roads used for access to the Louise Solar Project are shown on Map 7 (Existing Infrastructure and AADT).

The Applicant will secure necessary local permits for road access and other ancillary aspects of the Project, and will work with the county engineer and MnDOT in regards to planned work within road rights-of-way to support project utility installation. During the construction phase, temporary impacts are anticipated on some public roads within the vicinity of Project, primarily through additional traffic and the potential for slow-moving construction vehicles. The proposed gen-tie line does not cross roads or road rights-of-way, so no permits are anticipated from the county or MnDOT related to gen-tie construction.

Construction traffic will use the existing state and county roadway system to access the Project facilities and deliver construction materials and personnel. Traffic during construction is estimated to be approximately on average 50-100 pickup trucks, cars, and/or other types of employee vehicles onsite for the majority of construction. It is estimated that approximately 10-20 semi-trucks per day will be used for delivery of facility components. Semi-truck 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. Slow-moving construction vehicles may also cause delays on smaller roads, similar to the impact of farm equipment during planting or harvest. However, these delays should be minimal for the relatively short construction delivery period. Overweight or oversized loads are unlikely. If they are required, Louise Solar will obtain the appropriate approvals prior to construction.

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

Other Transportation Infrastructure

There are no active railroads in the area that will be affected by the project and therefore no mitigation is needed or planned.

At the direction of the FAA, the Applicant used the FAA's Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) Notice Criteria Tool to determine if further aeronautical study or FAA filing is needed. The screening tool indicated that worst-case height and elevation scenarios (1,354 feet elevation, 85' structure) at the portion of the Project Area closest to the airport does not exceed Notice Criteria. FAA staff reviewed the results on and responded on September 22, 2020 that nothing further needed to be filed with the agency. As a result, no 7460-1 forms need to be filed for the Project and no mitigation is needed or planned (Appendix B).

4.2.11 Zoning and Land Use

Zoning

Based on Mower County zoning information, the Project Area is zoned agricultural (Appendix I). The County's Zoning Ordinance outlines standards for large solar farms and solar facilities (Mower County, 2015). However, because the Project requires a Site Permit from the State of Minnesota, the Mower County Zoning Ordinance does not apply to the Project.

The Applicant is coordinating with local and county officials regarding the Project. As noted in Section 14-18.7 of the Mower County Zoning Ordinance, development of large solar energy systems within the agricultural district is a conditionally permitted use (Mower County, 2015). The Mower County Zoning 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). Minn. Stat.216E.10, Subdivision 1, states that the Site Permit is the only site approvals required for construction of the solar project. A Site Permit supersedes and preempts all zoning, building, or land use rules, regulations, or ordinances put in place by regional, county, local and special purpose governments, although the review by the Commission will take local land use into consideration. Regardless, Louise Solar has applied county standards to the Project where feasible.

The Project has been designed in compliance with the goals and policies of the Mower County Comprehensive Plan (2002). The Comprehensive Plan depicts the future land use of the Project Area as an Agricultural Management Area. Agricultural Management Area goals are to provide for the continuation of long-term agriculture in the county. As these lands will ultimately be returned to agricultural uses upon decommissioning the Project, and agricultural lands will be allowed to "rest" during the Project's life-cycle, the Louise Solar Project will further the county's goals of providing long-term agricultural opportunities. Mower County staff requested a setback of 50 feet from the state trail located directly north of the Project area, which has been incorporated into the Project design. In addition, Louise Solar, in coordination with the Nobles County, excluded lands within ½-mile of the City of Adams border to avoid future urban expansion areas.

Zoning information found on the Mower County Township Zoning Maps for Adams and Lodi Townships shows that the Project Area is currently zoned as agricultural (Map 13 and Appendix I). The Mower County Zoning Ordinances provides information for the development of Solar Energy Farms. The proposed Louise Solar Project will consider the setback requirements noted in the Zoning Ordinance where practicable and as discussed in Section 4.2.11. The proposed substation will be permitted under this Site Permit; a separate permit will be acquired from Mower County for the short transmission line.

Land Use

The Project is located within a rural landscape, and therefore the primary land use in the Project Area is agricultural (96.2 percent; U.S. Geological Survey [USGS], 2011; Table 17; Map 9 - Land Use). The remainder of the Project Area consists of developed land (2.3 percent) and a small amount of herbaceous or hay/pasture land (1.2 percent). The remaining identified land uses include deciduous forest, emergent herbaceous wetlands, barren land, and open water. In total, the remaining land uses comprise a minor 0.3% of the Project Area. Most of the agricultural land in the Project Area is subject to row-crop agriculture, such as corn and soybeans. Developed land within the Project Area generally consists of public roads, namely 680th Avenue, 690th Avenue, 140th Street and 150th Street. The small area (8.3 acre) of herbaceous/hay/pasture lands

within the Project Area is associated with roadside ditches and unnamed streams. The minor amount of open water identified in the Project Area is associated with a wetland that is predominantly located outside of the Project Area. See Section 4.5.4 for more information on wetlands.

Table 17: Land Use Within the Project Area

Land Use Type	Acres in Project Area	Percent of Total Acreage
Agricultural	590.1	96.2%
Developed	14.3	2.3%
Herbaceous/Hay/Pasture	7.2	1.2%
All other land uses	1.7	0.3%
Total	**613.3**	**100.0%**

Farmsteads are sparsely scattered outside of the Project Area, generally situated near public roads. Based on review of available aerial photography, there are 11 residences (A-K) located on parcels adjacent to the Project Area as highlighted on Map 3.

Impacts and Mitigation

The Solar Project will change the land use from agricultural to solar energy use within the Preliminary Development Area (Map 2). The conversion of agricultural land to the solar facility will have a relatively minimal impact on the rural character of the surrounding area or Mower County. As discussed further in Section 4.3, Land-based Economies, of the 455,680 acres in Mower County the majority is classified as agricultural land. Impacts to 325 or less acres of agricultural land within the solar facility and transmission line footprint would reduce the amount of agricultural land in the county by less than one percent. Expected land use impacts within the Preliminary Development Area are provided in Table 18.

Table 18: Expected Land Use Impacts – Preliminary Development Area

Land Use Type	Acres in Project Area	Percent of Total Acreage
Agricultural	320.7	98.79%
Developed	1.8	0.55%
Herbaceous/Hay/Pasture	2.1	0.65%
All other land uses	0	0%
Total	**324.6**	**100.0%**

Even though the Project proposes impacting a relatively small percentage of available farmland in Mower County, the Applicant has coordinated with MDA on an AIMP (Appendix C). This AIMP has been designed to incorporate best management practices (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. Louise Solar discussed the draft AIMP contents with MDA staff on January 12 and 15, 2021, and has incorporated comments from those discussions into the AIMP.

Normal agricultural activities can continue within portions of the Project Area not converted to solar panels, access roads, transmission and fencing. After the useful life of the Solar Project, the current agricultural land use could be restored by removing the solar panels, short transmission line and associated facilities.

While there is no land in the Project Area currently used as residential or commercial, land use may also be restored to these uses after the useful life of the Project. The Solar Project is not anticipated to preclude current or planned land use on adjacent parcels; and upon decommissioning and removal of the Solar 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 Mower County Comprehensive Plan (2002), and does not propose infrastructure or other construction activities in areas noted as Urban Service Management Areas or other future development areas specified in the Future Land Use Plan. Components of the Project may be located in areas where there is a planned extension of water, sewer, or other services. Construction of the Project would not preclude the future orderly extension of these services across property under Louise Solar's control as these extensions would likely be accomplished by utilizing existing public rights-of-way which will not be impacted by the Project.

Because no permanent land use or zoning impacts are anticipated, no additional mitigation measures are proposed beyond those described in the prepared AIMP.

4.3 Land-Based Economies

4.3.1 Agricultural

According to the U.S. Department of Agriculture's (USDA's) 2017 Census of Agriculture, of the 455,680 acres that comprise Mower County, approximately 447,193 acres are cropland. A total of 1,068 individual farms are located in Mower County, with the average farm size at 419 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, 2012).

The 2017 market value of agricultural production in Mower County was approximately $413 million. Livestock, poultry, and their products accounted for approximately 41 percent of the total value of agricultural production, while crop sales accounted for the remaining 59 percent (USDA, 2017).

Agricultural use encompasses more than 90 percent of the Project Area, with corn and soybean crops covering the majority of the land area according to AcreValue (AcreValue, 2020). The remaining land is mostly comprised of woodlands, forage production, and non-cropland.

Impacts and Mitigation

The Project will impact approximately 325 acres of agricultural land within the Preliminary Development Area by taking land out of row-crop production, but will not result in a significant impact to land-based economies in the Project vicinity as this acreage constitutes approximately 0.0008 percent of the agricultural land in Mower County (447,193 acres). Agricultural production would continue in the surrounding areas during construction and operation of the Project. In addition to removing agricultural lands from production, soils will be disturbed to accommodate project infrastructure including steel piles, access roads, inverter skids, fencing,

transmission power poles, and the project substation. Impacts to the agricultural lands will primarily include soil compaction and a certain degree of soil profile mixing.

Best Management Practices (BMPs) that will be implemented during construction to minimize and mitigate long-term impacts to agricultural lands including the following, among others:

- Reducing the overall disturbance footprint of the project by designing a project that minimizes access roads, fencing, transmission poles, and other infrastructure to the degree practicable,
- Separating, storing, and spreading topsoil to minimize soil profile mixing,
- Reducing rutting by halting construction during wet weather conditions,
- Decompacting soils following earthwork activities,
- Ensuring proper site drainage by identifying, avoiding, and repairing drain tile,
- Implementing erosion control practices such as silt fence installation and stock-pile stabilization to minimize the loss of agricultural soils to erosion.

Impacts to agricultural lands 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 Stormwater Pollution Protection Plan (SWPPP) that will be specifically prepared for the Project. The SWPPP will also include a discussion on topsoil and compaction management. 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.

Following construction, disturbed areas will be repaired and restored to pre-construction contours and characteristics. 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 the area within the Project Area but outside the fence of the Preliminary Development Area during construction and operation of the Project. Similarly, if haying or grazing vegetation management strategies are used, some agricultural activities would continue within the Preliminary Development Area.

Livestock is not located within or adjacent to the Project Area; therefore, no impacts to livestock are anticipated.

Payments will be made by Louise Solar to the owners of the land directly used for the Project. These payments will replace the revenue which would have been generated if agricultural production were continued by the landowners.

4.3.1.1 Prime Farmland

Soil characteristics within the study area were assessed using the Soil Survey Geographic database (SSURGO, 2020). 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 (USDA, NRCS, 2020). Table 19 lists the soil types located within the Project Area.

Nearly all of the Project Area is located on prime farmland/prime farmland if drained as shown on Map 10. 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). 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) (USDA NRCS, 2019).

Approximately 140 acres of prime farmland and 163 acres of prime farmland if drained are located within the Preliminary Development Area. These acreages of prime farmland would be taken out of production for the life of the Project but would not be permanently removed. The site was chosen due to the proximity to the Adams Substation and the substation's available capacity to interconnect the Project to the transmission system. Due to a lack of other environmental constraints, adequate roads for access, flat terrain, and proximity to a substation the Project Area was identified as an attractive location for a solar facility.

Table 19: Prime Farmland Classifications within Preliminary Development Area

Farmland Classification	Area (Acreage)	Percent of Preliminary Development Area
Prime Farmland	149.2	46.0
Prime Farmland if Drained	165.1	50.9
Not Prime Farmland	10.3	3.2
TOTAL	**324.6**	**100**

Impacts and Mitigation

Grading activities with the greatest potential to affect topsoil conditions is likely to be grading for the solar arrays, construction of access roads, and the Solar Project Substation. Minor impacts will be associated with installation of several transmission power poles. Calculations completed for the Preliminary Development Area estimate roughly 104 acres of grading and 11,000 cubic yards of cut and fill. This represents only about one-third of the Preliminary Development Area that will require grading.

Because the Solar Project will result in a temporary land use without significant grading, and minimal loss of soils, significant changes to future agricultural production are not expected following decommissioned of the Project. Landowners have been compensated based on the value of the Prime Farmland.

Impacts to soils will occur during the construction and decommissioning stages of the Project. Because the Project location is on relatively level existing agricultural fields, construction will require minimal grading to provide a level surface for the solar arrays. Primary impacts to soils that are anticipated include compaction from construction equipment, soil profile mixing during grading and pole auguring, rutting from tire traffic, drainage interruptions, and soil erosion.

Impacts to soils would be temporary and minor and mitigated through the proper use and installation of BMPs such as using soil ripping equipment to decompact soils following construction, separating and stockpiling topsoil for later spreading and seeding to prevent topsoil mixing with subsoils, halting construction during wet weather conditions to prevent soil rutting from equipment tires, and avoiding and repairing drain tiles to maintain proper site drainage. Louise Solar will also develop a Stormwater Pollution Prevention Plan (SWPPP) that

complies with Minnesota Pollution Control Agency rules and guidelines. Implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion during construction.

Additionally, Louise Solar has prepared a detailed Agricultural Impact Mitigation Plan and a separate Vegetative Management Plan outlining how soils and vegetative cover will be managed during and after construction for preservation of soils and wildlife habitat enhancement (Appendix D).

4.3.2 Forestry

The Louise Solar Preliminary Development Area and associated transmission line are located solely on agricultural land. 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 Mitigation

No economically significant forestry resources will be affected by the Project, and 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 Mower County Free Fair (mowercountyfair.com, 2020). No recreation resources are located in the Project Area. The nearest recreational resources are a snowmobile trail (Track 176) located about 0.53 miles away, and the Shooting Star State Trail located immediately to the north.

Impacts and Mitigation

Because all Solar Project facilities will be located on private lands, there will be no direct impacts to existing recreational facilities and tourism activities that typically generate revenue for the local community.

Louise Solar will construct the Project facilities within the limits of the Project Area and no road closures are anticipated during active construction, but will be closely coordinated with city, county and state staff if determined necessary. The annual events hosted by Mower 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 these events are anticipated during construction or operation of the Project.

No impacts to tourism and recreational activities are anticipated, and 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 Solar Project boundary. Three inactive gravel pits are located within one mile of the Project boundaries and are represented on Map 7. No other mining resources were identified on or near the Project Area.

Impacts and Mitigation
No impacts to mining operations are anticipated and therefore no mitigation measures are proposed.

4.4 Archaeological and Historical Resources

In June 2020, a review of records was conducted through 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) for the Solar Project Area and a one-mile buffer surrounding these boundaries.

One previous survey has occurred in a limited portion of the Project Area. This survey is detailed in the report, "Phase I Archaeological Survey of the High Prairie Wind Farm I, 98.9 MW Large Wind Energy Conversion System, Mower County, MN" (McFarlane Consulting, 2006).

Three previously recorded archaeological sites are within one mile of the project area, none of which are within the project area boundaries. Two of the sites, 21MW0045 and 21MW0046, are prehistoric lithic scatters that have been determined Not Eligible for listing in the National Register of Historic Places (NRHP). The third side, 21MW0047, is an historic artifact scatter and structural ruin that has not been evaluated for NRHP listing.

Eighteen historic/architectural resources have been previously inventoried within one mile, but outside of the project area. Trunk Highway 56 bisects the project boundary and one-mile buffer. The First National Bank of Adams (MW-ADA-001), located within the buffer, is listed in the NRHP. Built in 1924, it was designed by the noted Prairie School architects Purcell & Elmslie. The remaining resources, including businesses and houses in the City of Adams, and rural bridges within the buffer, have either not been evaluated for NRHP eligibility or the SHPO inventory forms could not be located.

Impacts and Mitigation
No previously recorded archaeological or historic sites will be directly impacted by the proposed Project. A Phase I archaeological survey of the Project Area, including the short transmission line route, was completed in October 2020, and no archaeological sites were identified. The Phase I archaeological survey report is attached in Appendix J. Additionally, the Applicant sent letters to the eleven Minnesota Tribal Nations' Tribal Historic Preservation Office contacts and the Minnesota Indian Affairs Council on August 5, 2020. One comment letter was received on September 10, 2020 from the Shakopee Mdewakanton Sioux Community as summarized in Table 25 and included in Appendix B. The letter stated that at this time the Shakopee Mdewakanton Sioux Community has no concerns regarding this Project. The Applicant will notice the Minnesota Tribal Nations on the availability of the site permit application.

Should previously unknown archaeological resources or human remains be inadvertently encountered during Project construction and/or operation, the discoveries will be reported to the SHPO. With regard to a discovery of human remains, procedures would be followed to ensure that the appropriate authorities would become involved quickly and in accordance with local and state guidelines.

Before construction of the Project begins, Louise Solar will prepare an Unanticipated Discoveries Plan that will outline steps to be taken if previously unrecorded cultural resources or human remains are encountered during construction.

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. Currently all areas of Minnesota are attainment areas except for an area in Dakota County. 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 Clean Air Act requires that the U.S. Environmental Protection Agency establish National Ambient Air Quality Standards (NAAQS). The Project Area presently meets federal air quality standards.

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 (USG), unhealthy, or very unhealthy (MPCA, 2020b).

The Project is located nearest to the air quality monitor in Rochester, Minnesota. This station monitors for O3 and PM2.5. The AQI for Rochester for the past five years is provided in Table 20 (MPCA, 2020c).

Table 20: Days in Each Air Quality Index Category (Rochester, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2019	313	51	0	0	0
2018	292	69	0	0	0
2017	312	53	0	0	0
2016	327	36	1	0	0
2015	315	49	1	0	0

Source: MPCA, 2020c.

Air quality has been considered good for the majority of the past five reported years in Rochester. Since 2015, the largest number of days classified as moderate occurred in 2018, with a couple day each in 2015 and 2016 where air quality was considered unhealthy for sensitive groups. No days have been classified as unhealthy or very unhealthy.

Impacts and Mitigation

The Project will have an overall effect of improving air quality by reducing harmful greenhouse gas and other pollutant emissions detrimental to air quality from the burning of fossil fuels. Following construction, the facility will not generate pollutant emissions.

Minor temporary effects on air quality are anticipated during construction of the proposed Solar Project and associated transmission line as a result of exhaust emissions from construction equipment and other vehicles, and from fugitive dust 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 equipment, will vary with

the phase of construction. Emissions from construction vehicles will be minimized by using modern equipment with lower emissions ratings. 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.

BMPs will be used during construction and operation of the Project to minimize dust emissions if wind erosion becomes an issue. Practices may include sprinkling haul and access roads and other exposed dust producing areas, containment of excavated material, protection of exposed soil, soil stabilization, reducing speed limits within construction zones, and treating stockpiles to control fugitive dust. A SWPPP will be developed prior to construction that will include BMPs to minimize the potential for fugitive dust. Overall, dust emissions currently experienced annually in the area through farming practices are likely to be reduced through the establishment of perennial vegetative cover.

4.5.2 Geology, Soils and Groundwater

Geology and Soils

The Applicant completed a Geotechnical Engineering Report for the Project in September 2020. The report describes the project site as being located in the Dissected Till Plains of Minnesota. The Dissected Till Plains of Minnesota are part of the Central Lowlands, a physiographic province of the United States, which extends from the Canadian Shield in Saskatchewan and central Minnesota southward and eastward to the Coastal Plains. The surface elevation at this site ranges from approximately 1,290 to 1,350 feet. The project site exhibits a nearly flat topography and is underlain by surficial glacial and post glacial alluvium deposits, glacial outwash, and till. These quaternary units overlay Devonian sedimentary rock.

The soils deposited in the area are characteristic of glacial and post glacial activity, and are summarized in Table 21. Although the regional surficial soil type is dominated by glacial till, some of the site soils are silty sand which can contain varying amounts of gravel consistent with glacial and post glacial alluvium depositional environments. The origin of the soil types found in the region (predominantly clays), is related to sediment that glaciers accumulated, carried, and deposited. Soil resources within the project area are shown on Map 11. Soils on the site are classified as predominantly low to moderate for erodibility.

Soils, underlying bedrock formations and other geologic features were identified during desktop evaluations using applicable GIS layers. Adjacent to the northern portion of the Project Area, areas identified as high potential for karst feature development were identified. However, while the site is underlain by carbonate bedrock, the overlying glacial soils are relatively thick and provide risk mitigation from karst. No karst features were in or near the Project Area were reported in the geotechnical report. Other susceptible geologic features, including sinkholes, shallow limestone formations, or unconfined/shallow aquifers are not present in the vicinity of the Project Area. The underlying bedrock is at varying depths across the site but may be encountered at shallow depths especially in the western edge of the site (Mossler, 1998).

The soils at the Project location as identified in the field during the geotechnical investigations consist of topsoil overlying primarily lean clay with varying amounts of sand and gravel (glacial till). Deposits of silty to clayey sand were encountered across the site and were typically observed to be layers or pockets on the order of several feet thick. At isolated locations, the sand and gravel deposits were tens of feet thick. Occasional cobbles and boulders were also encountered when drilling in the glacial till deposits.

Soils listed as predominantly hydric or all hydric are scattered throughout the Project location. Wetlands are associated with some of these areas, however other areas appear to be effectively drained by agricultural practices. There are no known springs or seeps at the site.

Table 21: Soils within Project Area

Map Unit	Soil Name	Acres	Drainage Class	Hydric	Wind Erodibility Group
1030	Pits, sand and gravel	4.2	Excessively drained	Non-hydric	Low Erodibility
1078	Anthroportic Udorthents, 2 to 9 percent slopes	0.8	Moderately well drained	Non-hydric	Moderate Erodibility
135	Donnan silt loam	6.2	Somewhat poorly drained	Predominantly Non-hydric	High Erodibility
1841	Hayfield loam, loamy substratum	1.0	Somewhat poorly drained	Non-hydric	Low Erodibility
1884	Stateline silt loam	13.7	Poorly drained	Predominantly Hydric	Moderate Erodibility
190	Hayfield loam	6.2	Somewhat poorly drained	Predominantly Non-hydric	Moderate Erodibility
1904	Udolpho silt loam, loamy substratum	6.6	Poorly drained	Predominantly Hydric	Moderate Erodibility
1974	Coland, frequently flooded-Spillville, occasionally flooded complex, 0 to 2 percent slopes	1.4	Poorly drained	Partially Hydric	Moderate Erodibility
23	Skyberg silt loam, 0 to 3 percent slopes	117.1	Somewhat poorly drained	Predominantly Non-hydric	Moderate Erodibility
244A	Lilah sandy loam, 0 to 2 percent slopes	8.4	Excessively drained	Predominantly Non-hydric	Low Erodibility
244B	Lilah sandy loam, 2 to 6 percent slopes	2.1	Excessively drained	Non-hydric	Moderate Erodibility
24B	Kasson silt loam, 1 to 4 percent slopes	4.4	Moderately well drained	Predominantly Non-hydric	High Erodibility
2A	Ostrander loam, 0 to 2 percent slopes	6.9	Well drained	Non-hydric	Moderate Erodibility
2B	Ostrander loam, 2 to 5 percent slopes	7.5	Well drained	Non-hydric	Moderate Erodibility
307	Sargeant silt loam	8.1	Poorly drained	Predominantly Hydric	High Erodibility
334B	Vlasaty silt loam, 1 to 4 percent slopes	4.4	Moderately well drained	Predominantly Non-hydric	Moderate Erodibility
479	Floyd silt loam, 1 to 4 percent slopes	21.6	Somewhat poorly drained	Predominantly Non-hydric	Moderate Erodibility
483B	Waukee loam, 2 to 5 percent slopes	11.9	Well drained	Non-hydric	Moderate Erodibility
485	Lawler silt loam	28.2	Somewhat poorly drained	Predominantly Non-hydric	Low Erodibility

Map Unit	Soil Name	Acres	Drainage Class	Hydric	Wind Erodibility Group
516B	Dowagiac loam, 2 to 6 percent slopes	4.8	Well drained	Predominantly Non-hydric	Low Erodibility
517	Shandep clay loam	0.1	Very poorly drained	All Hydric	Low Erodibility
631	Oran silt loam, 1 to 4 percent slopes	44.6	Somewhat poorly drained	Predominantly Non-hydric	High Erodibility
634	Protivin silt loam	91.3	Somewhat poorly drained	Non-hydric	Moderate Erodibility
79B	Billett fine sandy loam, 2 to 6 percent slopes	6.9	Well drained	Predominantly Non-hydric	Low Erodibility
88	Clyde silty clay loam, 0 to 3 percent slopes	33.1	Poorly drained	Predominantly Hydric	High Erodibility
M511A	Readlyn silt loam, 1 to 3 percent slopes	33.1	Somewhat poorly drained	Predominantly Non-hydric	Moderate Erodibility
M515A	Tripoli clay loam, 0 to 2 percent slopes	138.8	Poorly drained	Predominantly Hydric	Moderate Erodibility

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: bedrock, and unconsolidated sediments deposited by glaciers, streams, and lakes. The Project is within the South-Central Province, which is characterized by thick clayey glacial drift with limited extent sand aquifers overlying Paleozoic sandstone, limestone, and dolostone aquifers. In this province, groundwater is typically derived from sedimentary bedrock aquifers (MNDNR, 2001).

Louise Solar reviewed the Project Area for EPA designated sole source aquifers (SSA), wells listed on the Minnesota County Well Index (CWI), and Minnesota Department of Health (MDH) Wellhead Protection Areas (WHPAs). The EPA defines a SSA or principal source aquifer area as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer, where contamination of the aquifer could create a significant hazard to public health, and where there are no alternative water sources that could reasonably be expected to replace the water supplied by the aquifer (EPA, 2016). There are currently no EPA-designated SSAs in the Project vicinity (EPA, 2017).

The CWI is the most complete record of well construction and location in Minnesota and is kept up-to-date and maintained by the Minnesota Geological Survey, in cooperation with the MDH. A search of the CWI (MDH, 2019b) identified no domestic wells within the Project Area (Map 7 – Existing Infrastructure and AADT).

Among wells in the MDH database within one mile of the Project, average depth to groundwater ranges from 12 to 365 feet. According to the MDH information, no Wellhead Protection Areas are located within the Project boundary. Review of the MDH County Well Index identified no wells within the Solar Project Boundary (Map 7). Impacts to groundwater from the construction or operation of the Project are not anticipated. The direct-embedded piers will be installed to a depth of approximately 5 to 12 feet below the soil surface and foundations for the transmission poles and substation are not anticipated to extend beyond that depth. The Solar Project disturbances are generally anticipated to be limited to the ground surface and upper soil

column. It is anticipated that there will be minimal contact with the surficial water table, and no contact with deeper groundwater or aquifers. Wells identified within the Solar Project boundary will likely be capped and abandoned in place according to applicable regulation.

According to the geotechnical report, shallow groundwater was encountered throughout the project site at depths ranging from approximately 1 foot to 10 feet below existing ground surface based on piezometer measurements in December 2019 and January 2020. Typical values generally range from approximately 2 to 6 feet below existing ground surface.

Under the Safe Drinking Water Act (SDWA), each state is required to develop and implement a Wellhead Protection Program to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. 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 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 (2019c). A search for WHPAs in the MDH database indicated there are none in the Project Area; the nearest WHPA is located in the town of Adams, approximately 0.9 miles west of the Project Area.

Impacts and Mitigation

Geology and Soils

Impacts of the proposed Project to available geologic resources are likely to be limited. Due to the thickness of surficial materials (approximately 40-150 feet [Minnesota Geological Survey, 2018]), excavation or blasting of bedrock is unlikely. The geotechnical report identified the western edge of the Project Area as the most likely location to encounter shallow bedrock. The geotechnical report did identify glacial till obstructions such as cobbles and boulders as a potential concern for pile construction, and that foundation type should be carefully evaluated. The Applicant will carefully consider foundation design with the identified potential for shallow bedrock and glacial till obstructions to exist in the Project Area.

Impacts to soils will occur during both the construction and operational stages of the Project. Grading impacts will primarily be associated with the construction of foundations for the substation, access roads, and spot grading for the solar arrays and inverter skids. Impacts to soils will also occur associated with transmission pole installation for the associated transmission line. Because the Project and associated transmission line are located on fairly 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 regrading and tilling these areas following construction.

During operation of the Solar Project, ongoing soil compaction could occur from the use of access roads. This impact is expected to be negligible and confined to the road bed. Overall, the Project is expected to reduce the potential for erosion by establishing permanent vegetation, in contrast to the amount of exposed soils common to row cropping. Potential erosion will be

further minimized by dressing access roads with gravel and installing culverts under access roads where necessary to redirect concentrated runoff.

A National Pollutant Discharge Elimination System permit application to discharge stormwater from construction facilities will be acquired by the Project from the MPCA. BMPs will be used during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion, whether the erosion is caused by water or wind. Practices may include containment of excavated material, protection of exposed soil, stabilization of restored material, and treating stockpiles to control fugitive dust. A SWPPP will be developed for the Project prior to construction that will include BMPs such as silt fencing (or other erosion control devices), revegetation plans, and management of exposed soils to prevent erosion. Because the Project will disturb more than 50 acres, Louise Solar will submit the SWPPP to MPCA for review and approval prior to construction and obtaining coverage under the General Construction Stormwater Permit.

Stormwater on the site will be managed through a series of 18 National Urban Runoff Program (NURP) stormwater ponds required to satisfy MPCA and National Pollution Discharge Elimination System (NPDES) stormwater management requirements (Map 3). The number, location and size of the stormwater ponds were determined by completing a detailed stormwater management study for the Project. The stormwater management system has been designed in accordance with MPCA stormwater management for solar projects guidance, and in compliance with the NPDES construction stormwater permit. The State of Minnesota NPDES Permit requires post-construction stormwater management best practices to treat 1.0-inch of runoff from new impervious surfaces, primarily gravel access roads in the case of solar installations. The basins have been designed to meet storage volumes and provide the necessary treatment. These areas will be vegetated with a wet seed mix that will help stabilize soils after rain events.

The Applicant evaluated the use of infiltration basins, but wet sedimentation basins were determined to be the most appropriate solution. The site consists of primarily of Hydrologic Soil Group (HSG) C and D soils with some locations with HSG A and B. Type A soils have low runoff potential and high infiltration rates. Type B soils have moderate runoff potential and infiltration rates. Type C soils have moderate runoff potential and low infiltration rates. Type D soils have high runoff potential and low infiltration rates. While there are areas of C soils onsite, due to the numerous D soils and proximity to the C soils, it was assumed that all soils onsite would have difficulties infiltrating. Based on the predominance of low infiltrating soils types, it was determined that wet sedimentation basins would be the most prudent option for the Project.

The ponds are anticipated to have approximately 3 feet of standing water at all times. To function according to MPCA requirements, the wet sedimentation ponds are expected to hold water for proper rate control and treatment. The stormwater ponds are strategically placed to capture water without requiring additional grading to direct flow, reducing overall soil impacts required to grade the pond areas. The proposed wet sedimentation basins will treat stormwater from the project in accordance with MPCA requirements. At the end of the project's useful life, stormwater pond areas will be graded to match surrounding contours, decompacted, and topsoil spread to accommodate agricultural activities in accordance with the decommissioning plan and AIMP.

Additionally, the Applicant will work with participating landowners to identify and avoid existing drain tile currently functioning to drain hydric soil areas. Drainage will be augmented

by additional drain tile, as needed, in areas of know hydric soils to ensure proper drainage is maintained in the post-construction condition.

Groundwater

Due to the relatively shallow nature of construction work to be performed for the Project, impacts to groundwater resources are not anticipated. While shallow groundwater was identified as a potential concern in the geotechnical report, the Applicant is aware of the issue and will be completing additional geotechnical studies closer to construction to further inform the Project's design and construction techniques. As previously mentioned, there are no designated sole source aquifers or wellhead protection areas where the project is located.

Project facilities are not likely to affect the use of existing water wells because there are no wells within the Project Area. In addition, Project facilities (i.e., the Preliminary Development Area) are located at least 200 feet from the nearest occupied residence, thereby minimizing the risk of impacts on private wells in the area. Although no wells are identified within the Project Area, if one is discovered that was not mapped on available mapping resources, Louise Solar will assess whether the well is open and cap it, if necessary, in accordance with Minnesota Department of Health requirements.

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 discharged to the surrounding surface, thereby allowing it to infiltrate back into the ground to minimize potential impacts. If dewatering is necessary, the Applicant will obtain a Water Appropriation Permit from MNDNR.

Impacts to groundwater resources, including aquifers, are not anticipated during facility operation as water supply needs will be quite limited. It is probable that operations and maintenance water requirements, will be satisfied with a single domestic-sized water well. Based on the small amount of increased impervious surface area that will be created by Project components (access roads, inverter skids, and Project substation – ~7 acres [see Table 7 in Section 3.2.2]), the Project will likely have minimal impacts on regional groundwater recharge. The foundations of the tracking rack system will likely be a driven steel pier and will likely not require concrete, although some concrete foundations may be required.

The operating facility 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. A Spill Prevention, Control, and Countermeasure (SPCC) will be required for the main industry-standard power transformer. The transformer will be properly contained per Environmental Protection Agency (EPA) requirements.

4.5.3 Rivers, Streams, Lakes and Floodplains

The Project is located in the Cedar River Watershed Basin (MNDNR, 2019b). Map 12, Water Resources**,** depicts surface water features in the Project Area and within close proximity to the boundary. One unnamed MNDNR Public Watercourse is located in the northwest corner of the Project Area. It is classified as a natural perennial watercourse. This feature is also indicated as a Flowline in the National Hydrography Dataset (NHD). This stream likely tributaries to the Little Cedar River, located west of the Project. A total of 4 NHD flowlines and 4 NHD waterbodies intersect the Project Area. No other rivers, streams or lakes are mapped within the Solar Project Area.

A historical aerial photo review was used to identify wetlands and waters in accordance with the July 1st, 2016 Minnesota Board of Water and Soils Resources (BWSR)/USACE-accepted protocol for conducting off-site wetland determinations, *Guidance for Offsite Hydrology/Wetland Determinations*. The desktop analysis was used to support field delineation efforts. Desktop and field identified water resources are further discussed in Section 4.5.4.

Based on the Federal Emergency Management Agency (FEMA) data for Mower County, the majority of the Project Area is located outside of the 500-year and 100-year FEMA flood zones. A small portion of the northwest Project Area is classified as Zone AE or within the 100-year floodplain.

A full jurisdictional waters field delineation of the Project Area was conducted the week of November 2, 2020. No rivers or lakes were identified as part of the field delineation. Portions of three streams/waterways were delineated as described in Table 22, and as shown on Map 12. One delineated stream in the northwest portion of the project area is associated with an unnamed DNR Public Watercourse. Other surface water resources within a mile of the Project include one MNDNR Public Watercourse located to the southwest.

Table 22: Field Delineated Watercourses

Watercourse ID	Field Delineated Watercourse Type	Watercourse Size (Ac.) (within Project Area)	Mapped Type
WC-01	Ephemeral	0.23	R4SBC
WC-02	Intermittent	1.34	R4SBC
WC-03	Perennial	0.27	R2UBH

Impacts and Mitigation

The Project has been designed in a manner to avoid and minimize impacts to identified water resources to the extent practicable. Access roads, panels, inverters, substation facilities, and laydown areas are all sited outside of delineated streams and drainageways. A few areas have been identified where underground collection facilities will intersect with non-DNR Public Waterway streams and drainageways in order to connect the solar panels to the Adams Substation. Impacts related to these few collection crossing are anticipated to be minor. Collection will either be trenched, ploughed or directional bored depending upon depths of water in the channels at the time the construction work is performed. Impacts are anticipated to not exceed deminimis exemption thresholds under the Minnesota Wetland Conservation Act, and qualify for a U.S. Army Corps of Engineers Utility Regional General Permit. A permit from wetland regulatory agencies would likely only be required if trenching or ploughing installation techniques are used during construction. Additional details regarding collection line crossings are presented in Appendix F.

Further, as discussed in Section 4.5.2, a SWPPP will be developed for the Project prior to construction that will include BMPs such as silt fencing (or other erosion control devices), revegetation plans, and management of exposed soils to prevent sediment from entering into waterbodies. Because the Project is located within one mile of an impaired water, the Applicant will submit the SWPPP to the MPCA to obtain coverage under the General Construction Stormwater Permit prior to construction.

Additionally, Louise Solar has prepared a Stormwater Management Study to inform the design of multiple stormwater drainage basins within existing low-lying areas to control runoff into

surrounding natural waterbodies during rain events. Wet sedimentation basins are proposed where infiltration and filtration basins are not allowed due to soil conditions and/or water table elevation. These basins will provide rate control and treatment as needed to meet the requirements of the MPCA.

The Project will not significantly impact FEMA-mapped floodplains. Solar panels have been sited completely outside of mapped FEMA flood zones. Security fencing along the north and northwest boundaries of the Project Area minimally intersect the mapped FEMA floodplain boundary. It is Louise Solar's intent to fully avoid mapped floodplain with security fencing in the final design plans.

4.5.4 Wetlands

Wetlands are valuable for surface and subsurface water storage, nutrient cycling, retention of sedimentation, and plant and animal habitat. The National Wetlands Inventory (NWI) depicts a total of 26 wetlands within the Project Area. Most of these consist of wetlands classified as freshwater emergent or freshwater ponds. The potential for wetlands within the Project Area was further evaluated by reviewing other desktop resources (i.e., aerial photography, hydric soils map units, LiDAR, and digital elevation models) followed by a historical aerial photo review in accordance with the July 1st, 2016 Minnesota Board of Water and Soils Resources (BWSR)/USACE-accepted protocol for conducting off-site wetland determinations, Guidance for Offsite Hydrology/Wetland Determinations. A total of 25 suspect wetlands were desktop delineated, closely matching the number identified by NWI. Desktop delineated suspect wetlands comprise approximately 3% within the Solar Project Area.

A full jurisdictional wetland field delineation of the Project Area was conducted the week of November 2, 2020 (Appendix K). Eleven wetlands were delineated as described below in Table 23, and as shown on Map 12. Many of the suspect wetland areas identified during the desktop mapping exercise were determined to be drained.

Table 23: Field Delineated Wetlands

Wetland ID	Field Delineated Wetland Type	Wetland Size (Ac.) (within Project Area)	Mapped on NWI/NHD
WB-01	Shrub-Carr	0.69	N/A
WB-02	Shrub-Carr	2.31	PUBFx
WB-03	Wet Meadow	0.04	N/A
WB-04	Wet Meadow	0.04	R4SBC
WB-05	Wet Meadow	0.79	R4SBC
WB-06	Seasonally Flooded Basin	0.41	PUBFx
WB-07	Shrub-Carr	0.73	PEM1A
WB-08	Floodplain Forest	0.4	PFO1A
WB-09	Shrub-Carr	0.11	N/A
WB-10	Shallow Open Water	0.37	PUBFx
WB-11	Shrub-Carr	0.35	PEM1A

Impacts and Mitigation
The Project will be designed in a manner to avoid and minimize impacts to wetlands to the extent practicable. The Preliminary Development Area project layout completely avoids permanent impacts to delineated wetlands. It should be noted that the design is preliminary and engineering or other constraints could make it necessary to make adjustments to the design; however, the intent is to avoid wetland impacts to the extent practicable if modifications become necessary. In such a case, it is anticipated, based on existing size of wetlands identified, and location, that any unavoidable wetland impacts would be minor in nature.

Potential impacts to wetlands within the Project may include temporary impacts associated with the installation of electrical collection lines and temporary access roads during construction of the Project. 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 result from foundation of the Project substation.

Access roads and structures will be sited to completely avoid permanent direct impacts to wetlands when possible. The driven piers used to support the solar arrays and inverter skids are not anticipated to result in a loss of wetland under the WCA as they would not alter the wetland's cross-section or hydrological characteristics, obstruct flow patterns, change the wetland boundary, or convert the wetland to non-wetland (MN Rule 8420.0111, Subps. 26 and 32). Further, the driven piers are not expected to constitute wetland fill under Section 404 of the Clean Water Act as they are likely to fall under a structural discharge activity of the USACE Minnesota Regional General Permit (RGP)-003.

Temporary construction impacts will be minimized by using BMP's that include temporary construction mats for work in wetlands, directional bores under wetlands, as necessary, for the installation of electrical collection lines, and other erosion control measures identified in the MPCA Storm Water Best Management Practices Manual, such as using silt fencing to control sediment runoff to adjacent water resources. Disturbed surface soils will be stabilized at the completion of the construction process to minimize the potential for subsequent effects on surface water quality. Construction operations will be designed and controlled to minimize and prevent material discharge to nearby wetlands.

Wetlands and waters within the Project Area are regulated under: the Minnesota Wetland Conservation Act of 1991, as amended, administered in this area by Mower County, Section 404 and 401 of the Federal Clean Water Act administered by the U.S. Army Corps of Engineers and the Minnesota Pollution Control Agency, and Minn. Stat. 103G.245, administered by the Minnesota Department of Natural Resources. The Applicant will coordinate with the USACE, LGU and DNR, as needed, prior to construction if impacts to wetlands are anticipated. Should the Project result in permanent, unavoidable impacts to wetlands or water resources, impacts will be replaced in accordance with the Minnesota WCA and Section 404 of the Federal Clean Water Act.

4.5.5 Vegetation
The Project is located in the Oak Savanna subsection of the Minnesota and Northeast Iowa Morainal Section (MNDNR 2021). Most of the Oak Savanna is rolling plain of loess-mantled ridges over sandstone and carbonate bedrock and till (MNDNR 2021). Pre-European settlement vegetation was dominated by bur oak (*Quercus macrocarpa*) savanna interspersed with tallgrass prairies and maple (*Acer* spp.) -basswood (*Tilia* spp.) forests (MNDNR 2021). NLCD land cover type acreages are provided in Table 16. Land cover types within the Project Area are

predominately agricultural land (96.2 percent), followed by developed (2.2 percent), herbaceous/hay/pasture (1.4 percent), and all other uses (<1 percent). Forested land within the Project Area is predominately comprised of riparian deciduous woodlands areas along streams and wetlands. Based on the wetland delineation discussed in Section 4.5.4, there are 11 wetlands and waterways located within the Project Area. Most wetlands that were identified within the Project Area are seasonally-flooded basins (many of which have been farmed), some of the wetlands were identified as floodplain forest or wet meadow.

Impacts and Mitigation

As discussed in Section 4.3.1, agricultural land within the Preliminary Development Area will be converted from an agricultural use to solar energy use for the life of the Project, and the soils given the opportunity to rest and regenerate. Conversion of existing vegetation will be limited as most of the land within the Preliminary Development Areas is tilled on an annual basis for row crops. Agricultural land within the Preliminary Development Area will be seeded with herbaceous vegetation with the exception of the substation, inverter skids, and access roads, which will be converted to developed land and impervious surfaces. Additionally, Louise Solar has designed the Project to avoid tree clearing to the greatest extent practicable.

The project will be seeded with a low-growing vegetation mix within the module footprint, taller vegetation in the open areas between fences and arrays, and vegetation tolerant of wet conditions for any wetlands or areas anticipated to hold water. The seed mixes are developed to achieve Louise Solar's goals for operating the solar facility, promoting pollinator habitat, establishing stable ground cover, reducing erosion and runoff, and improving infiltration.

As described in Section 2.4.3.2, Louise Solar has developed a project-specific Vegetative Management Plan (VMP) with the intent of establishing objectives surrounding vegetation installation, monitoring, and adaptive management (Appendix D). Custom seed mixes currently under development will be planted after solar equipment has been installed. Details for planting will be described in the Planting Plan for the site (under development). These seed mixes are designed to be used with the vegetation management practices of mowing, grazing, and selective herbicide application.

4.5.6 Wildlife

The current understanding of wildlife PV-solar interactions are limited, but impacts are believed to include exclusionary fencing, habitat destruction and alteration, and direct mortality (summarized by Chock et al. 2020). Exclusionary fencing impedes movements of animals (e.g., medium to large mammals) that are too large to pass through the fencing or are unable to fly over the fencing. Habitat alteration resulting from the construction of PV-solar facilities typically occurs when the vegetation within a site is changed from row-crop agriculture to native perennial herbaceous vegetation. Direct PV-solar facility related mortality of wildlife species has been attributed to a variety of sources including direct impacts (i.e., collisions with infrastructure [birds and bats]), entrapment (i.e., soil ruts from vehicles or evaporation ponds [birds, mammals, insects, amphibians, and reptiles]), and electrocution (i.e., overhead lines [birds]) (summarized by Chock et al. 2020). Although PV-solar related impacts have been identified for a variety of wildlife taxa, impacts to bird species has received the greatest attention.

Direct impacts to birds, including waterbirds, are limited in absolute numbers and in relative numbers for PV-solar facilities compared to other anthropogenic sources (i.e., collisions with buildings, et cetera.). By prioritizing the use of land currently in agricultural production for the

Project footprint and implementing a ground cover strategy with a diverse plant community, and employing BMPs, the potential for indirect effects to birds will be minimized at the Project.

Direct effects to birds at PV solar facilities have been described as apparent collisions with the fixed structures of the facilities (Walston et al. 2016). However, there is evidence that many of the recorded bird fatalities were indicative of predation or even preening (i.e., feather-spots), and were not collision related (Kosiuch et al. 2017). The published literature on avian collisions with fixed PV solar infrastructure is limited to a few studies in regions of the world substantially more arid than Minnesota (H.T. Harvey and Associates 2015, Visser et al. 2019, Western Ecosystems Technology, Inc. 2014). These studies suggest direct impacts to birds were limited and mostly (about 85 percent) comprised of passerine (perching bird) species. Although passerines appear to account for most solar-related bird fatalities, waterbirds often receive a disproportionate amount of attention due to a lake effect hypothesis that posits waterbirds are at a risk of collision due to their misinterpretation of PV-panel arrays as a waterbody. However, to date there does not appear to be a consistent pattern of waterbird fatalities to support the lake-effect hypothesis.

Even with conservative inclusion of the bird fatalities attributed to background influences such as predation events, adjusted bird fatality estimates from the studies were low compared to other anthropogenic sources of avian mortality (i.e., vehicle-and building-collisions) with reported annual average bird fatality rates ranging from 1 to 3 birds/MW/year for solar facilities. The total range of statistical variability around reported bird fatality estimates, ranged from 0.5 to 10.0 birds/MW/year (H.T. Harvey and Associates 2015, Visser et al. 2019, Walston et al. 2016). Walston et al. (2016) estimated total annual bird mortality for solar energy facilities (included PV and concentrated solar power tower facilities) in the United States to be 37,800 – 138,600 per year. None of the studies suggest that PV solar facilities present a risk to any species populations. For context, various studies summarized by Walston et al. (2019) estimated that, annually, between 97 and 988 million birds die from building and window strikes, and 80 to 340 million die from vehicle collisions.

The primary indirect effect to birds of PV solar facility, as with other development, is loss or fragmentation of suitable habitat (American Bird Conservancy 2020). It is generally considered a BMP to site development in a way that minimizes loss of undisturbed or high-quality habitats, as has been done for the Louise Solar Project. Agricultural row crop areas are generally considered of lower ecological value compared to undisturbed, native habitats or semi-natural habitats (e.g., cover crops [Wilcoxen et al. 2018]) or Conservation Reserve Program [CRP] lands (Johnson 2000). Best et al. (1995) assessed habitat use by breeding birds in Iowa agricultural landscapes and found the lowest bird species abundances in agricultural habitats, and greater bird species abundances in natural and strip-cover habitats.

The replacement of monocultural row crops with a higher diversity plant community under and around PV-array fields as proposed by Louise Solar will, for some bird species, increase the attractiveness of the land to individual birds. For example, though different habitat types were evaluated, Visser et al. (2019) and Devault et al. (2014) found that some bird species used PV-facilities to the same degree or more than the surrounding, undeveloped lands. By prioritizing Project disturbance to lands in active agriculture and minimizing disturbance in existing non-agricultural or natural habitats, and by implementing the proposed ground cover strategy, Louise Solar will mitigate impacts to birds due to loss of the pre-construction land cover.

Avian Species

Based on Minnesota Biological Survey Breeding Bird Surveys (MNDNR 2021) and the last five years of the Austin Christmas Bird Count (entirely in Mower County) (National Audubon Society 2020), up to 128 bird species occur in Mower County annually. The 128 bird species are comprised of resident and migratory species. Migratory birds are federally protected under the Migratory Bird Treaty Act (MBTA), and bald eagles (*Halieetus leucocephalus*) are protected under the MBTA and Bald and Golden Eagle Protection Act (BGEPA) (USFWS, 2007a; USFWS, 2018a). The MBTA protects migratory birds and most resident birds that are native to the U.S. from impacts and take. BGEPA protects and conserves bald eagles and golden eagles (*Aquila chrysaetos*) from intentional take of an individual bird, chick, egg, or nest, including alternate and inactive nests (USFWS, 2007a). Unlike the MBTA, BGEPA prohibits disturbance that may lead to biologically significant impacts, such as interference with feeding, sheltering, roosting, and breeding or abandonment of a nest (USFWS, 2007a).

The Project Area is also located within the Eastern Tallgrass Prairie Bird Conservation Region (BCR) (USFWS, 2008). The USFWS identified 39 species of birds within Eastern Tallgrass Prairie BCR as Birds of Conservation Concern (BCC); BCC are avian species that represent the agency's highest conservation priorities as they are species that are considered to be at risk of becoming candidates for listing under the federal Endangered Species Act (ESA) without conservation efforts. Some of the BCC in the Eastern Tallgrass Prairie BCR include the bald eagle, American bittern (*Botaurus lentiginosus*), black rail (*Botaurus lentiginosus*), upland sandpiper (*Bartramia longicauda*), red-headed woodpecker (*Melanerpes erythrocephalus*), black-billed cuckoo (*Coccyzus erythropthalmus*), blue-winged warbler (*Vermivora cyanoptera*), grasshopper sparrow (*Ammodramus savannarum*), and dickcissel (*Spiza americana*) (USFWS, 2008).

The USFWS is also concerned about avian species that are at risk of population-level declines resulting from habitat fragmentation. Species of habitat fragmentation concern are impacted when large areas of habitat are divided into smaller areas with concomitant reductions in habitat connectivity (USFWS, 2012). At present, the Project Area is largely disturbed as 96 percent is used for agriculture purposes or is developed. If species of habitat fragmentation concern are present in the Project Area, they have adapted to the fragmentation and current land uses.

Land use within the Project Area is primarily agricultural (96 percent), with some small amounts of developed areas (2.2 percent), herbaceous/hay/pasture (1.4 percent), and less than one percent of deciduous forest, barren land, and emergent herbaceous wetland. Forested land within the Project Area is limited and is largely restricted to wetlands or streams. As a result, few migratory bird species that use trees or forested areas as habitat will be present, such as bald eagle, black-billed cuckoo, and red-headed woodpecker. Open water and wetland is limited within the Project Area (3 watercourses and 11 delineated wetlands). As such, it is unlikely that water-dependent birds (e.g., waterfowl or shorebirds) would use the Project Area for nesting or roosting purposes. Species of migratory birds associated with grasslands would also be limited or absent. It is unlikely that land cover within the Project Area provides suitable habitat for most BCCs.

Other Wildlife Species

In addition to birds, other wildlife taxa that may occur in the Project Area include mammals, reptiles, and insects. Mammals that may occur within the Project Area include white-tailed deer (*Odocoileus virginianus*), striped skunk (Mephitis mephitis), red fox (Vulpes vulpes), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and coyote (*Canis latrans*). Reptiles

that may occur in the Project Area include the plains gartersnake (*Thamnophis radix*), and common gartersnake (*Thamnophis sirtalis*). Water courses within the Project Area are limited to two streams and a small portion of an unnamed perennial stream in the northwest (see Section 4.5.3). If fish or mollusks are present within the Project Area, they are likely restricted to the unnamed perennial stream. Some pollinator insects may be present in the Project Area including native bees, butterflies, and moths.

Impacts and Mitigation
Impacts to wildlife are expected to be minimal. The proposed establishment of stable, year-round herbaceous cover post-construction will likely benefit many wildlife species (i.e., ground-nesting birds, pollinators, et cetera.). Common species of wildlife adapted to agricultural land use may be present in the Project Area such as white-tailed deer, red fox, striped skunk, wild turkey (*Meleagris gallopavo*), ring-necked pheasant (*Phasianus colchicus*), and an array of passerines, rodents, and insects. During Project construction, wildlife within the Project Area are likely to be temporarily displaced; however, as the current land use is predominately agricultural, these species would be impacted by human activity regularly. Overall, construction of the Project is expected to minimally impact wildlife or their populations. During operations, any potential impacts to wildlife are also expected to be minimal (e.g., excluding large mammals from site access from fencing). As the potential impacts to wildlife are anticipated to be minimal or temporary, no species-specific mitigation is proposed.

4.5.7 Rare and Unique Natural Resources

The USFWS Information for Planning and Conservation (IPaC) database was reviewed for the potential occurrence of federally-listed species, candidate species, or designated critical habitat that may occur within or near the Project Area. MNDNR's Natural Heritage Information System (NHIS) was reviewed for documented occurrences of federally- or state-listed species, state Species of Concern, and rare habitats within the Project Area and within one mile of the Project Area. Although these reviews do not represent a comprehensive survey, they provide information on the potential presence of protected species and habitat within and adjacent to the Project Area (refer to Table 24).

Special Status Species

Federally-Listed Species

According to the USFWS (2020) IPaC, two federally-listed species may occur within or near the Project Area: the federally-threatened northern long-eared bat (NLEB) *(Myotis septentrionalis)* and prairie bush clover (*Lespedeza leptostachya*).

Northern Long-eared Bat
The NLEB is listed as threatened under the federal ESA, due to population-level declines primarily due to a fungal infection that manifests as white-nose syndrome ("WNS"). NLEB occur throughout the eastern and central U.S. (Caceres and Barclay, 2000). The annual life history of the NLEB includes an inactive hibernation period and an active period when the species forages and raises offspring. Hibernation typically occurs in caves and mines from November 1 to March 31 (USFWS, 2016a; USFWS 2016b). In April, the species emerges from its hibernacula and migrates to summer habitat. Adult females form maternity colonies that vary in size, ranging from a few individuals to as many as 60 adults (Caceres and Barclay, 2000; Wisconsin Department of Natural Resources, 2015). During the summer, the species roosts in live or dead trees ≥3 inches in diameter at breast height ("dbh") in cavities, crevices, or

beneath sloughing bark (Timpone et al., 2010). NLEB forage in forested areas or along edge habitats (USFWS, 2016b).

The Project Area is primarily agricultural lands with only a small area of forested habitat (<1 percent); the landscape surrounding the Project Area is also dominated by agriculture. During their active season (April 1 through October 31), NLEB may roost in the trees within the Project Area.

Prairie Bush-Clover

The federally threatened prairie bush clover *is* a tallgrass prairie endemic native to the upper Mississippi River Valley. Its current range is limited to discrete locations in Minnesota, Illinois, Iowa, and Wisconsin. Prairie bush clover occurs on dry mesic prairies with gravelly soils on north-, northeast- or northwest-facing slopes in southwestern Minnesota. Remaining occurrences of the species are generally restricted to remnant prairies; in Minnesota, most populations occur in prairies that were formerly or are currently pasture. The primary threat to the species is habitat loss and destruction (MNDNR, 2019f; USFWS, 2009).

The Project Area is dominated by agriculture (96 percent), with some small amounts of developed areas (2.2 percent), herbaceous/hay/pasture (1.4 percent), and less than one percent of deciduous forest, barren land, and emergent herbaceous wetland. The Project footprint is designed to be sited on land currently used for agricultural purposes, (i.e., areas not suitable for prairie bush clover). Thus, prairie bush clover is not expected to be impacted by Project construction or operation. Additionally, the species was not observed during field studies conducted the week of November 2, 2020.

Stated Listed Species

A record of a state-endangered vascular plant was documented within one mile of the Project Area. These records were confirmed by the MNDNR NHIS response (Appendix B).

Wild quinine is found in prairies, fields, open wooded areas, rocky forests and hillsides, with dry, well-drained soils. Minnesota is the northwest tip of its habitat range and is usually only found in protected railroad rights-of-way, and prairie and savannah remnants in southeast Minnesota (Minnesota Wildflowers, Undated). The species was not observed during field studies conducted the week of November 2, 2020.

Table 24: Federal- or state-listed species identified as potentially occurring within the Project Area, or surrounding region.

Common Name	Scientific Name	Habitat	Within 1-Mile	Within Project Area	State	Federal
Mammals						
Northern long-eared bat (NLEB)	*Myotis septentrionalis*	In winter, hibernates in caves and mines. In fall, swarms in forested areas surrounding hibernation sites. During late spring and summer, forages and roosts in upland forests (USFWS, 2018b)	No	No	SC	T
Plants						
Prairie bush-clover	*Lespedeza leptostachya*	Dry to mesic tallgrass prairies with gravelly soils (USFWS 2009)	No	No	T	T

Common Name	Scientific Name	Habitat	Within 1-Mile	Within Project Area	State	Federal
Wild quinine	*Parthenium integrifolium*	Prairies, fields, open wooded areas, rocky woods and hillsides with dry soils (USDA 2001)	Yes	No	E	N/A

E = Endangered, T = Threatened, SC = Species of Concern

Wildlife Action Network and Minnesota Wildlife Action Plan Species

The Wildlife Action Network is comprised of areas with high concentrations or persistent or viable populations of Species of Greatest Conservation Need (SGCN). SGCN are defined as native animals with rare, declining, or vulnerable populations and species for which the state has a stewardship responsibility (MNDNR, 2016b). Minnesota's State Wildlife Action Plan (SWAP) (2015-2025) proactively addresses the state's conservation needs and catalyzes actions in an attempt to prevent species from needing to be listed under the state's endangered species law. No SGCN were documented within the Project Area based on the MNDNR ER response (#ERBD 20190287).

MNDNR High Value Habitats

The MNDNR (2016) issued a Commercial Solar Siting Guidance (Solar Guidance) that recommends identification of high value resources during Project development. High value habitats include (1) native plant communities ("NPCs"); (2) native prairies; (3) habitats included in the Wildlife Action Network and Minnesota Wildlife Action Plan (i.e., MBS Sites of Biodiversity Significance, Lakes of Biological Significance, and streams with exceptional indices of biological integrity); (4) lakes, wetlands, streams, and rivers; (5) large block habitats (i.e., >40 acres); (6) public conservation and recreation lands (e.g., Wildlife Management Areas [WMAs], Scientific Natural Areas [SNAs], et cetera.); and (7) properties in government programs or with conservation easements (MNDNR, 2016a). High value habitats in the project area are shown on Map 14.

Native Plant Communities

NPCs are groups of native plants that are not greatly altered by modern human activity or by introduced (i.e., non-native species). NPCs are classified in a hierarchical approach based on 1) vegetation structure and hydrology, 2) ecological processes, 3) climate and paleohistory, 4) local environmental conditions, 5) dominant canopy species, substrate, and fine-scale environmental conditions, and 6) finer-scale descriptions of dominant canopy species, substrate, and fine-scale environmental conditions (Aaseng et al., 2011). There are no NPCs mapped within the Project Area. However, there is an NPC mapped adjacent to the northern boundary of the southern portion of the Project Area. The NPC is identified as a southern mesic prairie. During the November 2, 2020 site visit, the southern mesic prairie was determined to be a degraded prairie, due to encroachment of woody and invasive plant species.

Native Prairie

The MNDNR (2016a) defines native prairies as grasslands that have not been plowed that are dominated by prairie plant species. The MBS's railroad prairie rights-of-way are native prairie remnants that occur along railroad rights-of-way. The MBS ranks railroad rights-of-way prairies into three categories: very good, good, or fair. There are no MBS railroad rights-of-way prairies mapped within the Project Area or within one-mile of the Project Area. Louise Solar completed a desktop review for native prairies within the Project Area, identifying suspect

areas that appeared to have never been plowed. Suspect areas were field reviewed in fall 2020 and determined not to be native prairie.

Wildlife Action Network and Minnesota Wildlife Action Plan Habitats

The Minnesota Biological Survey ("MBS") designates and assigns ranks to Sites of Biodiversity Significance based on the presence of NPCs, rare animals and plants, and landscape (i.e., context and ecological function). MBS Sites of Biodiversity Significance are classified as outstanding, high, moderate, or below (MNDNR, 2009). There are no MBS Sites of Biodiversity Significance within the Project Area. However, there are three within one-mile of the Project Area. Two of the three are considered below biodiversity significance and the third is considered of moderate biodiversity significance. One of the MBS sites of below biodiversity significance is adjacent to the western boundary of the northern portion of the Project Area. The other MBS site of below biodiversity significance is located to the northwest of the Project Area. The MBS site of moderate biodiversity significance is associated with the NPC identified as a southern mesic prairie. The Project Area does not intersect any habitats identified in the Wildlife Action Network.

Lakes, Wetlands, Streams, and Rivers

Lakes, wetlands, streams, and rivers are discussed in sections 4.5.3 and 4.5.4. The Project Area contains three field delineated watercourses and eleven delineated wetlands.

Large Block Habitats

Large block habitats are grassland or woodland areas of greater than 40 acres (MNDNR, 2016b). Land cover within the Project Area has largely been modified for anthropogenic purposes (approximately 96 percent). There are no large block habitats within the remaining 4 percent of land cover within the Project Area.

Public Conservation and Recreation Lands

Public conservation and recreation lands include lands administered by federal, state, or local agencies, or conservation easements. There are no public conservation or recreation lands in the Project Area or within one mile of the Project Area. Public conservation and recreation lands in the Project vicinity are further discussed in Section 4.2.9.

Properties in Government Programs or with Conservation Easements

Based on the MNDNR's (2016b) Solar Guidance, properties in government programs or with conservation easements include MNDNR Native Prairie Bank, Reinvest in Minnesota, Forest Legacy easements, and USFWS conservation easements (MNDNR, 2016a). There are no properties in government programs or with conservation easements in the Project Area. One Minnesota Board of Water and Soil Resources-managed conservation easement identified as marginal cropland – perpetual is located within one mile of the Project Area to the north.

Impacts and Mitigation

Federally Listed Species

The USFWS's (2016a) final 4(d) rule for NLEB limits prohibitions for the incidental take of the species to those that would protect the bat in WNS-affected areas. The Project Area is located within the USFWS-designated WNS Zone (USFWS, 2018c). Per the USFWS' (2016a) Final 4(d) rule for NLEB, within the WNS Zone, incidental take due to tree removal is prohibited as follows:

- If it occurs within 0.25-mile (0.4 kilometers) of a documented hibernaculum. or
- If it involves a documented maternity roost tree or other trees within 150 feet (47 meters) of the documented maternity roost tree during June or July.
- In addition, all take within known hibernacula is prohibited.

There are no known hibernacula or roost trees in Mower County (MNDNR and USFWS 2020). Although there are no records of NLEB in Mower County, the species may occur within or near the Project Area. Under Section 7(a)2 of the ESA, federal action agencies may rely upon the Programmatic Biological Opinion for the Final 4(d) Rule to meet Section 7 consultation responsibilities for NLEB (USFWS, 2016b). Under the Programmatic Biological Opinion and per the guidance of the USFWS on October 8, 2020, Project proponents may use a streamlined approach involving an online NLEB 4(d) rule determination key and consultation form. The USFWS stated that if the determination was a no effect determination, that no further coordination is needed. The Louise Solar determination (USFWS 2020) indicated that the Project will not affect NLEB, and the Project layout has been designed to avoid the removal of trees during Project construction.

It is unlikely that the Project will impact NLEB during construction or operations. Tree clearing is not anticipated for Project construction, therefore no removal of potential roost trees is anticipated. If NLEB occur near the Project Area, they may be temporarily disturbed during construction activities that occur during the species active season (April 1 to October 31) due to human activity or noise. However, these potential impacts are likely minimal and similar to human activity that currently occurs within and near the Project Area (i.e., highway traffic and farming equipment).

Prairie bush clover is endemic to tallgrass prairies (i.e., does not occur outside of this habitat type). No impacts to potential prairie bush clover are expected during Project construction or operation as tallgrass prairie habitat is not available within the Project Area. The NPC identified as a southern mesic prairie that is located adjacent to the Project boundary is not anticipated to be disturbed during Project construction or operation. There is no online determination tool for prairie bush clover impacts.

State Listed Species

Based on the MNDNR Environmental Review (ER) response (#ERBD 20190287), a state-endangered plant species was documented within the southern mesic prairie NPC (determined to be a degraded prairie remnant during the November 2, 2020 site visit) that is adjacent to the Project Area. However, Project construction will not impact the NPC. Suitable habitat for the state-endangered plant species includes prairies, fields, open wooded areas, rocky forests, or hillsides, with dry, well-drained soils. Land cover within the Project Area is predominately disturbed (96 percent), with limited amounts of herbaceous (<2 percent) and forest (<1 percent) available. As the adjacent NPC is not expected to be impacted during Project construction or operation, or potentially suitable habitat within the Project Area impacted, the state-endangered plant species are not anticipated to be affected.

MNDNR High Value Habitats

The MNDNR High Value Habitats (i.e., MBS sites of biodiversity significance, NPCs, et cetera.) identified within the Project Area were limited to 11 field-delineated wetlands and portions of three watercourses. The BMPs described in Section 4.5.4 will be used to minimize impacts to the wetlands and watercourses. No other MNDNR High Value Habitats were identified within the Project Area. The degraded prairie remnant that is located adjacent to the northern boundary of

the southern portion of the Project Area will not be impacted during Project construction. As such, permanent impacts to MNDNR High Value Habitats will be avoided and no mitigation measures are proposed.

4.6 Climate Change

Minnesota is taking action against climate change. Executive Order (19-37), signed in December 2019, created the Governor's Advisory Council to coordinate climate change mitigation and resilience strategies in the State of Minnesota. The Executive Order describes climate change as an existential threat that impacts all Minnesotans and our ability to thrive.

The Next Generation Energy Act of 2017 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 (Executive Order 19-37).

The Louise Solar 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. As described earlier, the Louise Solar Project is expected to offset approximately 79,618 metric tons of C02, the equivalent of 9,187 homes' energy consumption for one year.

Additionally, the project has been designed with resiliency in mind as our climate continues to change in Minnesota. Project equipment has been carefully engineered and selected to withstand the potential for an increase in the frequency of severe weather events. Similarly, the stormwater management system has been designed using NOAA Atlas-14, a modeling tool that provides precipitation frequency estimates for many of the Midwestern states, including Minnesota. The model takes into consideration the historical frequency of heavy rainfall events, which is of importance to project engineers when designing stormwater infrastructure that will be in place for the life of the project.

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.

On January 26, 2021, the Applicant reached out to representatives from Mower County and the Minnesota Department of Transportation in regards to any know development, road, drainage or similar projects planned within close proximity to the Project Area that might interact in such a way as to create cumulative impacts (construction timing, environmental resources, etc.). While responses were not received before this application was filed, a review of the Mower County website, and known MnDOT District 6 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.

4.8 Unavoidable Impacts

The Louise Solar 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 environmental are not entirely avoidable; temporary, minor impacts will occur in some circumstances. Louise Solar has taken steps to minimize the long-term effects of these impacts by implementing mitigation measures where warranted. Environmental effects related to the

Project, and efforts to 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 described below. The majority of these unavoidable impacts will be temporary in nature, will occur during Project construction, and will be rectified through BMPs and site restoration activities.

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

- Construction-related noise,
- Dust related to construction traffic,
- Construction-related traffic,
- Wildlife displacement, and
- Exposed soils from grading activities and potential for soil erosion and sedimentation.

The primary unavoidable impacts that are anticipated to remain for the life of the project include the following:

- Aesthetic changes to the landscape (agricultural landscape to solar),
- Land use change from row-crow agriculture to solar panels and perennial vegetation, and
- Infrequent vehicle trips from maintenance vehicles traveling to and from the site.

5.0 Agency and Stakeholder Coordination

Prior to preparing and filing this Application, the Applicant engaged with local, state and federal regulatory stakeholders to gain feedback. Additionally, the Applicant contacted the eleven recognized Minnesota Tribal Nations for comments.

On August 5, 2020, the Applicant sent an informal Project introduction letter and map to federal and state agencies, Minnesota Tribal Nations, and local cities and townships requesting feedback on Project location and resources, permits and approvals, known constraints and potential concerns. The agencies and stakeholders contacted are listed in Table 25, along with dates of further coordination.

A representative letter and responses received as of December 2020 are included in Appendix B. A summary of responses and meetings with stakeholders is included in the table below. The Applicant will continue to work with local, state, federal agencies, and Minnesota Tribal Nations as the Project advances.

Also, Louise Solar submitted a Project introduction letter to MNDNR staff in August 2020. On September 11, 2020, the MNDNR responded to Louise Solar with the following recommendations. Louise Solar's intentions regarding these comments follow in italics.

- Review the MNDNR's Commercial Solar Siting Guidance (MNDNR, 2016a) and Prairie Establishment and Maintenance Technical Guidance for Solar Project. *Louise Solar reviewed the MNDNR (2016) Commercial Solar Guidance for the Louise Solar Project.*

- MNDNR requests that infrastructure be placed sufficiently away from the Shooting Star State Trail so that it does not impact trail maintenance, typically the 10-foot paved trail and about 5 feet on either side of the trail. MNDNR prefers that crossings be directionally bored or placed overhead to avoid damage to the paved trail. *Louise Solar has designed the project to avoid placing infrastructure on or near the state trail. Any collection lines that need to cross the trail will be directionally bored, and licenses pursued from the Division of Lands and Minerals.*
- The MBS site/remnant prairie adjacent to the Project boundary should be avoided and contains a documented state-endangered plant (discussed in Section 4.5.7 Special Status Species and Native Plant Communities). If the native plant community will be disturbed, a botanical survey for the state-endangered plant will be required. *Louise Solar is aware of this native plant community and has designed the project to avoid the resource.*
- Live mussels have been document upstream and downstream of the proposed Project and could occur within the Project Area. None of the mussels are state- or federally-listed; however, mussels are generally uncommon and sensitive to disturbances. As such, the MNDNR recommends: Using effective erosion and sediment control. Avoid or minimize stream crossings and work instream. Use environmentally sensitive construction techniques such as directional boring or overhead lines. If boring is planned, bore pits should be placed away from the water's edge and erosion control methods should be employed to prevent excavation material from entering the water. Upon completion, pits should be filled, graded to preconstruction contours, and re-vegetated with native plant species. *As recommended by the DNR, Louise Solar intends to use effective erosion and sediment control in accordance with the SWPPP that will be prepared for the project and reviewed by the MPCA prior to start of construction. Bore pits will be placed away from the water's edge, and work within streams will be minimized or avoided altogether.*
- The northwest portion of the Project Area overlaps an unnamed stream (a public water) and its associated floodplain. Any work within the ordinary high water level will require a public waters work permit. It is recommended to avoid placing infrastructure in the flood zone. If work is intended to occur in this location, ensure all local floodplain requirements are met. *Louise Solar is not planning work within the unnamed Public Watercourse, and it is the intent to keep all project infrastructure outside of the floodplain.*
- A few areas within the Project Area are identified as NWI wetlands. The MNDNR recommends avoiding NWI wetlands to avoid installation and operational problems and to minimize environmental impacts. Ensure all wetland and WCA requirements are fulfilled by contacting the appropriate WCA authority. *Louise Solar intends to avoid or minimize impacts to NWI wetlands. Unavoidable impacts will be properly permitted.*
- The MNDNR recommends avoiding installing infrastructure in mapped flow paths. *Louise Solar intends to avoid installing infrastructure within mapped flow paths.* The MNDNR recommends using wildlife friendly fencing and erosion control, and invasive species BMPs due to the proximity to natural areas. *Additionally, Louise Solar will implement MNDNR guidance of wildlife-friendly fencing by installing either a 6-foot chain-link fence with top guard angled out and upward at 45 degrees with 3-4 strands of smooth wire (no barbs), or 8' chain link for security and safety purposes. At the request of MNDNR, barbed wire will not be used around the perimeter of the Project.*

Table 25: Louise Solar Agency Correspondence

Agency	Response Date and Summary
Federal	
USACE, St. Paul District	No response to date.
USFWS – Minnesota Wisconsin Field Office	September 22, 2020 (Initial Agency Response) – USFWS staff requested a shapefile of the proposed Project Area to assist in their review. Shapefiles were sent to USFWS that same day. October 8, 2020 (Agency Response) – USFWS staff indicated that if there is no habitat for the species that IPaC indicates, then the appropriate determination is No Effect. There is no need to consult further with USFWS for No Effect determinations. Louise Solar conducted further IPaC analysis and determined the site is No Effect for northern long-eared bat. See Section 4.5.7.
Federal Aviation Administration	August 14, 2020 (Initial Agency Response) – FAA requested Louise Solar submit an obstruction evaluation through our OE/AAA system for the transmission line and solar panels. September 21, 2020 – The Applicant provided obstruction evaluations for the facilities through the OE/AAA screening tool. The results of that evaluation indicate that the project does not exceed Notice Criteria. September 21, 2020 (Agency Response) - FAA responded indicating the project does not exceed Notice Criteria on any of these sites and that further filing and coordination is not needed.
State	
Minnesota Historical Society – SHPO	August 6, 2020 (Initial Agency Response) – Acknowledged receipt. September 1, 2020 (Agency Response Letter) - SHPO recommend that a Phase I archaeological survey be completed.
Minnesota Board of Water and Soil Resources	Draft VMP provided to BWSR by MDA per call with MDA on January 12, 2021.
MNDNR	August 7, 2020 (Initial Agency Response) – DNR requests shapefile of Project Area. August 18, 2020 – Project boundaries emailed to MNDNR staff. September 14, 2020 (Agency Response) – MNDNR staff provide early coordination comments as outlined in Section 4.5.7.

Agency	Response Date and Summary
	Draft AIMP and VMP provided to DNR on December 21, 2020.
Minnesota Pollution Control Agency (MPCA)	No response to date.
Minnesota Department of Agriculture (MDA)	August 10, 2020 (Initial Agency Response) – Acknowledged receipt. August 13, 2020 (Agency Response) – Acknowledged need for Louise Solar to coordinate on the Agricultural Impact Mitigation Plan and a Vegetation Management Plan (in conjunction with the MN DNR). Draft AIMP and VMP provided to MDA on December 21, 2020. Louise Solar discussed draft AIMP comments on telephone calls with MDA staff on January 12 and 15, 2021.
Minnesota Department of Transportation – District 6 (MnDOT)	No response to date. January 26, 2021 – Email coordination with Mark Schoenfelder regarding planned road projects in the vicinity of the project area.
Minnesota Department of Employment & Economic Development (MDEED)	No response to date.
Tribes	
Tribal Historic Preservation Office Lower Sioux Indian Community	No response to date.
Tribal Historic Preservation Office Upper Sioux Community	No response to date.
Tribal Historic Preservation Office Prairie Island Indian Community	No response to date.
Shakopee Mdewakanton Sioux Community	September 10, 2020 (Tribal Response) – "At this time the Shakopee Mdewakanton Sioux Community has no concerns regarding this Project, however in the event of an inadvertent discovery please stop all work and contact the proper authorities. And, please keep us informed of the progress of this Project."
Bois Forte Tribal Historic Preservation Office	No response to date.
Fond du Lac Tribal Historic Preservation Office	No response to date.
Grand Portage Tribal Historic Preservation Office	No response to date.
Leech Lake Tribal Historic Preservation Office	No response to date.
Mille Lacs Tribal Historic Preservation Office	No response to date.
Red Lake Nation	No response to date.
White Earth Nation Tribal Historic Preservation Office	No response to date.

Agency	Response Date and Summary
Minnesota Indian Affairs Council Cultural Resources	No response to date.
Local	
City of Adams	No response to date.
City of Taopi	No response to date.
Mower County	June 30, 2020 (Call with County Administrator) – The Applicant provided overview and introduction of the Project. July 9, 2020 – Call with Public Works Director and Environmental Services Supervisor. August 5, 2020 (Initial Agency Response) – County Administrator indicated she would share letter with the Board and the County Engineer. December 17, 2020 – A Project overview and open house was held for local elected officials. EDF presented an update on the project and discussed the state permitting process and how the county could get involved. Attendees included: Angie Lipelt - Mower Co. Environmental Services January 26, 2021 – Email coordination with Angie Lipelt - Mower Co. Environmental Services regarding other planned projects in the vicinity of project area.
Mower Soil and Water Conservation District	August 7, 2020 (Agency Response) – "It looks like the solar panels would generally be located on cropped fields. Those fields are likely tiled and non-wetland. We are unable to issue a blanket approval. However, the level of concern is low for this area. If you begin working in areas that appear to be wet for extended periods of time (2-3 weeks), drop us a line and we do assist you with reviewing those specific areas."
Southland School District	No response to date.
Adams Township	December 17, 2020 – A Project overview and open house was held for local elected officials. EDF presented an update on the project and discussed the state permitting process and how the township could get involved. Attendees included: John Kloeckner - Chairman Adams
Lodi Township	December 17, 2020 – A Project overview and open house was held for local elected officials. EDF presented an update on the project and discussed the state permitting process and how the township could get involved. Attendees included: John Kirtz - Chairman Gene Kiefer - Treasurer Mark Schafer - Board Member Denis Lewiston - Supervisor Nancy Lewiston - Clerk

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