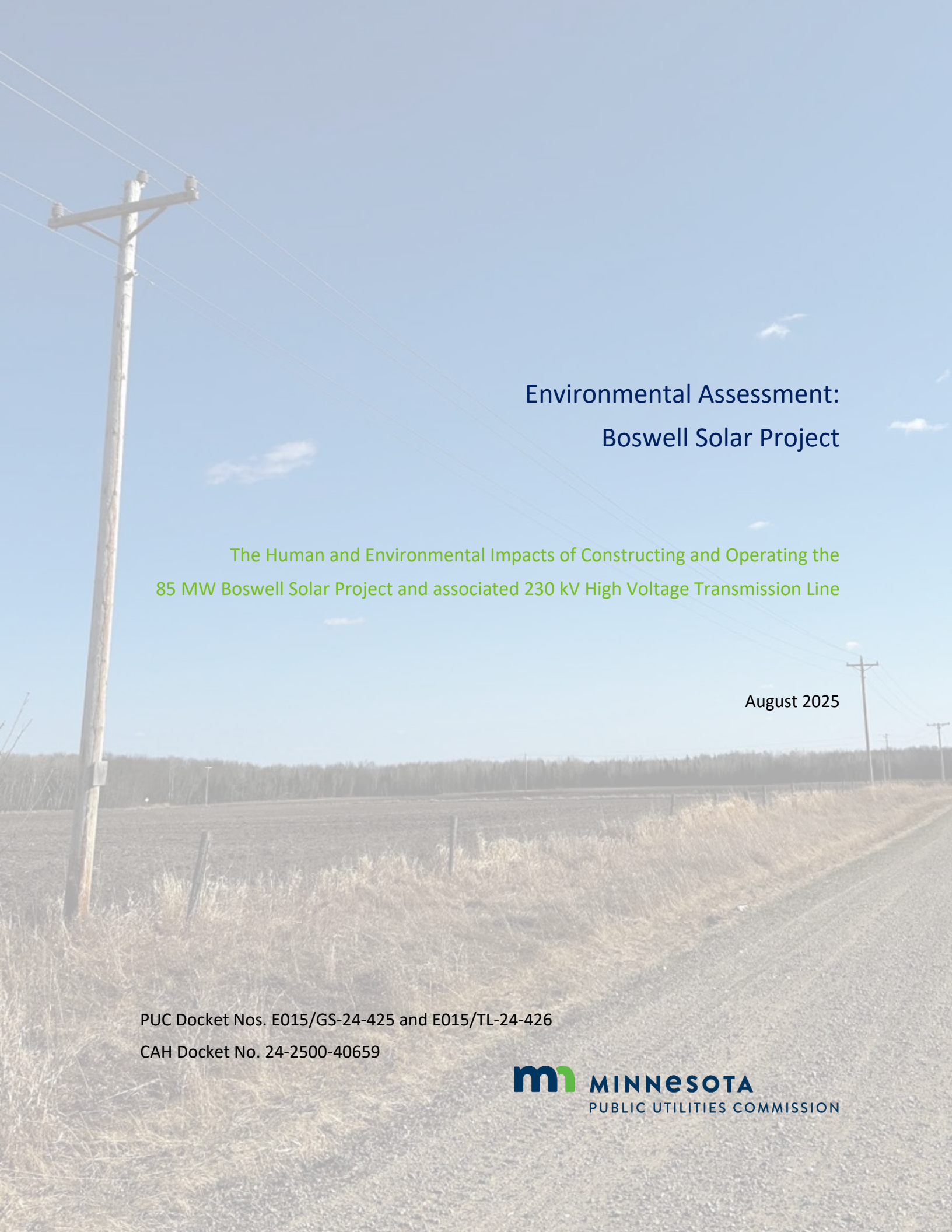

Environmental Assessment:
Boswell Solar Project

The Human and Environmental Impacts of Constructing and Operating the 85 MW Boswell Solar Project and associated 230 kV High Voltage Transmission Line

August 2025

PUC Docket Nos. E015/GS-24-425 and E015/TL-24-426

CAH Docket No. 24-2500-40659

MINNESOTA
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Minnesota Power proposes to construct and operate an up to 85 megawatt (MW) solar energy generating facility and a 2.45-mile 230 kilovolt (kV) transmission line (Gen-Tie Line) known as the Boswell Solar Project (project). The proposed project will be partially located in the city of Cohasset, partially within Deer Lake Township, and partially within the Leech Lake Band of Ojibwe Reservation in Itasca County, Minnesota. Minnesota Power must obtain a site permit and a route permit from the Minnesota Public Utilities Commission before it can construct the proposed Boswell Solar Project.

Sources

Much of the information used to prepare this environmental assessment comes from Minnesota Power's joint site and route permit application. Additional sources include information from relevant federal and state environmental review documents for similar projects, spatial data and site visits.

Project Mailing List

To place your name on the project mailing list contact docketing.puc@state.mn.us or (651) 201-2246 and provide the docket number (24-245 and 24-426), your name, email address, and mailing address. Please indicate whether you would like to receive notices by email or U.S. mail.

Alternative Formats

This document can be made available in alternative formats, that is, large print or audio, by calling (651) 296-0406 (voice)

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Acronyms and Abbreviations

Acronym/Abbreviation	Description
AC	alternating current
AIMP	Agricultural Impact Mitigation Plan
ALJ	administrative law judge
applicant	Minnesota Power
BMP	best management practice
BWSR	Board of Water and Soil Resources
Commerce	Department of Commerce
Commission	Public Utilities Commission
CSW Permit	Construction Stormwater Permit
dBA	A-weighted sound level recorded in units of decibels
DC	direct current
DNR	Minnesota Department of Natural Resources
DSP	draft site permit
EA	environmental assessment
EJ	Environmental justice
EMF	electromagnetic fields
EPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GHG	Greenhouse gas
kV	kilovolt
LLBO	Leech Lake Band of Ojibwe
MBS	Minnesota Biological Survey
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MW	megawatt
MWh	megawatt hour
mG	milligauss
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MWI	Minnesota Well Index
NAC	noise area classification
NHIS	Natural Heritage Information System
NLEB	Northern Long Eared Bat
NWI	National Wetland Inventory
project	Boswell Solar Project
PV	photovoltaic
PWI	Public Waters Inventory
ROI	region of influence
ROW	right-of-way
SCADA	supervisory control and data acquisition
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area

SWPPP	Stormwater Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VMP	Vegetation Management Plan
WCA	Wetland Conservation Act
WHPA	Wellhead Protection Area
WMA	Wildlife Management Area

DEFINITIONS

Several terms used in this document have specific meaning in Minnesota law or regulation. Other terms are defined for clarity.

associated facilities means buildings, equipment, and other physical structures that are necessary to the operation of a large electric power generating plant or high voltage transmission line (Minnesota Rule 7850.1000, subpart 3).

construction means any clearing of land, excavation, or other action that would adversely affect the natural environment of the site or route but does not include changes needed for temporary use of sites or routes for nonutility purposes, or uses in securing survey or geological data, including necessary borings to ascertain foundation conditions (Minnesota Statute 216E.01, subdivision 3).

distribution line means power lines that operate below 69 kilovolts.

easement means a grant of one or more of the property rights by the property owner to and /or for the use by the public, a corporation, or another person or entity

gen-tie line means the associated 2.45-mile 230 kilovolt (kV) transmission line proposed as a component of the Boswell Solar project.

high voltage transmission line means a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kilovolts or more and is greater than 1,500 feet in length (Minnesota Statute 216E.01, subdivision 4).

land control area means the 1,344.5-acre area for which Minnesota Power is assumed to have site control through ownership, a lease agreement, or an easement. The site permit application refers to this as the "Project Area." For this document, it applies to the area for the solar facility as well as area for collection corridors, substation and transmission lines. The term is used to bound a review area and should not be understood to imply the applicant has secured, or will definitely secure, the necessary land rights.

large electric power generating plant means electric power generating equipment and associated facilities designed for or capable of operation at a capacity of 50,000 kilowatts or more (Minnesota Statute 216E.01, subdivision 5).

local vicinity means 1,600 feet from the project site area and collection line corridor.

mitigation means to avoid, minimize, correct, or compensate for a potential impact.

power line means a distribution, transmission, or high voltage transmission line.

preliminary development area means the 498.6-acre area within the project site area where Minnesota Power proposes to build the solar facilities. This area does not include the collection corridors or required setbacks. This area is also referred to as the project boundary. The site permit application refers to this as the "Anticipated Development Area."

project area means one mile from the land control area and collection line corridor.

solar facility means ground-mounted photovoltaic equipment capable of operation at 50,000 kilowatts or more connected directly to the electrical grid and the associated facilities such as access roads and collector lines.

solar energy generation system means a set of devices whose primary purpose is to produce electricity by means of any combination of collecting, transferring, or converting solar-generated energy (Minnesota Statute 216E.01, subdivision 9a).

transmission line means power lines that operate at 69 kilovolts and above.

1 Introduction

Minnesota Power (applicant) is proposing to construct and operate the Boswell Solar Project (project). The project includes an up to 85 megawatt (MW) photovoltaic (PV) solar energy generating facility, a 230 kilovolt (kV) 2.45 mile transmission line (Gen-Tie Line) and associated infrastructure in Itasca County, Minnesota. Minnesota Power must obtain a site permit and a route permit from the Minnesota Public Utilities Commission (Commission) before it can construct and operate the project. The project Gen-Tie Line will connect to the electric transmission grid through the existing 230 kV substation at the Boswell Energy Center.

The applicant filed a joint site and route permit application (application) on December 30, 2024,[1] and the Commission found the application to be substantially complete on February 18, 2025.[2]

Commission Energy Infrastructure Permitting (EIP) staff has prepared the Environmental Assessment (EA) for this project. An EA contains an overview of the resources affected by the project. It also discusses potential human and environmental impacts and possible mitigation measures.[3] These mitigation measures can become enforceable conditions of the Commission's permits.

An EA is not a decision-making document, but rather an information document. The EA is intended to facilitate informed decisions by state agencies, particularly with respect to the goals of the Minnesota Power Plant Siting Act to "minimize adverse human and environmental impacts while ensuring continuing electric power system reliability and integrity and ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion".[4]

On July 1, 2025, Department of Commerce Energy Environmental Review and Analysis (DOC EERA) unit staff moved to the Minnesota Public Utilities Commission Energy Infrastructure Permitting (PUC EIP) unit as directed by state law (Laws of Minn. 2024, ch.126, art. 7) and in response to permitting reform under Minnesota Statute 216I (2024).

The review of this application began under and will continue under Minnesota Statute 216E (2023). DOC EERA staff initiated environmental review of this proposal prior to July 1, 2025, and will continue to exclusively perform environmental review duties for this application under 216E (2023) as EIP staff. Likewise, analyst staff at the PUC will continue to exclusively perform analyst duties on this application as PUC staff.

[1] Minnesota Power – Application to the Minnesota Public Utilities Commission for a Site and Route Permit: Boswell Solar Project, December 30, 2024. eDocket no. 202412-213417-03 (through -18). (Joint Site and Route Permit Application), (SPA).
[2] Minnesota Public Utilities Commission, Order, February 18, 2025. eDocket no. 20252-215451-01.
[3] Minnesota Statute 216E.04, subd. 5, Edition Year 2023; Minn. Rule 7850.3700, subp. 4, Published 2024.
[4] Minnesota Statutes 216E.02, subd. 1. Published 2024.

Chapter 1
Introduction

1.1 How is this document organized?

The EA addresses the matters identified in the scoping decision.

This EA is based on the applicant's site and route permit application and public scoping comments. It addresses the matters identified in the EA scoping decision (**Appendix A**).

- **Chapter 1** briefly describes the state of Minnesota's role; discusses how this EA is organized; and provides a summary of potential impacts and mitigation.
- **Chapter 2** describes the project—design, construction, operation, and decommissioning.
- **Chapter 3** summarizes the regulatory framework, including the site and route permit process, the environmental review process, other approvals that might be required for the project, and the criteria the Commission uses to make its decisions.
- **Chapter 4** describes the environmental setting; details potential human and environmental impacts from the Boswell Solar Project; and identifies measures to mitigate adverse impacts. It summarizes the cumulative potential effects of the project and other projects and lists unavoidable impacts and irreversible and irretrievable commitments of resources.
- **Chapter 5** identifies the sources used to prepare the document.

1.2 What does the applicant propose to construct?

Minnesota Power proposes to construct an up to 85 megawatt solar energy generating system and associated facilities on a site of approximately 1,344 acres to be partially located partially within the city of Cohasset, partially within Deer Lake Township, and partially within the Leech Lake Band of Ojibwe Reservation in Itasca County, Minnesota.

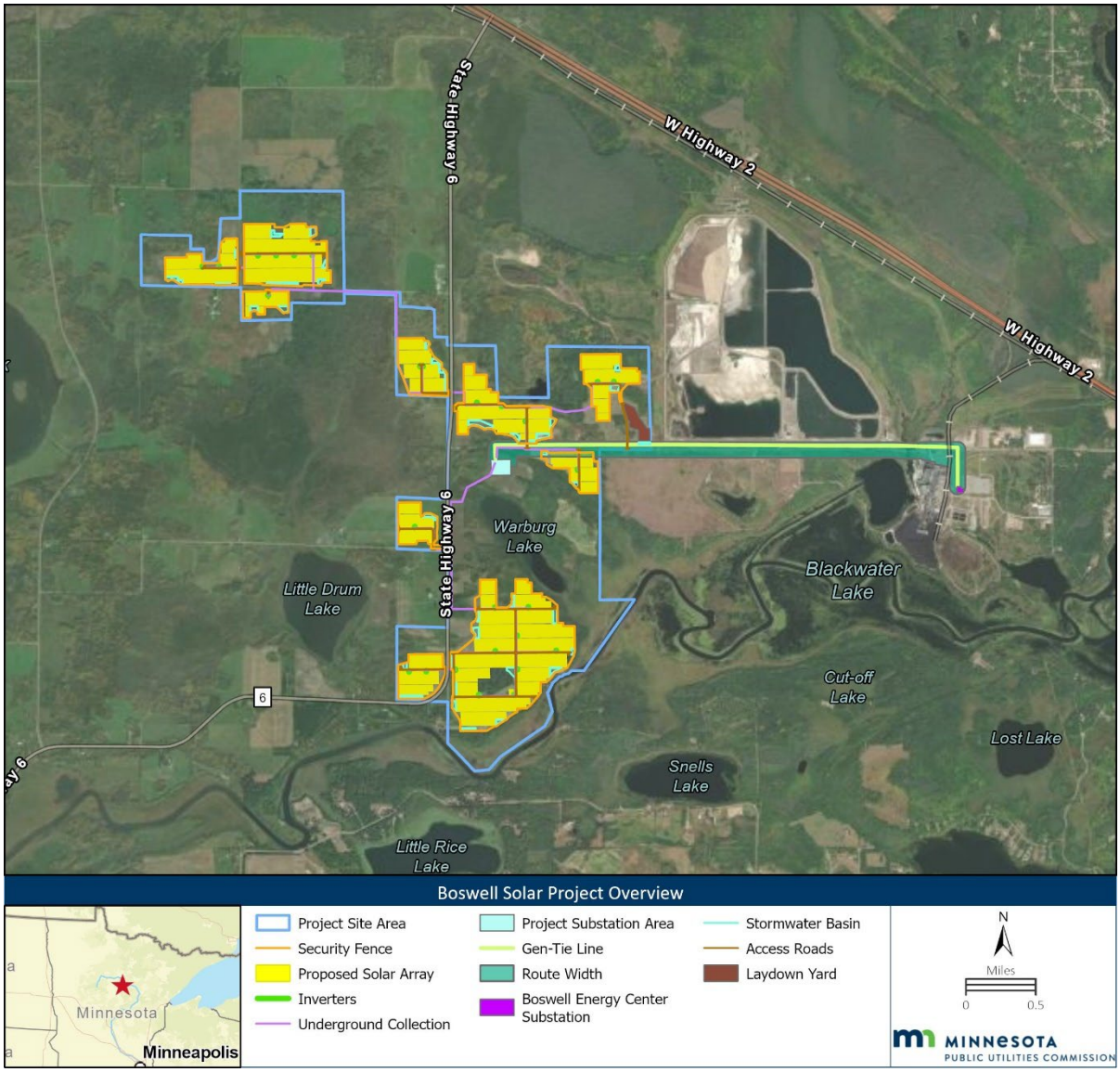
The project will consist of photovoltaic (PV) panels, trackers, inverters, transformers, access roads, security fencing and gates, above-ground and below-ground electric collection lines, stormwater management basins, a project substation, switchgear and associated facilities (**Figure 1**). Minnesota Power will construct the project within the 1344.5 acres of land under a purchase option or leased by the applicant. Based on the preliminary design, Minnesota Power anticipates approximately 498.6 acres within the 1344.5-acre site will be developed for the solar facilities.

The solar facilities will be connected to the project substation via 34.5 kilovolt underground (kV) electric collection lines. The project's AC (alternating current) and DC (direct current) collector lines are anticipated to be a combination of buried underground and above-ground, depending on final design. The project is anticipated to have approximately 9.4 miles of collector lines. At the project substation, the collector system voltage will be stepped up from 34.5 kV to 230 kV and transmitted to the grid via an aboveground 230 kV transmission line that connects to the existing Boswell Energy Center Substation.[5]

[5] Minnesota Power – Application to the Minnesota Public Utilities Commission for a Site and Route Permit: Boswell Solar Project, December 30, 2024. eDocket no. 202412-213417-03 (through -18). (Joint Site and Route Permit Application, SPA), Section 3.3.3.

Construction is anticipated to begin in 2026 with an anticipated in-service date by the end of 2027.[6]

Figure 1. Proposed Boswell Solar Project*



*Note that areas intersecting with Minnesota State Highway 6 Right of Way (ROW) boundaries are under MnDOT ownership.

[6] SPA, Section 1.3, p. 3.

1.3 What is the state of Minnesota's role?

The applicant needs a site permit and route permit from the Commission to construct the project. Commission staff prepared this EA. An administrative law judge will oversee a public hearing.

To build the project, the applicant needs a site permit and a route permit from the Commission. The project may also require additional approvals from other federal and state agencies and local governments, for example, a driveway permit from Itasca County or a Construction Stormwater Permit from the Minnesota Pollution Control Agency (MPCA). Site and route permits supersede local zoning, building, and land use rules.[7] Commission permit decisions must be guided, in part, however, by consideration of impacts to local zoning and land use in accordance with the legislative goal to "minimize human settlement and other land use conflicts."[8]

Minnesota Power applied to the Commission for a site permit and a route permit for the project on December 30, 2024.[9] The Commission must consider whether the record supports issuing these permits, and what conditions should be placed on them.[10]

To ensure a fair and robust airing of the issues, the Minnesota Legislature has set out a process for the Commission to follow when considering permit applications.[11] Under the alternative permitting process, an EA is the only required state environmental review document. The EA describes the project, highlights resources affected by the project, and discusses potential human and environmental impacts on these resources. It also discusses ways to mitigate potential impacts. In this instance, an EA has been prepared, and public hearings will be held. The goal of the EA is to describe the potential human and environmental impacts of the project (*the facts*); the goal of the public hearings is to allow interested persons the opportunity to advocate, question, and debate what the Commission should decide about the project (*what the facts mean*). The record developed during this process—including all public input—will be considered by the Commission when it makes its decisions on the applicant's site and route permit application.

1.4 What is the public's role?

Minnesota needs your help to make informed decisions.

During scoping, you told us your concerns about the project so that we could collect the right facts. At the public hearing, which comes next, you can tell us what those facts mean, and if you think we have represented them correctly in this EA. Your help in pulling together the facts and determining what they mean will help the Commission make informed decisions regarding the project.

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7 Minnesota Statutes 216E.10, subd. 1. Published 2024.
8 Minnesota Statutes 216E.03, subd. 7. Published 2024.
9 Minnesota Power – Application to the Minnesota Public Utilities Commission for a Site and Route Permit: Boswell Solar Project, December 30, 2024. eDocket no. 202412-213417-01 (through -18). (Joint Site and Route Permit Application, SPA).
10 If the Commission grants a site or route permit, it chooses which of the studied locations is most appropriate. In this matter only one site location is studied
11 *See generally* Minnesota Statute 216E. Published 2024.

1.5 What is an Environmental Assessment?

This document is an Environmental Assessment. The Commission will use the information in this document to inform their permit decisions for the project.

This Environmental Assessment (EA) contains an overview of affected resources and discusses potential human and environmental impacts and mitigation measures. Commission Energy Infrastructure Permitting (EIP) staff prepared this document as part of the environmental review process.

1.6 Where do I get more information?

For additional information don't hesitate to contact Commission staff.

If you would like more information or if you have questions, please contact Commission staff: Jessica Livingston (jessica.livingston@state.mn.us), (651) 539-1068 or Scott Ek (scott.ek@state.mn.us) (651) 539-1070.

Information about the project, including the joint site and route permit application, notices, and public comments, can be found on eDockets: https://efiling.web.commerce.state.mn.us/ by searching "24" for the year and "425" (site permit) and "426" (route permit). Information is also available on the Commission EIP webpage for the project: https://puc.eip.mn.gov/web/project/16003.

1.7 What permits are needed?

A site permit and a route permit from the Commission are required. Federal, state, and local permits may also be necessary to construct the project.

The project requires a site permit from the Commission because it meets the definition of a large electric power generating plant, which is any electric power generating equipment designed for or capable of operation at a capacity of 50 MW or more.

The project also requires a route permit from the Commission because the associated 230 kV Gen-Tie line is greater than 100 kV and longer than 1,500 ft in length.

Various federal, state, and local approvals will be required for activities related to the construction and operation of the project. These permits are referred to as "downstream permits" and must be obtained by the applicant prior to constructing the project.

1.8 What are the potential impacts of the project?

The project will impact human and environmental resources. Impacts will occur during construction and operation.

A potential impact is the anticipated change to an existing condition caused directly or indirectly by the project. Potential impacts can be positive or negative, short- or long-term, and can accumulate incrementally. Impacts vary in duration and size, by resource, and across locations. The impacts of constructing and operating a project can be mitigated by avoiding, minimizing, or compensating for the adverse effects and environmental impacts of a project.

The context of an impact—in combination with its anticipated on-the-ground effect and mitigation measures—is used to determine an impact intensity level, which can range from highly beneficial to highly harmful. Impacts are grouped: archeological and historic resources, human settlement, human health and safety, public services, land-based economies, and natural resources.

Select resource topics received an abbreviated study because they were deemed to be of minor importance to the Commission's site permit decision. Potential impacts are anticipated to be negligible in regards to displacement, communication, implantable medical devices, forestry and mining.

1.8.1 Human Settlement

Large energy projects can impact human settlement. Impacts range from short-term, such as increased local expenditures during construction, to long-term, such as changes to viewsheds.

Aesthetics The impact intensity level is expected to be minimal to moderate and long-term. Locations where visual impacts may potentially be the greatest are adjacent to residences and along public roadways within the project site. The solar arrays will be visible from nearby residences and adjacent roadways.

Cultural Values The impact intensity level is anticipated to be minimal. The project is not anticipated to impact or alter the work and leisure pursuits of residents in such a way as to impact the underlying culture of the area. Differences between cultural values related to renewable energy and rural character have the potential to create tradeoffs. There may be a change in the sense of place for residents. The project is proposed within the Leech Lake Band of Ojibwe reservation, which is an area rich in cultural history. Involving LLBO Tribal members in project activities can mitigate potential cultural impacts.

Land Use and Zoning The impact intensity level is anticipated to be moderate due to the conversion of agricultural and forested land to land used for energy generation. Land use impacts are anticipated to be long-term and localized. Constructing the project will change land use from agricultural and forest to solar energy production for a minimum of 30 years. After the project's useful life, the land control area could be restored to agricultural or other planned land uses by implementing appropriate restoration measures. Impacts can be minimized by using best practices to protect land and water quality.

Noise Distinct noises are associated with the different phases of project construction. The impact intensity level during construction will range from negligible to significant depending on the activity. Potential impacts are anticipated to be intermittent and short-term. These localized impacts could affect nearby residences and might temporarily exceed state noise standards. Impacts are unavoidable but can be minimized. Operational impacts are anticipated to be minimal.

Property Values Impacts in the local vicinity are anticipated to be minimal to moderate and decrease with distance and over time. Impacts on the value of specific properties within the local vicinity are difficult to determine but could occur. Specific permit conditions such as Visual Screening Plans can minimize the impact to property values of adjacent properties.

Tourism and Recreation The impact intensity level for tourism and recreation resources is anticipated to be minimal. Most impacts will be short-term and related to construction.

Public Services Potential impacts to the electrical grid, roads and railroads, and other utilities are anticipated to be short-term, intermittent, and localized during construction. Impacts on water (wells and septic systems) are not expected to occur. Overall, construction-related impacts are expected to be minimal and associated with possible traffic delays. During operation, negligible traffic increases would occur for maintenance. Impacts are unavoidable but can be minimized.

Socioeconomics The impact intensity level is anticipated to be minimal to significant and positive. Effects associated with construction will, overall, be short-term and minimal. Significant positive effects may occur for individuals. Impacts from operation will be long-term and significant. Adverse impacts are not anticipated.

Environmental Justice The project is within an environmental justice (EJ) community as defined by Minnesota Statute. However, it is not anticipated have disproportionately high and adverse human health or environmental effects on low-income, minority, or tribal populations. Potential impacts from construction of the project can be minimized with opportunities for engagement within the EJ community.

1.8.2 Human Health and Safety

Large energy projects have potential to impact human health and safety. Most concerns are related to the construction phase.

Electronic and Magnetic Fields (EMF) Impacts to human health from possible exposure to EMFs are not anticipated. Potential impacts will be long-term and localized. These unavoidable impacts will be of a small size. Impacts can be mitigated.

Public Safety and Emergency Services Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Public risks involve electrocution. Electrocution risks could also result from unauthorized entry into the fenced area. The project is designed to meet all applicable federal, state, and local safety standards. Several standard permit conditions mitigate the potential for public safety impacts related to the project.

1.8.3 Land-based Economies

Large energy projects can impact land-based economies by limiting land use for other purposes.

Agriculture Potential impacts to agricultural producers are anticipated to be minimal—lost farming revenues will be offset by easement agreements. A loss of farmland in Itasca County would occur for the life of the project. With respect to prime farmland, the applicant indicates that no feasible or prudent alternatives to the project exist. Potential impacts are localized and unavoidable but can be minimized.

Tourism Impact intensity is expected to be minimal, and short-term in duration. There may be potential for impacts to local recreational activities during construction, however, impacts will be temporary.

1.8.4 Archeological and Historic Resources

The impact intensity level is anticipated to be negligible to minimal. Impacts would be localized. Impacts can be mitigated through siting, routing and construction monitoring.

1.8.5 Natural Resources

Large energy projects can impact the natural environment. Impacts are dependent upon many factors, such as how the project is designed, constructed, maintained, and decommissioned. Other factors, such as the environmental setting, influence potential impacts. Impacts vary significantly within and across projects.

Air Quality Potential impacts to air quality during construction would be intermittent, localized, short-term, and minimal. Impacts are associated with fugitive dust and exhaust. Impacts can be mitigated. Once operational, the solar array will not generate criteria pollutants or carbon dioxide. Negligible fugitive dust and exhaust emissions would occur as part of routine maintenance activities. Impacts are unavoidable and do not affect a unique resource. Impacts can be minimized.

Geology and Groundwater Impacts to geology and domestic water supplies are not expected. Localized impacts to groundwater resources, should they occur, would be intermittent, but have the potential to occur over the long term. Indirect impacts from surface waters might occur during construction. Impacts can be mitigated through the use of Best Management Practices (BMPs) for stormwater management

Soils Impacts to soils will occur during the construction and decommissioning of the project. The impact intensity level is expected to be minimal. Potential impacts will be both positive and negative, and short- and long-term. Isolated moderate to significant negative impacts associated with high rainfall events could occur. Due to the large amount of water resources and hydric soil in the area, there is risk for rutting and erosion during construction. However, because the soil at the solar facility will be maintained with native perennials and other beneficial vegetation for the life of the project, soil health is likely to improve over the life of the project.

Surface Water and Floodplains The impact intensity level is anticipated to be minimal to moderate. Direct impacts to surface waters are not expected. Indirect impacts to surface waters might occur, such as during increased rain events. These impacts will likely be short-term and localized. Impacts can be mitigated. The project area is also within an area of flood hazard. Impacts to floodplains are not anticipated. However, the project site has increased risk for flooding events due to the presence of water features. Potential downstream impacts can be minimized by prudent siting and design and using construction BMPs near water features.

Wetlands The impact intensity level is anticipated to be minimal. Although there is a potential for wetlands to be temporarily affected during construction, direct permanent impacts to wetlands are not expected. Anticipated impacts will be short-term, of a small size, and localized. Impacts can be mitigated.

Vegetation The solar facility will convert farmland and forest land to perennial vegetation for the life of the project. Permanent tree removal will occur during project construction. Potential impacts of

the solar facility can be mitigated through the development of a VMP that includes native species and proper management strategies.

Wildlife and Habitat Potential impacts may be positive or negative and are species dependent. Long-term, minimal positive impacts to small mammals, insects, reptiles, amphibians, etc. would occur. Impacts to large wildlife species will likely be minimal. Preliminary fence design has the potential to impact deer. Significant negative impacts could occur to individuals during the construction and operation of the project. There are several aquatic ecosystems within the project site that have the potential for downstream impacts from dust or erosion control. Potential impacts can be mitigated by prudent design and adherence to Minnesota Department of Natural Resources (DNR) recommendations. Once restored, the land control area will provide native vegetative habitat for the life of the project. The project does not contribute to significant habitat loss or degradation or create new habitat edge effects. The introduction of PV panels, fencing and the Gen-Tie Line creates the potential for bird collisions and funneling wildlife towards roads in certain areas. Potential impacts can be mitigated in part through design and BMPs. The impact intensity level throughout the operation of the project is expected to be minimal.

Rare and Unique Resources The impact intensity level is anticipated to be minimal to moderate during construction. Impacts are anticipated to be minimal during operation of the project. Impacts could be both short and long-term and could be positive (e.g., through introduction of habitat), or negative (e.g., by removing trees that provide habitat, or erosion on shorelines). Impacts can be mitigated through design and BMPs, and through consultation with local government agencies who have expertise on the rare and unique resources in the area.

Climate Change Construction emissions will have a short-term negligible increase in greenhouse gases that contribute to climate change. Overall, the project will generate energy that can be used to displace energy otherwise generated by carbon-fueled sources. The total GHG emissions produced by construction and operation of the project will be minimal when compared to the reduction in GHG emissions long-term. The project's design incorporates design elements that minimize impacts from the increase in extreme weather events such as increased storm and wind events that are expected to accompany a warming climate.

1.9 What factors guide the Commission's decision?

Minnesota statute and rule identify the factors the Commission must consider when determining whether to issue a site and route permits.

After reviewing the project record—including public comments—the Commission will determine whether to issue a site permit and a route permit for the project.

Minnesota Statutes 216E.03 lists considerations that guide the study, evaluation, and designation of site and route permits.[12] Minnesota Rule 7850.4100 lists the factors the Commission must consider when making a permit decision:

[12] Minnesota Statutes 216E.03. Published 2024.

A. Effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services.

B. Effects on public health and safety.

C. Effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining.

D. Effects on archaeological and historic resources.

E. Effects on the natural environment, including effects on air and water quality resources and flora and fauna.

F. Effects on rare and unique natural resources.

G. Application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity.

H. Use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries.

I. Use of existing large electric power generating plant sites.

J. Use of existing transportation, pipeline, and electrical transmission systems or rights-of-way.

K. Electrical system reliability.

L. Costs of constructing, operating, and maintaining the facility which are dependent on design and route.

M. Adverse human and natural environmental effects which cannot be avoided.

N. Irreversible and irretrievable commitments of resources.

The Commission is also guided by the "state's goals to conserve resources, minimize environmental impacts, minimize human settlement and other land use conflicts, and ensure the state's electric energy security through efficient, cost-effective power supply and electric transmission infrastructure."[13]

1.10 Solar Facility and Gen-Tie Line Siting Factors – Analysis and Discussion

This analysis applies the siting factors to the project. Some factors are described in just a few words. Other factors are more descriptive and include a list of elements that, when grouped, make up the factor. Finally, certain factors are relatively succinct, but the scoping process identified elements to be analyzed in this EA. For example, the public safety factor includes an EMF element.

Factor M (unavoidable impacts) and **Factor N** (irreversible and irretrievable resource commitments) are discussed in Section 4.8 and Section 4.9, respectively, of this EA. **Factor G** (application of design

[13] Minnesota Statutes 216E.03, subd. 7(a).

options) and **Factor L** (costs dependent on design) do not apply as the design of the proposed project is the only design under consideration.

Other factors are ranked as follows:

●	Impacts are anticipated to be negligible to minimal and able to be mitigated or consistent with factor
○	Impacts are anticipated to be minimal to moderate and able to be mitigated in part or less consistent with factor, but nonetheless consistent
⊘	Impacts are anticipated to be moderate to significant and unable to be mitigated fully or consistent in part or not consistent with factor

Table 1 Application of Siting Factors- Solar Facility and Gen-Tie Line

Factor A: Human Settlement				
	Solar Facility		Gen-Tie Line	
Element	Construction	Operation	Construction	Operation
Aesthetics	○	○	○	○
Displacement	●	●	●	●
Cultural Values	○	○	○	○
Electric Interference	●	●	●	●
Environmental Justice	○	●	●	●
Land Use and Zoning	●	●	●	●
Noise	⊘	●	⊘	●
Property Values	○	○	●	●
Recreation	○	●	○	●
Socioeconomics	●	●	●	●
Factor B: Public Services				
Element	**Construction**	**Operation**	**Construction**	**Operation**
Airports	●	●	●	●
Roads	○	●	○	●
Utilities	●	●	●	●
Factor C: Public Safety				
Element	**Construction**	**Operation**	**Construction**	**Operation**
EMF	●	●	●	●

Emergency Services	●	●	●	●
Medical Devices	●	●	●	●
Public Safety	●	●	●	●
Stray Voltage	●	●	●	●
Worker Safety	●	●	●	●

Factor D: Land-based Economies

Element	Construction	Operation	Construction	Operation
Agriculture	○	○	○	○
Forestry	●	●	●	●
Mining	●	●	●	●
Tourism	●	●	●	●

Factor E: Archaeological and Historic Resources

Element	Construction	Operation	Construction	Operation
Archeological	●	●	●	●
Historic	●	●	●	●

Factor F: Natural Resources

Element	Construction	Operation	Construction	Operation
Air Quality	●	●	●	●
Climate Change	●	●	●	●
Geology and Groundwater	●	●	●	●
Soils	○	●	○	●
Surface Water and Floodplains	○	●	○	●
Topography	●	●	●	●
Vegetation	●	●	●	●
Wetlands	●	●	●	●
Wildlife	○	●	○	●
Wildlife Habitat	○	●	○	●

Factor G: Rare and Unique Resources

Element	Construction	Operation	Construction	Operation
Fauna	○	●	○	●
Flora	○	●	○	●

Factor H: Use of Existing Generating Plants

Element	Construction	Operation	Construction	Operation
Existing Plants	⊘	⊘	⊘	⊘

1.10.1 Discussion

The following discussion highlights potential impacts to factor elements that are anticipated to be minimal to moderate or moderate to significant, and factors determined less consistent, consistent in part, or not consistent.

FACTOR A: HUMAN SETTLEMENT

Aesthetics Visual impacts are subjective. Thus, potential impacts are unique to the individual and can vary widely. Because there is existing energy infrastructure in the area, including energy generating facilities, transmission lines, substations, and distribution lines (See Section 4.3.1), features the project will not be an entirely new type of feature on the landscape. However, the addition of solar panels and associated infrastructure will create a new aesthetic feature. For those with high viewer sensitivity, for example, neighboring landowners, or those traveling along State Highway 6, visual impacts are anticipated to be moderate to significant, while for those that travel through the project area, visual impacts are likely to be minimal, although noticeable.

Cultural Values The project is not anticipated to impact or alter the work and leisure pursuits of residents in such a way as to impact the underlying culture of the area. In the case that cultural resources are discovered during project construction, the permittee shall work with the appropriate LGU regarding next steps. Differences between cultural values related to renewable energy and rural character have the potential to create tradeoffs that cannot be addressed in the site permit.

Environmental Justice The project area is sited within an Environmental Justice (EJ) community as defined by Minnesota Statute. Although the project is not anticipated to have disproportionately high or adverse human health or environmental effects on low-income, minority, or tribal populations, meaningful community engagement and outreach within local groups will be important to minimize the risk of adverse impacts. Construction of the project may create temporary, short-term impacts that will be minimal to moderate in intensity. Providing the local EJ community opportunities for direct engagement, employment, and economic opportunity will ensure that the project does not disproportionately cause or intensify environmental inequities within this community.

Land Use and Zoning Land use impacts are anticipated to be long-term and localized. Constructing the project will change land use from agricultural and forest land to solar energy production for a minimum of 30 years. After the project's useful life, the land control area could be restored to agricultural or other planned land uses by implementing appropriate restoration measures. Impacts can be minimized by using best practices to protect land and water quality.

Noise Distinct noises are associated with the different phases of project construction. These impacts will be temporary and intermittent and range from negligible to significant depending on the construction equipment used and the location of the listener.

Property Values On whole, impacts to property values are anticipated to be minimal and to decrease with distance and over time. However, impacts to a specific property's value are difficult to determine. Because of this uncertainty, impacts to specific properties could be minimal to moderate. Impacts can be minimized with visual screening plans between adjacent landowners and the project applicant.

Recreation Potential impacts to recreational resources associated with construction are anticipated to be short-term, intermittent, and localized. The impact intensity level is expected to be minimal to moderate, most likely occurring due to increased traffic and noise from construction. During operation, no impacts to recreation are anticipated; negligible traffic increases would occur for maintenance. Access to recreational trails and areas will remain open throughout the life of the project.

FACTOR B: PUBLIC SERVICES

Transportation Potential impacts to roads and highways associated with construction are anticipated to be short-term, intermittent, and localized. The impact intensity level is expected to be minimal to moderate. During operation, no impacts to roads are anticipated; negligible traffic increases would occur for maintenance.

FACTOR C: LAND-BASED ECONOMICS

Agriculture Potential impacts to agricultural producers are anticipated to be minimal to moderate — lost farming revenues will be offset by lease or easement agreements. A negligible loss of farmland in Itasca County would occur for the life of the project. Potential impacts are localized and unavoidable but can be minimized.

FACTOR E: NATURAL RESOURCES

Geology and Groundwater Impacts to geology and domestic water supplies are not expected. Localized impacts to groundwater resources, should they occur, would be intermittent, but have the potential to occur over the long term. Impacts can be mitigated through use of BMPs for stormwater management.

Surface Water and Floodplains Indirect impacts from surface waters might occur during construction. The project site is also proposed within an area that is at risk for flooding and could potentially be impacted in the event of a severe storm. Impacts can be mitigated through proper consultation with local groups regarding surface waters, such as the Mississippi River, as well as following BMPs for tree removal, and erosion on the shoreline. Proper planning and emergency preparedness can minimize the potential risk from severe storm and flooding events.

Soils Impacts to soils will occur during construction and decommissioning of the project. The impact intensity level is expected to be minimal to moderate. Potential impacts will be both positive and negative, and short- and long-term. Isolated moderate to significant negative impacts associated with high rainfall events could occur but can be mitigated with erosion prevention and sediment control BMPs. Because the soil at the solar facility will be covered with native perennials and other beneficial vegetation for the life of the project, soil health is likely to improve.

Wildlife and Habitat Impacts to wildlife are anticipated to be minimal to moderate during construction and operation of the project. Potential impacts may be positive or negative and are species dependent. Long-term, minimal positive impacts to small mammals, insects, reptiles, amphibians, etc. would occur. Impacts to large wildlife species, for example, deer, could occur depending on the final

fence design. Indirect impacts to aquatic life could occur. Significant negative impacts could occur to individuals during the construction and operation of the project. Once restored, the land control area will provide native habitat for the life of the project. The project does not contribute to significant habitat loss or degradation or create new habitat edge effects. Project components can be designed to reduce the potential impact by following the Minnesota Department of Natural Resources (DNR) guidance and BMPs. Additional BMPs can be implemented to avoid impacts to local and rare and unique wildlife (e.g., Northern Long-Eared Bats.)

Rare and Unique Resources Indirect impacts to rare and unique resources may occur during construction. These impacts will likely be minimal to moderate and would be short-term in length. Minimal impacts are anticipated during operation of the project. There are several high value biological resources near and adjacent to the project area, including Blackwater Lake, which is ranked outstanding for biological significance, as well as the Mississippi River. There is also the presence of several Native Plant Communities and Wildlife Action Networks (WAN), including a WAN in the northwest corner of the site (**Figure 18**). Potential impacts can be mitigated by adhering to the Minnesota DNR's recommendations provided in the Natural Heritage Review Letter, such as through project design and further consultation with the DNR.

FACTOR I: POWER PLANTS

Because the solar facility is not constructed at an existing power plant, the solar facility is inconsistent with this siting factor.

1.11 What's next?

A public hearing will be held in the project area; you can provide comments at the hearing. The Commission will then review the record and decide whether to grant a site permit and a route permit for the project.

An administrative law judge (ALJ) from the Court of Administrative Hearings (CAH) will hold a public hearing after the EA is complete and available. At the hearing you may ask questions and submit comments about the project. After the close of the comment period, the ALJ will provide a written report to the Commission with findings, conclusions, and recommendations for the Commission.

The Commission reviews all the information in the project record in determining whether to issue permits for the project. Site and route permits define the location of the project and include conditions specifying mitigation measures. The Commission is expected to make a permit decision in the first half of 2026.

2 Proposed Project

Minnesota Power (applicant) is proposing to construct and operate the Boswell Solar Project (project), an up to 85 megawatt (MW) solar energy generating facility with a 230 kilovolt (kV) transmission line (Gen-Tie Line) and associated infrastructure in Itasca County, Minnesota. The project Gen-Tie Line will send electricity from the project substation to the electric transmission grid through the existing the Boswell Energy Center Substation. This chapter describes the project and how it would be constructed, operated, and decommissioned.

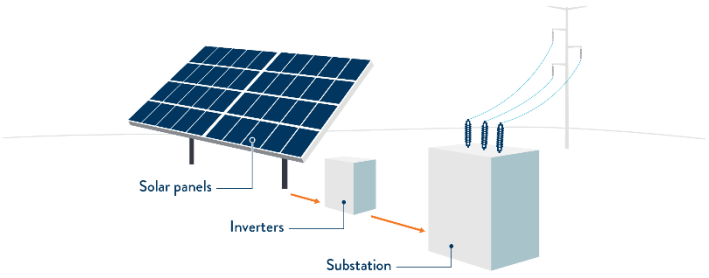
2.1 Solar Facility

2.1.1 How do solar facilities generate electricity?

The *photovoltaic effect* is the physical process through which a PV cell converts sunlight directly into electricity by capitalizing on nature's inherent desire to keep electrical charges in balance.

When direct and indirect solar radiation (direct and scattered sunlight) strikes a PV cell, some radiation is absorbed, which excites electrons within the cell. This results in a continuous flow of electrons from the front to the back of the panel through electrical connections, which results in a continuous flow of electricity.

Figure 2. Solar Facility Schematic



Solar panels (sometimes referred to as solar modules) are made up of PV cells that generate direct current (DC) electricity, which must be converted to alternating current (AC) electricity before reaching the electrical grid. Solar panels are arranged into electrically connected blocks and connected to inverters. An inverter converts DC electricity to AC electricity. Transformers then step up the electrical voltage before the electrical power is collected through an above- or below-ground collection system. Collection systems combine the electricity from across the array and deliver it to a project substation. **Figure 2** shows a simplified schematic of the major components of the solar generating facility.

2.1.2 Where is the Project located?

The Project is located in the city of Cohasset, in Deer Lake Township, and in the Leech Lake Band of Ojibwe Reservation in Itasca County, Minnesota (Figure 1).

As shown in **Figure 1**, the proposed solar facility will be partially located in the city of Cohasset, partially within Deer Lake Township, and partially within the Leech Lake Band of Ojibwe Reservation in Itasca County, Minnesota. The project location is approximately 3 miles southeast from the city of Zemple, 3.3 miles southeast of the city of Deer River, and 5 miles west of the city of Grand Rapids,

Minnesota.[14] **Table 2** summarizes the project location. Solar panels and associated infrastructure would be located on approximately 498.6 acres within an area of approximately 1,344.5 acres of land. Minnesota Power has obtained leases or has purchase options for each of the parcels within the site. The project's Gen-Tie Line will connect the project substation to the existing Boswell Energy Center Substation, which will be the project point of interconnection to the grid. Currently, the site is primarily used as cultivated agricultural farmland, with areas of wetlands and forested land, adjacent farmsteads, and township and county roads.[15]

Minnesota Power selected the proposed site location because of the availability of a point of interconnection, the presence of locations above a minimum threshold for solar irradiance, local landowner willingness to participate, proximity to the existing Boswell Energy Center, and its use as a developable area that is relatively flat with few sensitive resources.[16] Further, Minnesota Power screened the area for development constraints, habitat for endangered species, proximity to culturally sensitive areas, and other potential environmental risks.

Table 2: Project Location

Township	Range	Sections	Location	County
Solar Facility				
55N	27W	2	Leech Lake Band of Ojibwe Reservation	Itasca
55N	27W	1, 11, 12	Deer Lake Township	Itasca
55N	26W	6, 7, 18	City of Cohasset	Itasca
Gen-Tie Line				
55N	26W	7, 8, 9	City of Cohasset	Itasca

2.1.3 How is the solar facility designed?

The project will consist of photovoltaic (PV) panels, trackers, inverters, transformers, electrical cables, conduit, switchgear, supervisory control and data acquisition system (SCADA), metering equipment, security fencing, access roads, stormwater management areas, an operations and maintenance building, temporary laydown yards, a communication shelter, meteorological stations, and a new substation and 2.45-mile 230 kV gen-tie line to connect the project.[17]

[14] Joint Site and Route Permit Application (SPA), pp. 28-29.
[15] SPA, p. 37.
[16] SPA, pp. 8-9.
[17] SPA, pp. 11-12.

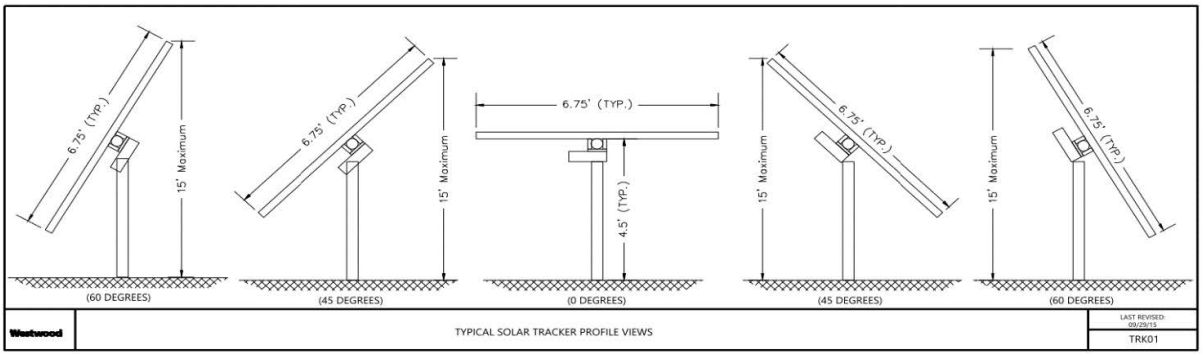
SOLAR ARRAYS

Minnesota Power anticipates using PV solar panels affixed to a single-axis tracking system, installed in linear arrays. The current design includes the use of Q. Tron XL-G2.3 610w, n-type, monocrystalline bifacial solar modules. The final PV panel selection may change prior to construction. The PV panels will be in linear arrays oriented north-south, with motors that will rotate the panels on a single point to track the sun.[18]

Figure 3 and **Figure 4** show examples of typical solar mounting and tracking systems. At a tilt angle range of ±50 degrees, the edge of the modules will be a maximum of 8 to 10 feet off the ground and a minimum of 33 inches off the ground or greater. The racking system will be supported by vertical steel piles that are typically driven into the ground at an embedment depth of 13 to 22 feet. Minnesota Power notes that the tracker system and associated posts are designed to withstand wind, snow, and seismic loads anticipated at the site.[19]

Figure 3. Typical Solar Array

Figure 4. Typical Solar Tracking Profile

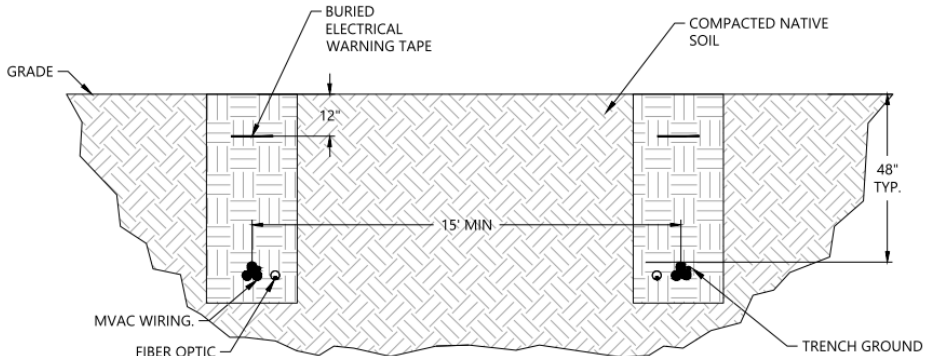


[18] SPA, p. 13.
[19] Id.

ELECTRICAL COLLECTION SYSTEM

The solar panels will deliver power to project inverters through a combination of both aboveground and underground collector lines. Buried collector lines will be installed via trenching, plowing, and/or bore methods.[20] (**Figure 5**).

Figure 5: Underground Cabling



Following installation, Minnesota Power indicates that suitable native soil will be placed around the cable and compacted.[21] Minnesota Power indicates that the project is anticipated to have approximately 9.4 miles of buried collector lines.[22]

Figure 6. Inverter

The project is anticipated to require approximately 27 inverters (**Figure 6**). Each inverter will be mounted on a steel skid and set on a steel pile or concrete pad foundation. The inverter skid has approximate dimensions of 3.6 feet long by 3.6 feet wide by 6.2 feet tall. Inside the inverter skid are the AC-DC inverters, a medium-voltage transformer where the electrical current is stepped up to a voltage of 34.5 kV, and a cabinet that houses power control electronics. The purpose of the inverter is to convert the DC output of the PV panels to AC output, required for delivery to the electrical grid. After the electricity is converted, it is stepped up from low voltage to medium voltage (34.5 kV) via a transformer.[23]

FENCING

Minnesota Power indicates security fencing will be installed along the perimeter of the Anticipated Development Area in compliance with National Electric Safety Code (NESC) requirements. The perimeter fencing design around the project is expected to extend to a height of approximately seven

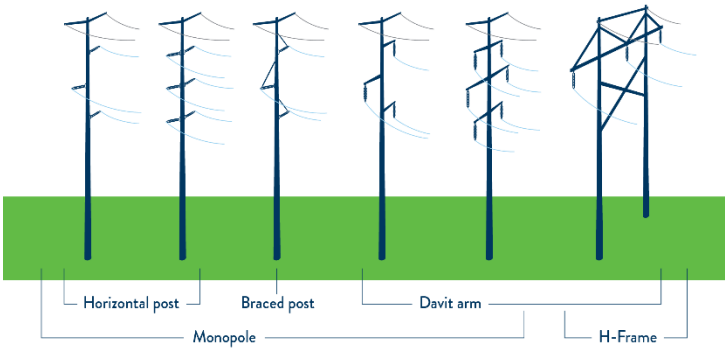
[20] SPA, p. 14.
[21] Id.
[22] SPA, pp. 12-14.
[23] Id.

feet tall, with three to six inches of Stay-Tuff Deer Fence Wire 1775-6 Class 3 or an approval similar wire, and a single barbed wire 9 inches above the fence fabric. Substation fencing will be a seven-foot-tall chain-link security fence with a one-foot-tall strand of barbed wire on top, complying with NESC.[24]

Gen-Tie Line

The project 2.45-mile 230 kilovolt (kV) Gen-Tie Line will connect the project substation to the existing Boswell Energy Center Substation. The Gen-Tie Line will consist of a combination of steel monopole structures, and wood H-Frames.[25] **Figure 7** shows the common type of transmission structures, including monopoles and H-Frames.

Figure 7. Transmission Structures



Minnesota Power indicates that the Gen-Tie Line design will meet all relevant local and state codes, and other recognized standards, including the Rural Utility Service Bulletin 1724E-200, Design Manual for High Voltage Transmission Lines, the National Electric Safety Code (NESC) C2-2023 the American Society of Civil Engineers (ASCE), the American Concrete Institute and the American Institute of Steel Construction Steel Construction Manual, the North American Electric Reliability Corporation standards, and the Avian Power Line Interaction Committee (APLIC) recommendations for avian protection.[26]

Minnesota Power indicates that the Gen-Tie Line will meet appropriate standards and safety procedures for construction and installation. Minnesota Power will construct, own, and operate the Gen-Tie Line within a 130-foot right-of-way (ROW), with 65 feet on either side of the centerline of the route. Conductors and all structure components for the line will remain within the Gen-Tie Line's ROW.

Stormwater Management

Minnesota Power will design the project to consider and incorporate existing offsite drainage patterns while maintaining or reducing the discharge flow rate and erosion from existing conditions. Through the establishment of native vegetation, and the usage of permanent stormwater detention or retention basins, discharge flows and erosion on the site will be minimized., The project design will consider and incorporate the existing and proposed watershed conditions of the site, minimizing changes to water movement during operations. The anticipated locations of the permanent stormwater detention or retention basins are shown in the project detail maps (**Figure 17**) (**Appendix B**). Project design is preliminary, and subject to change.[27]

[24] SPA, p. 19.
[25] SPA, pp. 16-19.
[26] SPA, p. 18.
[27] SPA, p. 20.

Minnesota Power will prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the Minnesota Pollution Control Agency (MPCA) standards and guidance specific to solar projects. The SWPPP includes erosion and sediment control best management practices (BMPs), including construction track out controls, silt fence, permanent seeding, and vegetated buffers. Minnesota Power notes that this will minimize the potential for downstream water quality impacts throughout the duration of construction and operation of the project.[28]

Laydown Areas and Communication Shelter

Temporary, graveled laydown areas will be used during construction for storage of construction materials and supplies, equipment, temporary parking for project-related vehicles, and deliveries. (Insert reference to project map). After construction is complete, Minnesota Power will restore the area according to the project Vegetation Management Plan (VMP) and the SWPPP.[29]

Lighting

Minnesota Power indicates that operational lighting will be necessary along perimeter fencing and at entrances or exits for safety and security. However, Minnesota Power will utilize lighting that is motion activated, down lit, and facing away from neighboring properties.[30]

Project Substation

The project substation will convert the power from the solar facility to be carried by the project Gen-Tie Line, which will then connect the project to the transmission grid at the existing Boswell Energy Center Substation. The project substation will be located in the center of the site near Warburg Lake (**Figure 1**) and surrounded by an eight-foot-tall chain-link security fence with three strands of barbed wire. The voltage from the solar facility inverters will be stepped up from 34.5 kV to 230 kV at the substation and then transmitted to the existing Boswell Energy Center Substation. Minnesota Power indicates that the project substation will be designed in accordance with Institute of Electrical and Electronics Engineers (IEEE) 605, C37, and C57.[31]

Project substation components will consist of supporting structures for high voltage electrical structures, breakers, transformers, lighting protection, and control equipment according to the specifications of Minnesota Power's Interconnection Agreement with the Midcontinent Independent System Operator (MISO).[32]

Meteorological Stations

During operation of the project, permanent meteorological stations will be installed at the site to measure critical weather data including wind speed and direction, ambient temperature, and solar

[28] Id.
[29] SPA, p. 20.
[30] SPA, p. 39.
[31] SPA, pp. 15-16.
[32] Id.

irradiance. The meteorological towers will be set on a small concrete foundation, with an approximate height of 10 feet tall.[33]

ACCESS ROADS

For access to the solar facility, Minnesota Power will construct approximately 9.6 miles of aggregate base access roads within the Anticipated Development Area. Minnesota Power indicates that these roads are typically 20 feet wide or less. Minnesota Power also notes that during construction, access road installation and use could result in temporary soil disturbance with a maximum width of 50 feet. After construction, Minnesota Power will restore temporarily disturbed areas, including the removal of excess road material and rocks greater than 12 inches, and topsoil will be used to return the surface to the approximate pre-construction contours, unless otherwise requested by landowners.[34]

The anticipated access points for the project include the northwest portion of the project from 670th Avenue and Trunk Highway (TH) 6 (State Highway 6), the center portion of the project from Minnesota Power Road, and the southcentral portion of the project from TH 6. All proposed entrances will have locked gates.[35]

Access from Minnesota Department of Transportation (MnDOT) right-of-way whether at an existing driveway or new driveway is not guaranteed, and new highway access permits will be required in either case. In their scoping comments, MnDOT stated that through discussions with the Applicant, MnDOT has proposed two location changes to the current access road layout. These locations address MnDOT concerns with proximity to the Trunk Highway 6 curve in the southern portion of the project area. MnDOT will continue its coordination to identify safe and permittable project access locations along TH 6.[36]

Minnesota Power states that it will work with Itasca County and the city of Cohasset to facilitate any necessary upgrades or changes to public roads to meet required standards, and with landowners for final design considerations. Upgrades or changes to roads could include, but are not limited to, road improvements, additional aggregate, and driveway changes.[37]

2.1.4 How would the solar facility be constructed?

Minnesota Power anticipates that construction of the solar facility will begin in 2026, going through 2027, with an expected in-service date of Q3 2027. This section summarizes construction activities.

[33] SPA, p. 21.
[34] Id.
[35] Id.
[36] MnDOT, Scoping Comments. April 28, 2025. eDockets no. 20255-218589-01.
[37] Id.

CONSTRUCTION

Minnesota Power anticipates that construction will begin in Q1 2026, to meet an in-service goal of Q3 2027.[38] The actual construction schedule will be dependent upon permitting and the availability of required materials.

Pre-construction and construction activities will consist of the following:

1. Pre-mobilization activities (approximately 18 months)
    a. Complete final design of the project
    b. Procure equipment/Project components
    c. Locate and mark existing utilities
    d. Delineate the limits of construction disturbance areas by surveying, flagging, and staking.
2. Mobilization activities (approximately 3 months)
    a. Install stabilized construction entrances and sediment control BMPs
    b. Install any necessary temporary security fencing
    c. Grade and gravel the temporary laydown areas for office trailers, storage of construction materials and shipped equipment containers, receiving construction deliveries, and temporary parking for project-related vehicles
    d. Mobilize office trailers and construction equipment
    e. Receive material deliveries
    f. Survey and mark the locations of access roads, solar arrays, collection system, Gen-Tie alignment
3. Construction activities (approximately 18 months)
    a. Remove vegetation, including tree removal, within the solar arrays and substation
    b. Strip and stockpile topsoil within the solar arrays and substation
    c. Construct access roads
    d. Site grading
    e. Install fencing, inverters, and transformer pads
    f. Pile driving and installation
    g. Install tracker and solar modules
    h. Install inverters
    i. Install collection system
    j. Install the communications shelter
    k. Install Gen-Tie Line (right of way preparation, foundation installation, tower installation, attach cross-arm or davit arms and insulators, and conductor stringing onto the structures)
    l. Substation construction will occur simultaneously with the solar arrays

Typical construction equipment will be used for the project such as scrapers, bulldozers, dump trucks, motor graders, vibratory compactors, pile drivers, watering trucks, and backhoes. Additional specialty equipment could include a skid steer loader, concrete truck and boom truck, a high reach bucket truck,

[38] SPA, p. 3.

a medium duty crane, an all-terrain forklift, side-by-sides, gas or diesel remote generators for power, and telehandler for equipment offload and load, diesel. Upon completion of construction, heavy equipment will be removed from the project site.[39]

Minnesota Power indicates that it will work with Itasca County and the local government to develop a traffic control plan prior to construction to minimize the impact of vehicular traffic on the local area.

COMMISSIONING AND INSPECTIONS

Minnesota Power indicates that it will construct and operate the project consistent with applicable state and federal safety regulators, and that the solar array and ancillary electrical equipment will be inspected during commissioning. Prior to being brough online, the interconnecting utility will inspect the equipment for grid system safety. Once the array has been installed, qualified personnel will routinely inspect, operate, and repair them as necessary pursuant to preventive maintenance schedules.[40]

RESTORATION

Restoration of temporary laydown yards and other temporary disturbance will occur as portions of the project near completion. This will include final grading, decompaction of soils, and seeding according to the project's VMP and the SWPPP. Minnesota Power anticipates that the post-construction restoration activities will take approximately four to six months.[41]

Minnesota Power's project VMP[42] outlines several vegetation maintenance strategies that may be implemented for the project, as well as additional information on site preparation, seed mixes, management of invasive species and noxious weeds, and ongoing management and monitoring after construction.[43]

2.1.5 How would the solar facility be operated and maintained?

Minnesota Power estimates the service life of the project to be 30 years. This section summarizes operations and maintenance activities.

OPERATION AND MAINTENANCE

Minnesota Power indicates the project will be maintained and operated locally, anticipating the need for two to three solar technicians. Communication of data from the PV Control and SCADA equipment will occur to the remote Regional Operations and Control Center (ROCC) 24 hours a day, seven days a week. An operation and maintenance (O&M) Engineering team and a Technical Services Team will be available to support the field technicians as needed.[44]

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[39] SPA, p. 24.
[40] Id.
[41] Id.
[42] SPA - Appendix F: Vegetation Management Plan (VMP). eDockets no. 202412-213417-09.
[43] SPA, p. 24.
[44] SPA, p. 25.

Minnesota Power uses a maintenance management system to generate preventative, predictive, and corrective tasks, striving to avoid unplanned forced or maintenance outages. In the case a piece of equipment fails and results in an unscheduled outage, Minnesota Power will consider implementation of new or modified preventative measures to avoid similar failures in the future or make the necessary repairs in a timely manner, returning the equipment back to service as soon as possible.[45]

Substation Control House and Supervisory Control and Data Acquisition System

The project Supervisory Control and Data Acquisition System (SCADA) will communicate with the PV inverters in a communication shelter adjacent to the project substation. A PV Power Plant Controller will coordinate the interactions of the PV field to not exceed the interconnection limit of 85 MW. The Site SCADA historian will aggregate and relay information to the utility remote terminal in order to meet the requirements of the Generator Interconnection Agreement.[46]

EQUIPMENT INSPECTION

Inspection of the main equipment will occur at regular intervals, as outlined below and in the joint site and route permit application.[47] **Table 3** describes the regular operations and maintenance tasks that are anticipated to occur for the project.

[45] Id.
[46] SPA, p. 16.
[47] SPA. pp. 25-26.

Table 3. Regular Operations and Maintenance Tasks

Equipment	Task	Frequency
PV modules	Visual inspection of the modules, thermal drone scan to detect hot spots, open module cells and strings	Annual
Inverters	Visual inspection	Every three months
	Operation and Torque Check AC/DC connection, Skid Transformer Oil Sample	Annual
	Detailed Inspection – includes IR scan, torque check & voltage check	Every five years
	Preventative maintenance check	Twice per year
Trackers	Remote-connection inspection to check for fault conditions	Daily
	Visual inspection of fasteners, bolt torque marks, damper assemblies, center structures, drivelines, and overall corrosion	Twice per year
	Visual inspection of driveline and bearing alignment, column settling, bearing wear, and motor controller conduit and seals	Annual
	Visual inspection of driveline and bearing alignment, column settling, bearing wear, and motor controller conduit and seals	Every two years
DC Cabling and Disconnect System	Visual inspection of cabinet seal, cabinet grounds, overall condition, cable hangers and cable. Thermal image inspection of connections. Verify torques.	Annual
Supervisory Control and Data Acquisition (SCADA)	Verify readings and data points	Annual
	Visually inspect sensors and cabling for damage	Annual
	Replace battery of components with internal lithium battery	Every three years

2.1.6 What happens at the end of the solar facility's useful life?

REPOWERING AND FUTURE EXPANSION

As the project progresses through its service life, the applicant may seek to repower the project. The applicant's decision on whether to pursue repowering will consider the equipment performance, maintenance costs, extending the useful life of the project, or a desire to increase generation output. Any site permit issued by the Commission will specify the maximum generating capacity, so if the generation capacity increases, the existing site permit must be amended, or a new site permit may be sought if required. Minnesota Power indicates that any repowering of the project will abide by all applicable local, state, and federal regulations.

DECOMMISSIONING

If the project is not repowered, Minnesota Power will decommission the project and remove the project facilities. Commission-issued site permits require that the permittee be responsible for removing all project components and restoring the site to pre-construction conditions at the end of a project's useful life and that the permittee is responsible for all costs associated with decommissioning the project. Minnesota Power provided a draft decommissioning plan as Appendix G of its joint site and route permit application.[48] The Commission requires updates of the decommissioning plan at five-year intervals and at project milestones such as repowering or changes in ownership.

Decommissioning would include the removal of the solar arrays (panels, racking, and foundation posts), inverters, fencing, access roads, cables and lines, and lighting. Standard decommissioning practices will be used, including dismantling and repurposing, salvaging, recycling, or disposing of the solar energy improvements, and restoration.[49]

Minnesota Power estimates that decommissioning will take place approximately 12 months after closure of the project and indicates that all equipment and materials will be recycled or disposed of appropriately.[50]

Minnesota Power anticipates that the total estimated net cost to decommission the project is approximately $14,056,000 (approx. $165,364 per MW). Estimated salvage/scrap value is approximately $6,947,000, reducing net decommissioning costs to approximately $7,109,000. Minnesota Power will provide financial assurance through asset depreciation. The financial assurance will begin on the tenth anniversary of the commercial operation date, unless there is closure or decommissioning of the project prior to that time and, secured by Minnesota Power. The amount of the financial assurance will be adjusted accordingly to offset any increases or decreases in decommissioning costs and salvage values determined during each plan reassessment. Minnesota Power proposes to post financial assurance in the following format: 25 percent of the net decommissioning estimate posted in year 10, 25 percent of the net decommissioning estimate posted

[48] SPA – Appendix G: Decommissioning Plan. eDockets no. 202412-213417-10.
[49] SPA, pp. 26-27.
[50] SPA – Appendix G: Decommissioning Plan. eDockets no. 202412-213417-10.

in year 15, 25 percent of the net decommissioning estimate posted in year 20, and 25 percent of the net decommissioning estimate posted in year 25.[51]

2.2 Project Costs

Minnesota Power estimates the total cost to construct the project to be approximately $163.5 million (**Table 4**).[52] Project cost components include development expenses, engineering, procurement and construction, and interconnection. Minnesota Power notes that the cost breakdown is an estimate; negotiations are ongoing as to the pricing and other terms for some of the services and materials included in the estimate.[53] Actual costs will depend on final material and labor costs, and salvage value from decommissioning.

Table 4. Estimated Project Cost Ranges[54]

Project Component	Estimated Cost ($USD millions)
Development expenses	2.7
Engineering, procurement, construction	140.8
Interconnection	20.0
Total Project Cost	**163.5**

2.3 Project Schedule

Minnesota Power anticipates the project will be in service by 2027.[55] **Table 5** shows the estimated project development and construction milestones.

Table 5. Anticipated Project Schedule[56]

Activity	Anticipated Timeframe
File Commission Site Permit Application	Completed
Application for Surplus Interconnection Service with MISO	Q2 2025
Construct Solar Array	Q1 2026 - Q2 2027
Conduct Commissioning/Start-up	Q2 2027
Begin Commercial Operation	Q3 2027

[51] Id; SPA - Appendix G: Decommissioning Plan.
[52] Appendix D – Response to Data Requests.
[53] Id.
[54] Id.
[55] SPA, p. 3.
[56] SPA, p. 3.

3 Regulatory Framework

Chapter 3 discusses the permit approvals required from the Commission. It describes the environmental review process and lists the factors the Commission considers when making its decisions. This chapter also discusses required approvals from federal and state agencies and local units of government with permitting authority for actions related to the project. Lastly, it lists topics outside the scope of this EA.

3.1 What Commission approvals are required?

The project requires a site permit and a route permit from the Commission before it can be constructed.

The project requires a site permit from the Commission because it meets the definition of a *large electric power generating plant*, which means any electric power generating equipment designed for or capable of operation at a capacity of 50 MW or more (Minn. Stat. 216E.01, subd. 5). The project is exempt from the certificate of need requirement per Minn. Stat. 216B.243, subd. 9. This exemption applies to any solar energy generation facility that is intended to meet the obligations of Minn. Stat. 216B.1691.

The project Gen-Tie line requires a route permit from the Commission because it meets the definition of a *high voltage transmission line (HVTL).* In accordance with Minn. Stat. 216E.03, subd 2, a route permit is required to construct a high voltage transmission line (100 kV or more and greater than 1,500 feet in length).

3.2 What is environmental review?

Environmental review informs interested persons about potential impacts and possible mitigation measures associated with the project; environmental review informs Commission decisions.

Minnesota law requires that potential human and environmental impacts be analyzed before the Commission decides whether to grant permits for the project. This analysis is called environmental review.

Minnesota law provides the Commission with two processes to review permit applications. The alternative process, which applies to solar generating facilities and relatively smaller transmission lines, such as the project, requires that an EA be prepared and that a public hearing be held.[57]

[57] Minnesota Statutes 216E.04, subd. 1 and 5; Minn. R. 7850.3700, subp. 1. Applicants are free to elect the alternative process if their project qualifies for it. Published in 2024.

3.3 What permitting steps have occurred to date?

The Commission accepted the joint site and route permit application as complete on February 18, 2025. Public information and scoping meetings were held online on April 3, 2025, and in person in Cohasset, Minnesota on April 21, 2025.

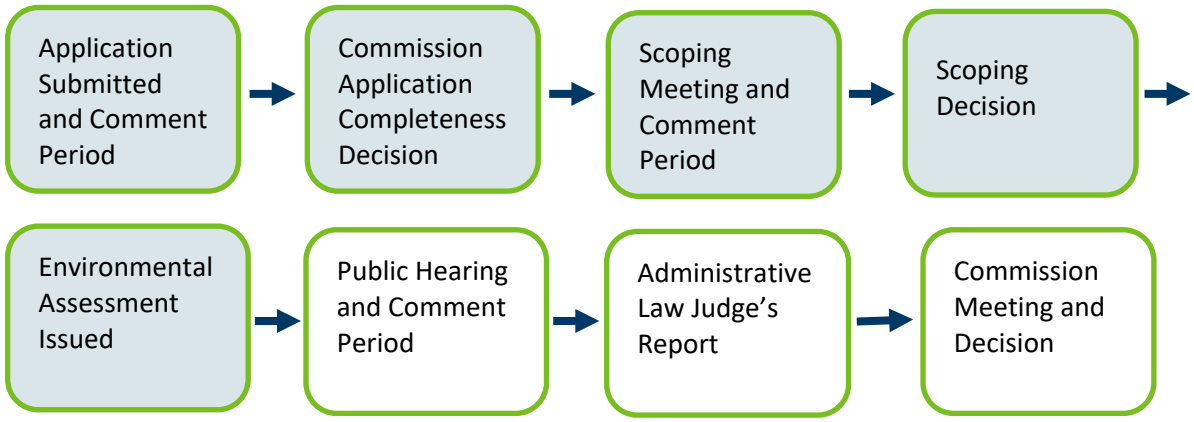
Application Filing and Acceptance

Minnesota Power provided the required written notice of its intent to file a permit application under the alternative process on December 18, 2024.[58]

Minnesota Power filed a joint application for a site and route permit on December 30, 2024.[59] The Commission accepted the application as substantially complete in its order dated February 18, 2025.[60] The order also referred the matter to the Office of Administrative Hearings for appointment of an administrative law judge (ALJ) to conduct a public hearing for the project. Commission staff provided a *Sample Site Permit for a Solar Energy Generating System* on February 25, 2025.[61]

Figure 8. outlines the permitting process as it has unfolded for this project.

Figure 8. Permitting Process Summary[62]



[58] Minnesota Power, Notice of Intent to Submit a Joint Site and Route Permit Application under the Alternative Permitting Process Docket No. E015/GS-24-425 and 24-426, December 18, 2024, eDocket ID:202412-213178-01.

[59] Minnesota Power, Joint Application to the Minnesota Public Utilities Commission for a Site Permit for a Large Electric Generating Facility and a Route Permit for a HVTL, December 30, 2024, eDocket ID: 202412-213417-01 (through-02), 202412-213417-03 (appendices and attachments through -18).

[60] Commission, *Order*, February 18, 2025, eDocket ID: 20252-215451-01.

[61] Commission Staff, Sample Solar Site Permit, February 25, 2025, eDockets No. 20252-215752-01.

[62] Read from left to right; shaded steps are complete.

Scoping Process

Scoping is the first step in the environmental review process. It helps focus the EA on the most relevant information needed by the Commission to make informed decisions.

Scoping includes a public meeting and comment period that provides opportunities for interested persons to help develop the scope (or contents) of the EA.[63] The purpose of the public information and scoping meetings is to provide information and answer questions about a proposed project and the permitting process. The meeting and associated comment period also provide an opportunity to gather input regarding potential impacts and mitigative measures that should be studied in the EA.

On March 19, 2025, the Commission issued a joint *Notice of Public Information and Environmental Assessment Scoping Meeting* and associated public comment period.[64] The notice was sent to those individuals on the project contact list and was also available on the webpage for the project. In addition, a rescheduled notice was issued on April 9, 2025, due to a snowstorm cancelling the first scheduled Scoping meeting.[65]

Staff held public information and scoping meetings in Cohasset, Minnesota on April 21, 2025, and an online meeting on April 3, 2025. The comment period closed on May 5, 2025. Approximately 25 people attended the Cohasset meeting, and several attendees provided public comments. There were no public comments at the online meeting.[66] Written comments were received from two members of the general public, in addition to the Fond du Lac Band of Lake Superior Chippewa, the Minnesota Department of Natural Resources (DNR), and the Minnesota Department of Transportation (MnDOT).[67]

Public comments addressed a number of potential impacts and concerns related to the project. Several attendees providing comments in support for the project and Minnesota Power's dedication to using local union labor. Other comments and questions were related to tree removal, wildlife habitat, aesthetic impacts, potential damage to solar panels from weather, project fencing, and property value impacts.

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[63] Minn. R. 7850.3700, subp. 2.

[64] Commission and Commerce *Notice of Public Information and Environmental Review Scoping Meeting*, March 19, 20245, eDocket ID: 20253-216565-01.

[65] Commission and Commerce *Notice of Rescheduled Public Information and Environmental Review Scoping Meeting*, April 9, 20245, eDocket ID: 20254-217396-01.

[66] Oral Comments on the Scope of Environmental Assessment, Public Scoping and Information Meetings, Cohasset, Minnesota, April 21, 2025 and virtual meeting, April 3, 2025, eDocket ID: 20255-218719-01.

[67] Written Comments on the Scope of Environmental Assessment, May 8, 2025, eDocket ID: 20255-218719-02.

SCOPING DECISION

The scoping decision identifies the issues studied in this EA.

After considering public comments and recommendations by staff, a scoping decision was issued on May 30, 2025 (**Appendix A**). The scoping decision identifies the issues to be evaluated in this EA.

3.4 Are other permits or approvals required?

Yes, other permits and approvals are required for the project.

A site permit and a route permit from the Commission are the only state permits required for the project. However, various federal, state, and local approvals might be required for activities related to construction and operation of the project. These subsequent permits are referred to as "downstream" permits and must be obtained by the permittee prior to construction.[68] **Table 6** lists potential downstream permits that might be required, several of which are discussed below.

Table 6. Potential Downstream Permits

Unit of Government	Type of Application	Purpose	Anticipated for Project
Federal			
U.S. Army Corps of Engineers	Section 404 Clean Water Act – Dredge and Fill	Protects water quality by controlling discharges of dredged and fill material	Possible
U.S. Environmental Protection Agency	Spill Prevention, Control and Countermeasures Plan	Protect facilities with oil storage of more than 1,320 gallons	Possible
	Section 401 Water Quality Certification (WQC)	Required when obtaining Section 404 Individual or Nationwide Permits for wetland impacts within the exterior bounds of the Leech Lake Band of Ojibwe reservation	Likely not necessary
	Construction Stormwater Permit	Required for portions of the project within the exterior bounds of the Leech Lake Band of Ojibwe Reservation	MP will submit a notice of intent for coverage under the General Permit prior to construction
Federal Aviation Administration (FAA)	Determination of No Hazard to Air Navigation (Form 7460-1 Notice of Proposed Construction or Alteration)	Required of project features are above 200 feet tall or located within the 100:1 notification surface area.	Likely not necessary, but MP will confirm closer to construction

[68] DSP (Appendix C), Section 4.5.2 (stating the permittee "shall obtain all required permits for the project and comply with the conditions of those permits").

Unit of Government	Type of Application	Purpose	Anticipated for Project
U.S. Fish and Wildlife Service	Threatened and Endangered Species Consultation	Consultation to mitigate impacts to federally listed species	Possible
	Section 10 Endangered Species Incidental Take Permit	Potential impacts on federally endangered or threatened species	Possible
State			
Minnesota Department of Natural Resources	Utility License to Cross Public Lands and Waters	Prevent impacts associated with crossing public lands and waters	Possible
	Water Appropriation Permit	Balances competing management objectives; may be required for construction dewatering of more than 10,000 gallons of water per day or 1 million gallons per year	Possible
	Public Water Work Permit	Regulates placement of structures and work in public waters.	No
	Consultation and review of state threatened and endangered species and/or take permit	Potential impacts to state protected species	Possible, in-progress[69]
Minnesota Pollution Control Agency	Construction Stormwater Permit	Minimizes temporary and permanent impacts from stormwater	Yes
	Section 401 Clean Water Act – Water Quality Certification	Ensures project will comply with state water quality standards	Possible
	Storage Tank Registration	Required for back-up generator aboveground storage tanks exceeding 500 gallons and underground storage tanks exceeding 110 gallons	Possible
	State Air Registration Permit	Required for backup generators if they do not qualify for an exemption	Possible
State Historic Preservation Office	National Historic Preservation Act Section 106 Consultation	Ensures adequate consideration of impacts to significant cultural resources	Yes

[69] SPA, Section 4.5.8.

Unit of Government	Type of Application	Purpose	Anticipated for Project
Department of Agriculture	Agricultural Impact Mitigation Plan	Establishes measures for protection of agricultural resources	Yes, developed in consultation with MDA[70]
Department of Labor and Industry	Electrical Inspection	Necessary to comply with electric code.	Yes
Department of Transportation	Utility Accommodation on Trunk Highway ROW Permit	Controls utilities being placed along or across highway rights-of-way (ROW)	Possible
	Oversize/Overweight Permit	Controls use of roads for oversize or overweight vehicles	Possible
Minnesota Department of Health	Well Construction Permit	Installation of a water supply well	Possible
Local			
Itasca County	Driveway/Approach Permit	Required for construction of a new approach or driveway	Possible
	Oversize/Overweight Permit	Required for loads on county roads when the load exceeds size and weight requirements	Possible
City of Cohasset	ROW/Excavation/Utility Permit	Required for work occurring with ROW	Possible
Itasca County Soil and Water Conservation District (SWCD)	Minnesota Wetland Conservation Act Approval	Activities affecting water resources	Possible

3.4.1 Federal

The U.S. Army Corps of Engineers (USACE) "regulates the discharge of dredged or fill material into waters of the United States, including wetlands."[71] Dredged or fill material, including material that moves from construction sites into these waters, could impact water quality. A permit is required from USACE if the potential for significant adverse impacts exists. The USACE is also charged with coordinating with Native American Tribes regarding potential impacts to traditional cultural properties.

[70] SPA, Appendix D - AIMP. eDockets no. 202412-213417-07.
[71] U.S. Environmental Protection Agency (February 26, 2025) *Section 404 Permit Program*, retrieved from: http://www.epa.gov/cwa-404/section-404-permit-program.

The U.S. Environmental Protection Agency (USEPA) enforces the Spill Prevention, Control and Countermeasures Plan (SPCCP). "The purpose of the Spill Prevention, Control, and Countermeasure (SPCC) rule is to help facilities prevent a discharge of oil into navigable waters or adjoining shorelines. The SPCC rule requires facilities to develop, maintain, and implement an oil spill prevention plan, called an SPCC Plan." If a plan is required for this project, it would prevent oil spill, as well as control a spill should one occur. This plan may be required for the storage of fuel for construction. The USEPA also coordinates with Native American Tribes regarding obtaining Section 404 permits or construction stormwater permits for wetland or stormwater impacts within the bounds of a Tribal reservation.

A permit is required from the U.S. Fish and Wildlife Service (USFWS) for the incidental taking[72] of any threatened or endangered species. As a result, USFWS encourages project proposers to consult with the agency to determine if a project has the potential to impact federally listed threatened or endangered species. Additionally, consultation can lead to the identification of measures to mitigate potential impacts associated with the project.

The United States Federal Aviation Administration (FAA) Requires notification if project features are above 200 feet tall or located within a 100:1 notification surface area. Although the project is not within a notification surface area, Minnesota Power will confirm the height of project equipment to determine if a notification is required closer to construction.[73]

3.4.2 State

Potential impacts to state lands and waters, as well as fish and wildlife resources, are regulated by the DNR. Licenses are required to cross state lands or waters.[74] Projects affecting the course, current, or cross-section of lakes, wetlands, and streams that are public waters may require a *Public Waters Work Permit*.[75] Not unlike the USFWS, DNR encourages project proposers to consult with the agency to determine if a project has the potential to impact state-listed threatened or endangered species. Additionally, consultation can lead to the identification of measures to mitigate potential impacts associated with the project. If project construction requires dewatering greater than or equal to 10,000 gallons per day or 1 million gallons per year, a dewatering permit is also required by the DNR.

Construction projects that disturb one or more acres of land require a general *National Pollutant Discharge Elimination System / State Disposal System Construction Stormwater Permit* ("CSW Permit") from the MPCA. This permit is issued to "construction site owners and their operators to prevent stormwater pollution during and after construction."[76] The CSW Permit requires use of best management practices; the development of a Stormwater Pollution Prevention Plan; and adequate stormwater treatment capacity once the project is complete. Projects must be designed so that

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[72] 16 U.S. § 1532(19) (defining "take" to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct).

[73] SPA, p. 5. Table 2-1.

[74] Minnesota Statutes 84.415.

[75] DNR (n.d.) *Requirements for Projects Involving Public Waters Work Permits*, http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/requirements.html.

[76] MPCA. *Construction Stormwater*. (2025). https://www.pca.state.mn.us/business-with-us/construction-stormwater

stormwater discharged after construction does not violate state water quality standards. Specifically, projects with net increases of one acre or more to impervious surface must be designed to treat water volumes of one inch times the net increase in impervious surface. PV panels are impervious and are counted towards total impervious surface along with access roads, buildings, etc. The area beneath the panel, however, is pervious if properly vegetated. To account for this, MPCA developed a solar panel calculator that estimates the amount of stormwater retained by PV solar facilities. This amount can be applied as a credit towards the total amount of stormwater treatment needed for a project.[77]

A Clean Water Act Section 401 *Water Quality Certification* from MPCA might also be required. "Section 401 of the Clean Water Act requires any applicant for a federal license or permit to conduct an activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the discharge originates that the discharge complies the applicable water quality standards."[78] The certification becomes a condition of the federal permit.

Additionally, MPCA requires storage tanks to be registered with the agency if aboveground storage exceeds 500 gallons and underground storage exceeds 110 gallons. This may be required for the project backup generators, if they do not qualify for an exemption.[79]

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

The Minnesota Department of Agriculture (MDA) ensures the integrity of Minnesota's food supply while protecting the health of its environment and the resources required for food production. MDA assists in the development of agricultural impact mitigation plans that outline necessary steps to avoid and mitigate impacts to agricultural lands.

The Minnesota Department of Labor and Industry requires an electrical inspection as a component of an electrical permit.[80]

A permit from MnDOT is required for construction, placement, or maintenance of utility lines adjacent or across trunk highway rights-of-way.[81] Coordination would be required to construct access roads or driveways from trunk highways.[82] A permit is also required for oversized/overweight vehicles

[77] MPCA. *Minnesota Stormwater Manual*. (2025). https://www.pca.state.mn.us/water/minnesotas-stormwater-manual.
[78] MPCA. (n.d.) *Clean Water Act Section 401 Water Quality Certifications*, https://www.pca.state.mn.us/water/clean-water-act-section-401-water-quality-certifications.
[79] MPCA. (n.d.) *Storage tanks*. https://www.pca.state.mn.us/business-with-us/storage-tanks.
[80] MNDLI (n.d.) *Electrical Permits, Contractors*, https://www.dli.mn.gov/business/electrical-contractors/electrical-permits-contractors.
[81] Minnesota. Rules, Part. 8810.3300, subp. 1.
[82] MnDOT *Land Management*. (2025). https://www.dot.state.mn.us/utility/forms.html:.

exceeding MnDOT limits. These permits are required to ensure that use of the right-of-way does not interfere with free and safe flow of traffic, among other reasons.[83]

The Minnesota Department of Health (MDH) requires permits for the installation of a water supply well. In the case Minnesota Power will install a well, a permit will be obtained prior to construction.[84]

3.4.3 Local

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

- Access/Driveway: Coordination may be required to construct access roads or driveways from county or township roads.
- Overwidth Load: Coordination may be required to move over-width or heavy loads on county or township roads.
- Road Crossing and Right-of-Way: Coordination may be required to cross or occupy county or township road rights-of-way.

Itasca County local permits may be required as a component of this project, including:

- Driveway/Approach Permit: Required for constructing a new approach or driveway.
- Oversized/Overweight Permit: Regulates the use of overweight/oversized vehicles on county roads

The Itasca County Soil and Water Conservation District (SWCA) also regulates Wetland Conservation Act (WCA) Approval for the local area. If impacts are necessary for access, Minnesota Power will submit a joint permit application for WCA approval.

The City of Cohasset requires a ROW/Excavation/Utility Permit for work accruing with ROW.

3.5 Do electrical codes apply?

Yes, if constructed the project must meet electrical safety code requirements.

The project must meet requirements of the National Electrical Safety Code.[85] These standards are designed to safeguard human health "from hazards arising from the installation, operation, or maintenance of conductors and equipment in electric supply stations and overhead and underground

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[83] MnDOT. *Utility Accommodation on Trunk Highway Right of Way: Policy OP002.* (2025). http://www.dot.state.mn.us/policy/operations/op002.html.

[84] MDH. (n.d.). *Water Use Permits.* https://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html

[85] *See* Minnesota. Statute. 326B.35; Minn. R. 7826.0300, subp. 1 (requiring utilities to comply with the most recent edition of the National Electric Safety Code when constructing new facilities or reinvesting capital in existing facilities)

electric supply lines."[86] They also ensure that facilities and all associated structures are built from materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided operational maintenance is performed.

3.6 Are any issues outside the scope of this EA?

Yes, the scoping decision identified several issues that will not be studied.

The EA will not address following topics:

- Any site other than the project site proposed by the applicant.
- The manner in which landowners are compensated for the project.

[86] IEEE Standards Association (2023) – *National Electrical Safety Code*, retrieved from: https://standards.ieee.org/products-programs/nesc/products/.

4 Project Impacts and Mitigation

Chapter 4 describes the environmental setting, affected resources, and potential impacts from the project. It also discusses mitigation of potential impacts.

4.1 How are potential impacts measured?

Potential impacts are measured on a qualitative scale based on an expected impact intensity level; the impact intensity level takes mitigation into account.

A potential impact is the anticipated change to an existing condition caused either directly or indirectly by the construction and operation of a proposed project. Potential impacts can be positive or negative, short- or long-term, and, in certain circumstances, can accumulate incrementally. Impacts vary in duration and size, by resource, and across locations.

Direct impacts are caused by the proposed action and occur at the same time and place. An indirect impact is caused by the proposed action but is further removed in distance or occurs later in time. This EA considers direct and indirect impacts that are reasonably foreseeable, which means a reasonable person would anticipate or predict the impact. Cumulative potential effects are the result of the incremental impacts of the proposed action in addition to other projects in the environmentally relevant area.

4.1.1 Potential Impacts and Mitigation

The following terms and concepts are used to describe and analyze potential impacts:

- Duration Impacts vary in length. Short-term impacts are generally associated with construction. Long-term impacts are associated with the operation and usually end with decommissioning and reclamation. Permanent impacts extend beyond the decommissioning stage.
- Size Impacts vary in size. To the extent possible, potential impacts are described quantitatively, for example, the number of impacted acres or the percentage of affected individuals in a population.
- Uniqueness Resources are different. Common resources occur frequently, while uncommon resources are not ordinarily encountered.
- Location Impacts are location-dependent. For example, common resources in one location might be uncommon in another.

The context of an impact—in combination with its anticipated on-the-ground effect—is used to determine an impact intensity level, which can range from beneficial to harmful. Impact intensity levels are described using a qualitative scale, which is explained below. These terms are not intended as value judgments, but rather a means to ensure common understanding among readers and to compare potential impacts between alternatives.

- Negligible impacts do not alter an existing resource condition or function and are generally not noticeable to an average observer. These short-term impacts affect common resources.

- Minimal impacts do not considerably alter an existing resource condition or function. Minimal impacts might, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short- or long-term.
- Moderate impacts alter an existing resource condition or function and are generally noticeable to the average observer. Impacts might be spread out over a large area making them difficult to observe but can be estimated by modeling. Moderate impacts might be long-term or permanent to common resources, but generally short- to long-term to uncommon resources.
- Significant impacts alter an existing resource condition or function to the extent that the resource is impaired or cannot function. Significant impacts are likely noticeable or predictable to the average observer. Impacts might be spread out over a large area making them difficult to observe but can be estimated by modeling. Significant impacts can be of any duration and affect common or uncommon resources.

Also discussed are opportunities to avoid, minimize, or compensate for potential impacts. Collectively, these actions are referred to as mitigation.

- To avoid an impact means to eliminate it altogether, for example, by not undertaking parts or all of a project, or relocating the project.
- To minimize an impact means to limit its intensity, for example, by reducing project size or moving a portion of the project.
- To correct an impact means to repair, rehabilitate, or restore the affected resource.
- To compensate for an impact means replacing it or providing a substitute resource elsewhere, or by fixing it by repairing, rehabilitating, or restoring the affected resource. Compensating an impact can be used when an impact cannot be avoided or further minimized.

Some impacts can be avoided or minimized; some might be unavoidable but can be minimized; others might be unavoidable and unable to be minimized, but compensation can be applied. The level at which an impact can be mitigated might change the impact intensity level.

4.1.2 Regions of Influence

Potential impacts to human and environmental resources are analyzed within specific geographic areas called regions of influence ("ROI"). This EA uses the following ROIs:

- Project site area (Project site including solar generating facility, collection corridors, and Gen-Tie Line)
- Local vicinity (1,600 feet from the boundary of the solar generating facility)
- Project area (one mile from the boundary of the solar generating facility)
- Region (Itasca County)

Impacts to resources may extend beyond these distances but are expected to diminish quickly. ROIs vary between resources. **Table 7** summarizes the ROIs used in this EA.

Table 7. Regions of Influence for Human and Environmental Resources

Resource Type	Resource Element	Region of Influence
Human Settlement	Displacement, Land Use and Zoning	Project site area
	Noise, Property Values	Local vicinity
	Aesthetics, Recreation and Tourism, Cultural Values, Transportation and Public Services	Project area
	Socioeconomics, Environmental Justice, Cultural Values	Region
Public Health and Safety	Electric and Magnetic Fields, Implantable Medical Devices, Public Safety and Emergency Services	Project site area
Land-based Economies	Agriculture, Forestry, Mining	Project site area
	Tourism	Project area
Archaeological and Historic Resources	—	Project area
Natural Environment	Geology and Groundwater, Soils, Surface Water and Floodplains, Wetlands	Project site area
	Vegetation, Wildlife and Habitat (except birds)	Project Area
	Wildlife and Habitat (birds), Rare and Unique Resources	Local vicinity
	Air Quality, Climate Change	Region

4.2 Project Setting

The project is in a rural area, located partially in the city of Cohasset, in Deer Lake Township, and in the Leech Lake Reservation. The project area is a diverse combination of land use types including agricultural, forest, recreational, and development land uses. There are several natural resources in the area, including forest, lakes, and rivers. Roads within and surrounding the area include state highways, county roads, or township roads.

The proposed solar facility will be located in parts of the city of Cohasset, the Leech Lake Band of Ojibwe Reservation, and Deer Lake Township. The location is immediately west of, and partially within the city of Cohasset. The city of Grand Rapids is located 5 miles to the east.[87] The project is intersected north to south by State Highway 6. The project also intersects with County Road 87/Minnesota Power road on the east side of the project, as the Gen-Tie route line follows this road, and County Road 251 on the northwest portion of the project. Several residences border and are in the vicinity of the project, but none are within the site.

The project is in the Chippewa Plains Subsection (212NA), adjacent to the St. Louis Moraines Subsection, within the Northern Minnesota Drift and Lake Plains Section of the Laurentian Mixed Forest Province.[88] The southern boundary of this subsection is Leech Lake and the moraines south of the lake. The northern boundary is the southern shore of Glacial Lake Agassiz. On the east side, the boundary of the subsection is a series of end moraines. The west side is framed by the Alexandria Moraine Complex. The subsection is primary characterized by level to gently rolling lake plains and till plains. Thick glacial drift covers bedrock over most of the subsection, with drift thickness ranging from 200 to over 600 feet. The primary landforms are ground moraines, a lake plain, stagnation moraines, and an outwash plain. Three large, heavily used lakes are found in this section: Leech Lake, Lake Winnibigoshish, and Cass Lake. There are also several other lakes, streams and wetlands in the area, including within the project site.

Prior to settlement, conifers dominated the sandier portions of the subsection. Aspen-birch, sugar maple, basswood, northern red oak, and bur oak were common on more productive sites. Soils range from sandy to clayey, depending on parent material. Total annual precipitation ranges from 23 inches in the northwest to 27 inches in the east, with about 40 percent occurring during the growing season. Only 12 to 16 percent of the annual precipitation falls during winter months. Growing season length varies from 111 to 131 days. Pre-European settlement vegetation included a mixture of deciduous and conifer forests. White pine and red pine were present on the moraines. Jack pine was the dominant cover type on outwash plains and sandy lake plains. Hardwoods (northern red oak, sugar maple and basswood) grew in sheltered areas of the moraines, close to large lakes. Forested lowlands were occupied by black spruce, tamarack white cedar, and black ash. Non-forested wetlands were dominated by sedge meadow communities.[89]

The current land use in the project area is predominately cultivated cropland/hay pastureland and forest, including forested wetlands and upland deciduous and mixed forest. Presently, forestry is one of the most important land uses in the subsection. Aspen is the most common tree species, found in both bure stands and mixed stands with birch, maple, oak, white spruce, jack pine, and red pine. Tourism and recreation are also important land uses, with many lakes present and the development of summer homes around them. There is also the presence of agriculture locally, particularly in the western part of the subsection.[90]

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[87] SPA, p. 28.
[88] DNR (n.d.) *Ecological Classification System: Ecological Land Classification Hierarchy*, retrieved from: https://www.dnr.state.mn.us/ecs/index.html
[89] Id.
[90] Id.

4.3 Human Settlement

Large energy projects can impact human settlements. Impacts might be short-term, such as increased local expenditures during construction, or long-term, such as changes to viewshed.

4.3.1 Aesthetics

The ROI for aesthetics is the project area. The project will introduce new manmade structures into the existing landscape. Portions of the project will be visible from local roads adjacent to the project, and nearby residences. For most people who pass through the area on US Highway 2 or more distant local roads, the impact intensity level is expected to be minimal. For individuals with greater viewer sensitivity, such as people who live in the project area, or those who pass through adjacent roads such as State Highway 6, the impact intensity level is anticipated to be moderate to significant. Impacts will be short- and long-term and localized. Potential impacts are unavoidable but can be mitigated in part through visual screening and proper project design.

Aesthetics refers to the visual quality of an area as perceived by the viewer and forms the impression a viewer has of an area. Aesthetics are subjective, meaning their relative value depends upon the perception and philosophical or psychological responses unique to individuals. Impacts to aesthetics are equally subjective and depend upon the sensitivity and exposure of an individual. How an individual values aesthetics, as well as perceived impacts to a viewshed, can vary greatly.

A viewshed includes the natural landscape and built features visible from a specific location. Natural landscapes can include wetlands, surface waters, distinctive landforms, and vegetation patterns. Buildings, roads, bridges, energy infrastructure and power lines are examples of built features.

Viewer exposure refers to variables associated with observing a viewshed, and can include the number of viewers, frequency and duration of views, and view location. For example, a high exposure viewshed would be observed frequently by large numbers of people. These variables, as well as other factors such as viewing angle or time of day, affect the aesthetic impact.

The existing landscape in the project is area is primarily rural and agricultural consisting of generally flat and gently rolling terrain. There are also areas present with wetlands and forested land with adjacent farmsteads, and township and county roads. Viewsheds in the area are typically broad, interrupted by farmsteads and associated residences. Views in the site vary and include forest, wetlands, rivers, lakes, agricultural fields, and pastures. Adjacent residences are located within forests or are otherwise surrounded by trees. **Figure 9** shows the existing viewshed and distribution lines along County Road 251. **Figure 10** shows the view of existing electric distribution lines in the project area along State Highway 6, facing the Boswell Energy Center to the east. **Figure 11** shows an aerial view of the Boswell Energy Center and Blackwater Lake area, looking north and east over Blackwater Lake, which connects to the Mississippi River.

Figure 9. Existing Landscape and Distribution Line within the Boswell Solar Project Area[91]

Figure 10. Existing viewshed of the Boswell Solar Project Area[92]

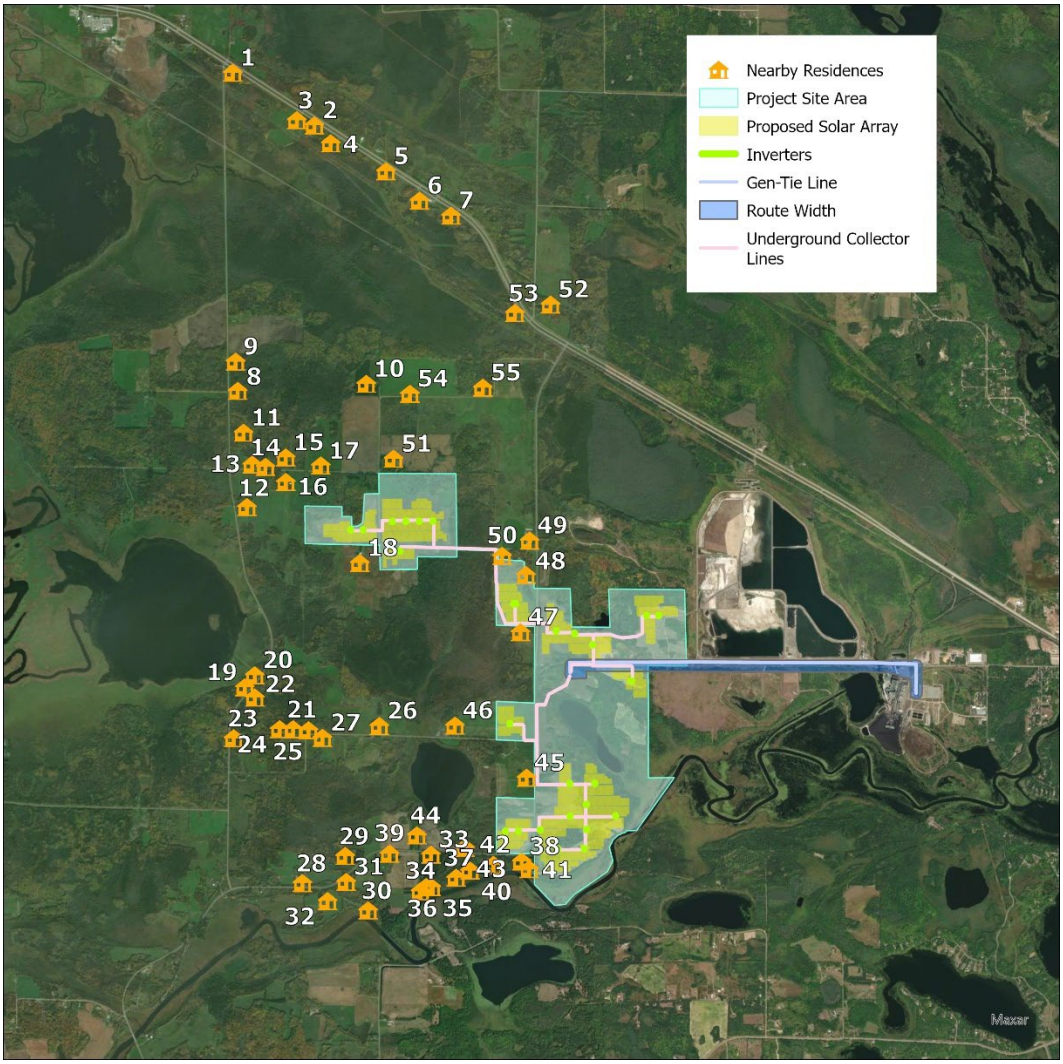
[91] Agricultural fields and existing distribution lines along County Road 251 looking West.
[92] Agricultural fields off State Highway 6 looking east towards the Boswell Energy Center.

Figure 11: Boswell Energy Center Aerial Photo[93]

[93] Aerial view of the Boswell Energy Center and Blackwater Lake. The project will be located to the west of Blackwater Lake and connect to the existing Boswell Energy Center substation via the project Gen-Tie Line.

The built environment in the project area includes farmsteads scattered throughout the area, as well as existing energy infrastructure associated with the Boswell Energy Center. As shown in **Figure 12**, there are no businesses within the project area; however, there are 13 residences within 0.25 miles of the project site, excluding those in the city of Cohasset, and over 50 residences within a mile of the project.[94] There are no residences located within the Anticipated Development Area. Most farms are surrounded by forested land or trees. The closest residence to the project area is approximately 300 feet from the nearest solar array.[95]

Figure 12. Residences within Local Area



[94] SPA, Boswell Solar Maps.
[95] SPA, p. 38.

POTENTIAL IMPACTS

Solar Facility

The visible elements of the solar facility will consist of new PV solar modules, transformers and inverters, access roads, an O&M facility, a new substation, and security fencing surrounding the project.

The project will be a noticeable change in the landscape, converting approximately 498.6 acres of agricultural fields and forested land into solar production. Although the change will be noticeable from nearby residences and roadways, there are other existing infrastructure features in the landscape such as gravel roads and distribution lines, as well as existing high voltage transmission lines and substations associated with the Boswell Energy Center. The Boswell Energy Center is a large area of energy generating infrastructure and connects directly to the site via the Gen-Tie Line (**Figure 11**).

How an individual viewer perceives the change from a field of corn, or an area of forest, to a field of solar panels depends, in part, on how a viewer perceives solar panels. Will the viewer consider the harvesting of solar energy to be like harvesting crops or will the viewer see an agricultural use be replaced by an industrial use? For residents outside the project vicinity and for others with low viewer sensitivity, such as travelers along U.S. Highway 2, aesthetic impacts are anticipated to be minimal. For these viewers, the solar panels would be relatively difficult to see due to distance, fencing and vegetation, or would be visible for a very short period. For residents in the project vicinity and for others with high viewer sensitivity traveling on local roads in the project vicinity, such as State Highway 6, County Road 87, or County Road 254, aesthetic impacts are anticipated to be moderate to significant.

Current agricultural fields and forested land will be converted to acres of solar panels. Minnesota Power indicates that the project was designed to avoid tree clearing to the extent practicable, which will help to screen the arrays in some areas.[96] Construction of the new 4.8-acre project substation, the associated collection lines, and the 2.5-mile-long Gen-Tie line will also present new visual impacts.

The majority of the Anticipated Development Area will be comprised of solar panels, which will be the most prominent visible project component, along with project fencing.[97] PV panels are designed to absorb light to convert the light to electricity. The reflection of light from a solar panel is undesirable, as it results in losses to the panel's electricity generation capacity. When light reaches the interface between two transparent materials with different refractive indexes, such as air and glass, it is both refracted and reflected, a phenomenon known as Fresnel's Law. Only the refracted light crosses the interfaces and continues passing through to the next material, resulting in an incremental loss of light transmission. These transmission losses are compounded as light passes through the consecutive transparent layers in a solar panel to reach the photovoltaic cell, resulting in an optical loss of electrical power.[98] To combat these losses, modern-day solar modules come equipped with an anti-reflection coating similar to the type on eyeglasses. These coatings reduce optical losses by applying destructive interference that cancels out the light reflected by the top surface of the module and the photovoltaic

[96] SPA, p. 38.
[97] SPA, p. 39.
[98] Shanmugam, N., Pugazhendhi, R., Elavarasan, R.M., Kasiviswanathan, P., & Das, N. (2020). Anti-Reflective Coating Materials: A Holistic Review from PV Perspective. DOI: 10.3390/en13102631.

cell, increasing solar panel efficiency. Residents who live adjacent to the solar facility or use the recreational resources surrounding the project will not experience viewsheds interrupted by glare from the solar panels, and aesthetic impacts resulting from glare are not anticipated.

Minnesota Power notes that although lighting will be installed outside the facility, it will be downward-facing, motion-activated security lighting will be installed facing away from neighboring properties.[99] Impacts to light-sensitive land uses are not anticipated given the rural project location coupled with minimal required lighting for operations.

Gen-Tie Line

The addition of the new project Gen-Tie Line will alter the current viewshed, converting agricultural and forest land to approximately 2.45 miles of new 230 kV line. The proposed route will connect the solar facility to the existing Minnesota Power, Boswell Energy Center substation, using a 130-foot right-of-way (ROW) for the entire length of the line. The height of the Gen-Tie Line steel structures will be up to 140 feet tall.[100]

The Gen-Tie Line is designed to be located entirely on Minnesota Power property and will be double-circuit ready along the east-west segment, and single-circuit connecting to the substations on each end. The line will begin at the proposed project substation, which is to be located south of Minnesota Power road (County Road 87). The Gen-Tie line will be located within the solar facility for approximately 0.8 miles, where it then will travel east through agricultural fields and forest, parallelling Minnesota Power road (County Road 87). North of the road, there are energy infrastructure facility supporting the nearby Boswell Energy Center. The line will turn south of this road to connect to the existing Boswell Energy Center 230 kV substation (**Figure 1**).

The construction of the Gen-Tie Line will alter the viewshed through the clearing of existing forested land and addition of new infrastructure features. However, the addition of the Gen-Tie Line is not expected to create a significant increase to visual impacts, as there is existing energy infrastructure associated with the Boswell Energy Center along the proposed route and surrounding areas.[101]

MITIGATION

Minimizing aesthetic impacts from solar generating facilities is primarily accomplished by locating the facilities so that they are not immediately adjacent to homes, ensuring that damage to natural landscapes during construction is minimized, and shielding the facilities from view by terrain or vegetation. Impacts from facility lighting can be minimized by using shielded and downward-facing light fixtures and using lights that minimize blue hue.

The project is located along the Mississippi River, which can be considered a scenic area. State Highway 6 intersects with the project and connects to several scenic vistas, including the Great River Road, which connects to State Highway 6 south of the project. MnDOT provided comments during scoping[102] that describe recommendations to reduce impacts on nearby scenic resources, including:

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[99] Id.
[100] SPA, p. 46.
[101] Id.
[102] MnDOT, Scoping Comments, April 28, 2025. eDockets no. 20255-218589-01.

- Consulting with the Mississippi Head Waters Board regarding impacts to the Mississippi River.
- Consulting with The Minnesota Mississippi River Parkway Commission (MRPC) regarding impacts to the Great River Road (GRR) (State Highway 6).
- Consulting with the Leech Lake Band of Ojibwe, regarding portions of the river classified as a serpentine river reach and with wild rice production.

Site-specific landscaping plans can minimize visual impacts to adjacent land uses and homes through vegetation screening, berms, or fencing. Minnesota Power can work with adjacent landowners to determine the need for additional vegetation screening and landscaping to minimize aesthetic impacts of the project.

Impacts can be mitigated through standard or special permit conditions. A draft site permit (DSP) for the Project is included in **Appendix C** and contains several permit conditions related to aesthetic impacts.[103]

- Section 4.3.8 of the DSP is a standard condition that requires the permittee to consider landowner input with respect to visual impacts and to use care to preserve the natural landscape, minimize tree removal and prevent any unnecessary destruction of the natural surroundings in the vicinity of the project during construction and operation.
- Section 5.1 of the DSP is a special condition for visual screening plans: The Permittee shall develop a site-specific Visual Screening Plan. The Visual Screening Plan shall be designed and managed to mitigate visual impacts to adjacent residences and roadsides. The Visual Screening Plan shall at a minimum include:

  (a) objectives for screening of nearby residences and roadsides; and
  (b) a description of the types of trees and shrub species to be used, the location of plantings, and plans for installation, establishment, and maintenance.

  The location of trees and shrubs included in the Visual Screening Plan that are located within the Permittee's site control shall be included in the Site Plan filed under Section 8.3. The Permittee is required to maintain and ensure the successful growth, health, and maintenance of the vegetation for 3 years.

  At least 14 days prior to the pre-construction meeting, the Permittee shall file:

  (a) the Visual Screening Plan;
  (b) documentation of coordination between landowners within 500 feet of the site boundary; and
  (c) an affidavit of its distribution of the Visual Screening Plan to landowners within 500 feet of the site boundary.

- Section 5.2 of the DSP is a special condition relating to Roadside Vegetation Management The Permittee is required to coordinate with the Minnesota Department of Transportation (MnDOT) regarding vegetation management between the project area and State Highway 6.

[103] Appendix C – Proposed Draft Site Permit.

The Permittee shall retain or plant vegetation, as requested by MnDOT, necessary to ensure the safe operation of State Highway 6. The Permittee shall coordinate with MnDOT regarding vegetative designs and management necessary to ensure the safe operation of State Highway 6.

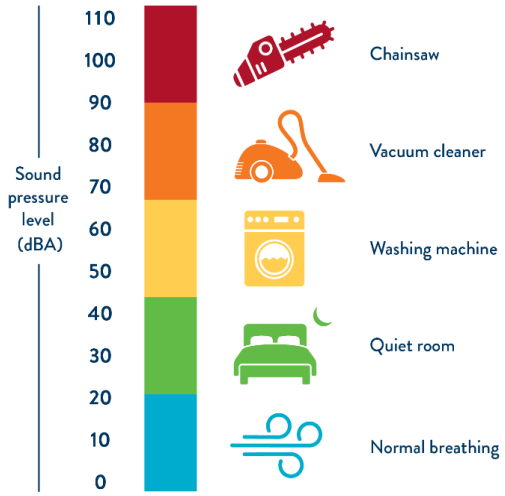
- Section 5.12 of the DSP is a special condition that requires the permittee to consult with the MNDNR and the Mississippi Headwaters Board regarding potential impacts to the Mississippi River due to construction activities, including tree removal and erosion on the shoreline.

4.3.2 Noise

The ROI for noise is the local vicinity. Distinct noises are associated with the different phases of project construction. The impact intensity level during construction will range from negligible to significant depending on the activity. Potential impacts are anticipated to be intermittent and short-term. These localized impacts during construction could affect nearby residences and might temporarily exceed state noise standards. Impacts are unavoidable but can be minimized. Operational impacts are anticipated to be minimal.

Noise can be defined as any undesired sound. It is measured in units of decibels on a logarithmic scale. The A-weighted scale ("dBA") is used to duplicate the sensitivity of the human ear.[104] A three dBA change in sound is barely detectable to average human hearing, whereas a five dBA change is clearly noticeable.

Figure 13. Common Noise Levels



A 10 dBA change is perceived as a sound doubling in loudness. Noise perception is dependent on a number of factors, including wind speed, wind direction, humidity, and natural and built features between the noise source and the receptor.

Figure 13 provides decibel levels for common indoor and outdoor activities.[105]

In Minnesota, noise standards are based on *noise area classifications* ("NAC") corresponding to the location of the listener, referred to as a receptor. NACs are assigned to areas based on the type of land use activity occurring at that location. Household units, designated camping and picnicking areas, resorts and group camps are assigned to NAC 1; recreational activities (except designated

[104] MPCA. *A Guide to Noise Control in Minnesota*. (2015). https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf.

[105] Federal Aviation Administration (2022) *Fundamentals of Noise and Sound*, retrieved from: https://www.faa.gov/regulations_policies/policy_guidance/noise/basics/.

camping and picnicking areas) and parks are assigned to NAC 2; agricultural and related activities are assigned to NAC 3.

Noise standards are expressed as a range of permissible dBA over a one-hour period. L_{10} may be exceeded 10 percent of the time, or six minutes per hour, while L_{50} may be exceeded 50 percent of the time, or 30 minutes per hour. Standards vary between daytime and nighttime hours. There is no limit to the maximum loudness of a noise. **Table 8** provides current Minnesota noise standards.

Table 8. Noise Area Classifications (dBA)

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

The MPCA noise standards are public health standards. That is, they protect people from noise generated by all sources at a specific time and place. The total sum of noise at a specific time and location cannot exceed the standards. The MPCA evaluates whether a specific noise source is in violation by determining if the source causes or significantly contributes to a violation of the standards.

The project area may have existing sounds that can interact with project construction noise. Minnesota Power states that audible traffic sounds are likely present from U.S. Highway 2, which is just north of the project, as well from several other county and township roads. The Boswell Energy Center is east of the Project, and faint sounds from these operations are part of the existing sound character. Other sound sources in the vicinity include agricultural activities on neighboring properties, vegetation, birds, and insects.[106]

Potential Impacts

The primary noise receptors are the local residences. There are no residences within the site, and 13 residences in local proximity (within 0.25 miles).[107] The proposed project is in a rural area, mostly comprised of agricultural and forested land. Typical rural sound levels are in the 30-55 dBA range, with variability depending on local activities, time-of-day, weather, and season.[108] Residences are in NAC 1. Noise receptors could also include individuals working outside in the project vicinity. Potential noise impacts from the project are associated with construction noise and operational noise.

[106] SPA, p. 37.
[107] SPA, p. 35.
[108] SPA, p. 32-33.

Construction

Noise from construction will be temporary in duration, and the amount of noise will vary based on what type of construction is occurring, and the distance from the noise source. Sound levels from grading equipment and backhoes are anticipated to generate noise between 80 and 85 dBA, and are not dissimilar from the typical tractors and larger trucks used in agricultural communities during harvest.[109] Pile driving equipment associated with installing the solar array foundations will be the most significant source of construction noise at roughly 90 dBA at 50 feet.[110] The noise from construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. Thus, this construction noise will generate a temporary increase in ambient noise, which could exceed state noise standards at select times and locations. Impacts from project construction will be intermittent and localized, however, and times that exceed noise standards will likely be within the maximum allowable noise volumes that can occur within the NAC-1 L_{10} and L_{50} limits (**Table 8**).

Minnesota power indicates that construction will be limited to daytime operations as much as possible, minimizing potential disturbances associated with construction equipment.[111]

Operation

Noise levels during operation of the project are anticipated to be minimal. The primary source of noise from the solar facility will be from the panel rotation, the inverters, and transformers.[112] Minnesota Power estimated that the typical background ambient noise in the area is that of standard rural sound levels, which fall between the 30-55 dBA range.[113] For the inverters, the nearest sound receptor is a nearby residence, which is located approximately 48 feet from the nearest solar array. A sound pressure level of 34 dBA is modeled at this distance from the site. The highest modeled noise impact to a residential receptor was modeled at 36 dBA, which is approximately 294.1 feet away from the site, and is in proximity to multiple inverters.[114] At that distance, the noise would fall below the both the daytime and nighttime NAC 1 Noise Limit.[115]

The Gen-Tie Line may generate minor noise throughout the operation of the project in the form of corona (crackling) or from wind blowing through the conductors and structure. This type of noise is not unusual for the project area, given the presence of existing distribution lines and transmission lines associated with the Boswell Energy Center, however it will extend into areas that have not previously routinely experienced it. Minnesota Power states that this sound is expected to comply with the applicable noise limits.[116]

MITIGATION

Sound control devices on vehicles and equipment (e.g., mufflers), conducting construction activities during daylight hours, and running vehicles and equipment only when necessary are common ways

[109] SPA, p. 34-35.
[110] SPA, p. 35.
[111] SPA, pp. 29-31.
[112] SPA, p. 35.
[113] SPA, p. 35.
[114] SPA, pp. 32-35.
[115] Id.
[116] SPA, pp. 35-26.

to mitigate noise impacts. Minnesota Power indicates that construction will be limited to daylight hours, using construction equipment and vehicles with properly functioning mufflers and noise-control devices.[117]

- Section 4.3.7 of the DSP (**Appendix C**) is a standard condition that requires the permittee to comply with Minnesota noise standards as established under Minnesota Rule, part 7030.010 to 7030.0080, and to limit construction and maintenance activities to daytime hours to the extent practicable.

No additional mitigation is proposed.

4.3.3 Cultural Values

The ROI for cultural values is the region. Development of the project will change the character of the area, potentially changing residents' sense of place. There are tradeoffs for rural communities between renewable energy projects and retaining the rural character of an area. Construction and operation of the project is not anticipated to impact or alter the work and leisure pursuits or community events of residents in the project area in such a way as to impact the underlying culture of the area. However, given the Leech Lake Band of Ojibwe's rich history in the area, it will be important to involve Tribal members in consultation prior to construction.

Cultural values can be defined as shared community beliefs or attitudes that define what is collectively important to the group. These values provide a framework for individuals and community thought and action. Infrastructure projects believed inconsistent with these values can deteriorate community character. Those found consistent with these values can strengthen it. Projects often invoke varying reactions and can, at times, weaken community unity.

Individual and community-based renewable energy is becoming more valued across the nation. Utility scale renewable projects—generally located far from load centers in rural areas—are also valued, but, at times, opposed by residents. The highly visible, industrial look and feel of these projects can erode the rural feeling that is part of residents' sense of place.

Itasca County has a rural character, with scattered areas of natural resources, forest land, and scenic vistas. The area within and surrounding the project is abundant in lakes, rivers, forests, and farms. Itasca County being one of the original nine counties in Minnesota,[118] its economy has historically been driven by timber harvesting, mining, and tourism. The Itasca County Historical Society located in Grand Rapids, Minnesota contains historical information about topics such as the Mississippi River, Charles Smith Chippewa Indian Legacy, Wild Ricing, among other exhibits.[119] Each year in mid-August, Itasca County hosts a fair in Grand Rapids, along with other various community events throughout the year. Itasca County has a Comprehensive Land Use Plan, which details the goals, objectives, and implementation tools for the county and local governments. The county's plan states that Itasca County government will "strive to preserve and enhance the quality of life, the environment and economic well-being within the community." The comprehensive plan also includes land use goals

[117] SPA, p. 32.
[118] Itasca County, History. https://www.co.itasca.mn.us/419/History-Of-Itasca-County.
[119] Itasca Historical Society. https://itascahistorical.org/.

spanning across eight categories, such as cooperation, natural resources, agricultural, and commercial/industrial uses, among others.

Parts of the project are within the city of Cohasset, outside the Chippwea National Forest. People of the Ojibwe nation called the city "Ushigunkan", which means "the place of the bass". Previously a lumber camp, the area has been and continues to be a popular summer vacation destination. This is largely due to its natural environment, as there are several lakes, rivers, forests, and parks within the city. The city of Cohasset has stated that their community vision and guiding principles "will maintain its North Country character by carefully growing and diversifying its economic base while maintaining its lake and waterfront appeal." Cohasset emphasizes investment in and protection of the desirability of the area due to its rural and environmental character.[120]

The project site also contains portions located within the Leech Lake Band of Ojibwe reservation boundaries. The local area has historically been occupied by and cared for by the Ojibwe nation, and prior to European settlement, the area was untouched land covered by red and white pine, looked after by the Ojibwe people. The area is within the 1855 Treaty boundaries, also known as the Treaty of Washington. This treaty was signed between the U.S. government and representatives from the Pillager, Lake Winnibigoshish, and Mississippi bands of the Ojibwe, establishing a reservation at Leech Lake for the Pillager and Lake Winnibigoshish Bands, and reservation at Lake Mille Lacs for the Mississippi Bands of the Tribe.

The Ojibwe people have many long-standing cultural traditions that are still honored today. The Leech Lake Band of Ojibwe (LLBO) hosts events both open to the public, and some only for Tribal members. Events include Powwows, which provide a space for those to gather and make moccasins, as well as canoe races, herbal events, and various wellness events, such as walks to bring awareness to illnesses.[121] In addition to cultural events, wild rice has a rich cultural significance to Tribal members. Wild rice, or manoomin (good seed) in Ojibwe, is sacred to Indigenous peoples in the Great Lakes region, because it's part of their creation story, and because for centuries it staved off starvation during harsh winters. Wild rice is also more frequently declining in production, with climate change likely contributing to why.[122] The project site is located near two lakes that contain wild rice beds, White Oak Lake and Little White Oak Lake. Water quality is especially important in areas that contain wild rice resources. Addressing climate change is also a priority of the tribe. The LLBO references community values that are tied to actions to combat climate change, mentioning composting, wind power, reducing energy consumption, and improving recycling in various projects and plans. The reservation has also been part of the Minnesota GreenStep Cities Program since 2014, committing to creating a more sustainable climate friendly community, including the support of renewable energy sources.[123]

Cultural values in the region can also be informed by ethnic heritage. Residents of Itasca County derive primarily from white or European ancestry, which accounts for the 89 percent of the population,

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[120] SPA, p. 51.
[121] Leech Lake Band of Ojibwe, News. https://www.leechlakenews.com/events/.
[122] Leech Lake Tribal College, *Minnesota Ojibwe Harvest Sacred Climate-Imperiled Wild Rice.* (2022). https://www.lltc.edu/2022/09/20/minnesota-ojibwe-harvest-sacred-climate-imperiled-wild-rice/.
[123] Minnesota GreenStep Cities, *Minnesota GreenStep Tribal Nations.* https://greenstep.pca.state.mn.us/page/minnesota-greenstep-tribal-nations.

followed by 3.5 percent Native American, 1.4 percent Hispanic or Latino, 0.4 percent Black or African American, 0.3 percent Asian American, and 0.02 percent Native Hawaiian and Pacific Islander.[124] Overall, the region surrounding the project area has cultural values tied to the area's Native American heritage, the presence of vast natural and recreational resources, and the local forest and agricultural economy.

Potential Impacts

The project contributes to the growth of renewable energy and is likely to strengthen and reinforce this value in the area. At the same time, the development of the project will change the character of the area. The value residents put on the character of the landscape within which they live is subjective, meaning its relative value depends upon the perception and philosophical or psychological responses unique to individuals. Because of this, construction of the project might—for some residents—change their perception of the area's character, thus potentially eroding their sense of place. The project area is not located within areas where regional community events typically occur, so impacts on community events are not anticipated. Construction of the project is not anticipated to alter existing cultural resources. However, in the event that cultural discoveries are made during construction, or if there are anticipated impacts to cultural and historic resources, Minnesota Power should ensure that the proper local government unit (LGU) is contacted, such as the LLBO, or MnDOT to determine next steps.

Minnesota Power notes that the project helps to support the "Sustainable Building" goals included in the Itasca County Comprehensive Land Use Plan. Goals include encouraging the economic development that sustains the quality of the natural resources of Itasca County, as well as encouraging new commercial development and renovation projects that incorporate "green building" practices that reduce adverse impacts on human health and the environment and include renewable energy sources.[125] The applicant also addresses the city of Cohasset's goal to maintain its rural character and environmental desirability, while increasing investments in the community. Minnesota Power states that the project can help support the city's goal of growing the commercial tax base by the creation of jobs and increase in payouts from the creation of clean energy, leading to tax benefits for the area.[126]

Mitigation

Two permit conditions included in the DSP address cultural values.

- Section 4.3.23 of the DSP is a standard condition that addresses impacts to cultural properties. The permittee is required to avoid impacts to archeological and historic resources during construction, and the permit condition describes requirements for in the event resources are encountered. The permittee is also required to train workers about cultural resources.
- Section 5.3 of the DSP is a special condition requiring the permittee to work with the appropriate LGU regarding cultural discoveries during construction. This includes MNDOT

[124] U.S. Census Bureau (2020a).
[125] SPA, p. 52.
[126] Id.

coordination if there are discoveries within MNDOT Right of Way, and coordination with the Leech Lake Band of Ojibwe if there are cultural discoveries within the project site.

4.3.4 Land Use and Zoning

The ROI for land use and zoning is the land control area. The impact intensity level is anticipated to be moderate due to the conversion of agricultural land to land used for energy generation. Land use impacts are anticipated to be long-term and localized. Constructing the project will change land use from agricultural to solar energy production for a minimum of 30 years. After the project's useful life, the land control area could be restored to agricultural or other planned land uses by implementing appropriate restoration measures. Impacts can be minimized by using best practices to protect land and water quality.

Land use is the characterization of land based on what can be built on it and how the land is used. Zoning is a regulatory tool used by local governments (cities, counties, and some townships) to guide specific land uses within specific geographic areas. Land cover documents how much of a region is covered by forests, wetlands, impervious surfaces, agriculture, and other land and water types, including wetlands. Construction of solar generating facilities and transmission line will alter current and future land use and land cover.

The National Land Cover Database (NLCD) provides "spatial reference and descriptive data for characteristics of the land surface" nationwide.[127] This data was used to determine the land use conversion that will take place, using GIS data. Although the project site is approximately 1,344 acres, as listed in the SPA, the area used for this analysis measured as a 1,330 acres on the GIS mapping tool. As shown in **Table 9** and **Table 10,** the project site land cover is largely used by cultivated agriculture including cropland and hay/pasture, as well as forest, including forested wetlands and upland deciduous and mixed forest. Other land cover types include developed areas around residences and other industrial facilities, shrub/scrubs, herbaceous wetlands and uplands, and open water. Minnesota Power states that based on field biological resource reviews conducted in September 2022, most of the site was dominated by wetlands, forest, and grassland/herbaceous vegetation.[128]

Table 9. Project Site Land Cover

Category	Project Site (Acres)	Percentage
Open Water	46.64	4%
Developed, Open Space	10.78	1%
Developed, Low Intensity	32.56	2%
Developed, Medium Intensity	7.04	1%
Deciduous Forest	172.04	13%
Evergreen Forest	4.84	0%

[127] U.S. Geological Survey. *The National Land Cover Database (NLDC) 2019 Products (ver 3.0)*. (February 2024), retrieved from: https://www.usgs.gov/data/national-land-cover-database-nlcd-2019-products-ver-30-february-2024#publications.

[128] SPA, pp. 74-75.

Mixed Forest	103.4	8%
Shrub/Scrub	6.6	0%
Herbaceous	11.88	1%
Hay/Pasture	144.76	11%
Cultivated Crops	498.96	38%
Woody Wetlands	196.46	15%
Emergent Herbaceous Wetlands	93.94	7%
Total	**1329.9**	100%

Table 10. Project Gen-Tie Route Land Cover

Category	Project Site (Acres)	Percentage
Open Water	2.42	2%
Developed, Open Space	3.74	3%
Developed, Low Intensity	19.58	16%
Developed, Medium Intensity	9.68	8%
Developed, High Intensity	6.38	5%
Barren Land	2.64	2%
Deciduous Forest	5.5	4%
Evergreen Forest	0.22	0%
Mixed Forest	1.98	2%
Herbaceous	1.32	1%
Hay/Pasture	8.8	7%
Cultivated Crops	25.96	21%
Woody Wetlands	14.96	12%
Emergent Herbaceous Wetlands	20.9	17%
Total	**124.08**	100%

Permits from the Commission supersede local zoning, building, or land use rules.[129] Though zoning and land use rules are superseded, the Commission's permit decisions must be guided, in part, by consideration of impacts to local zoning and land use in accordance with the legislative goal to "minimize human settlement and other land use conflicts."[130]

[129] Minnesota Statutes 216E.10, subd. 1.
[130] Minnesota Statutes 216E.03, subd. 7.

The project area has components located within the city of Cohasset, Deer Lake Township, and within the Leech Lake Band of Ojibwe (LLBO) Reservation in Itasca County, Minnesota. The project site falls within city and county shoreland areas, as it lies within 1,000 feet of the ordinary high-water line for lakes and 300 feet from a river (Blackwater Lake, and the Mississippi River, respectively).

Itasca County has a has a Comprehensive Land Use Plan,[131] as well as a county Zoning Ordinance,[132] which include zoning classifications, and regulations that are to be referenced for the siting of new projects. Itasca County's zoning map identifies the project site as within Municipal and Farm Residentially zoned land. The general purpose of this zoning district is to protect and promote rural living, farming, and forestry in Itasca County.[133] Transmission Lines are considered an essential service, and a permitted use in all zoning districts. Most adjacent and nearby areas are also zoned as Farm Residential, with some nearby zoned public areas.[134] The project will not interfere with future land use plans for Itasca County. The Itasca County Zoning Ordinance includes Shoreland Overlay Regulations.[135] These documents include setbacks that are to be followed on county roads, or within certain zones, such as along shoreline or road ROW.

The city of Cohasset also has a Land Use Controls Ordinance,[136] as well as a city Comprehensive Plan.[137] The Comprehensive Plan includes land use zoning that identifies the current land use within the project area as Agricultural and Timber areas.[138] The city's future land use map classifies the areas as industrial and Commercial, specifying the preferred future use of the area.[139] This also identifies setbacks that are to be applied within zoning districts, which is included in **Table 11: County and City Setbacks**. The city of Cohasset has their own Zoning map, which identifies the project site as within the Heavy Industrial Zoning District.[140] The purpose of this district is to "promote and protect areas for the full range of industrial enterprises, specifically those which might have significant impacts on off-site properties and uses."[141] Electrical power generation is a permitted use in the heavy industrial district according to the city of Cohasset zoning ordinance. Transmission lines, electrical transformers

[131] Itasca County, Comprehensive Land Use Plan, (2013). https://www.co.itasca.mn.us/DocumentCenter/View/5500/Itasca-County-Comprehensive-Land-Use-Plan.
[132] Itasca County, Zoning Ordinance, (2024). https://www.co.itasca.mn.us/DocumentCenter/View/10123/Itasca-County-Zoning-Ordinance-512024
[133] Itasca County, GIS Zoning Data, (2025). https://gisdata.mn.gov/organization/us-mn-co-itasca.
[134] Id.; SPA, p. 54-56.
[135] Itasca County, Information for Shoreland Overlay Residential, 2016). https://www.co.itasca.mn.us/DocumentCenter/View/2908/Residential-Development-in-Shoreland-Areas.
[136] City of Cohasset, Land Use Controls Ordinance, (2017). https://www.cohasset-mn.com/vertical/sites/%7B4DED3294-59E1-4C4A-B675-C7E6970BA170%7D/uploads/Cohasord_05-18-17.pdf
[137] City of Cohasset, Comprehensive Plan, (2024). https://www.cohasset-mn.com/vertical/sites/%7B4DED3294-59E1-4C4A-B675-C7E6970BA170%7D/uploads/Cohasset_Comprehensive_Plan_2024.pdf.
[138] Id., Figure 6. Land Use.
[139] Id., Figure 19. Future Land Use Policy Areas.
[140] City of Cohasset, Zoning Map, (2022). https://www.cohasset-mn.com/vertical/sites/%7B4DED3294-59E1-4C4A-B675-C7E6970BA170%7D/uploads/Zone_District_Map.pdf
[141] Id.

and substations are considered "minor utility structures" and are considered a permitted use in all zoning districts.[142]

Table 11: County and City Setbacks[143]

Setback Category	Itasca County Accessory Building Setback	City of Cohasset Setback
Road ROW	Road ROW 68 feet from centerline or 35 from ROW, whichever distance is greater.	Road ROW 68 feet from centerline or 35 from ROW, whichever distance is greater.
Side Yard Property Line	10 feet	15 feet
Rear Yard Property Line	10 feet	15 feet

Although the project site falls within areas considered shoreland and floodplains by the city and county, Minnesota Power states that the anticipated development area does not encroach into this area. It is also noted that the city of Cohasset does not have any specific provisions relating to commercial solar systems.[144]

Portions of the site are also to be located within District One of the Leech Land Band of Ojibwe (LLBO) reservation.[145] The LLBO has several ordinances related to cultural resources, emergency responses, pesticide control, water quality standards, licensing for fishing, hunting, and recreation, hazardous waste, wild rice, harvesting, burning and more.[146] Minnesota Power notes that outside of these ordinances, there is no formal adopted comprehensive plan or zoning ordinance document for the LLBO.[147]

Potential Impacts

Development of a solar farm in this area will temporarily change the land use from predominantly agricultural and timber uses to energy generation for the life of the project. Minnesota Power states that the layout for the project site is consistent with both the Itasca Cunty and the city of Cohasset zoning ordinances and comprehensive plans.[148] The land use change of the site will also be consistent with the future land use planning of the city of Cohasset, which emphasizes the investment in clean energy generation as an encouraged land use in the area.[149] The anticipated development area is

[142] Id.; SPA, pp. 54-56.
[143] SPA, p. 55., City of Cohasset Zoning; Itasca County Zoning.
[144] SPA, pp. 55-56.
[145] Id; Leech Land Band of Ojibwe (LLBO), Leech Lake Reservation District One Map. https://www.llojibwe.org/government/district1/district1map.html.
[146] LLBO, Tribal Ordinances (2018). https://www.llojibwe.org/drm/subnav/ordinances.html.
[147] SPA, pp 55-56.
[148] SPA, p. 56.
[149] City of Cohasset, Comprehensive Plan, (2024). https://www.cohasset-mn.com/vertical/sites/%7B4DED3294-59E1-4C4A-B675-C7E6970BA170%7D/uploads/Cohasset_Comprehensive_Plan_2024.pdf.

designed to avoid the floodplain and shoreland areas. However, the project Gen-Tie Line will cross a Public Waters Basin, and a 100-year flood plain close to the existing Boswell Substation.

Although the Leech Lake Band of Ojibwe (LLBO) reservation does not have a formal comprehensive plan or zoning ordinance, the reservation is considered a GreenStep City, which is a program that promotes sustainability and climate forward values. The construction of a renewable energy project would align with the strategy to reduce carbon emissions and fossil fuels from energy generation. The project Gen-Tie Line goes through the city of Cohasset and is defined as a "minor utility structure" in the city of Cohasset Zoning Ordinance, which is a permitting use in the Heavy Industrial zoning district of the city.[150]

Commission route permits supersede local zoning and permitting. However, the placement of energy infrastructure near floodplains and water resources can have impacts on the ability for the structures to appropriately function over time, which may require additional planning and preparation with LGUs, including emergency response teams. The LLBO has requirements in their ordinances related to engaging tribal representatives for emergency planning. Minnesota Power is expected to conduct thorough engagement throughout the development of the project with LGUs, including the county, city, and LLBO on emergency plans.

Overall, the change of land use is in line with local government goals. The addition of the solar facility and Gen-Tie Line is expected to have a minimal to moderate impact on the rural character of the surrounding area, and a minimal impact on the city or county land use throughout the life of the project.

Mitigation

The project is proposed on a site of 1344.5 acres, mostly comprised of agricultural and forested land. Construction of the project will convert approximately 498.5 acres of cultivated cropland and forest land to development for solar energy production. Minnesota Power has developed an Agricultural Impact Mitigation Plan (AIMP)[151] and a Vegetation Management Plan (VMP)[152] that will be implemented throughout the duration of the project. The AIMP and VMP identify measures to avoid, minimize, mitigate, and/or repair potential negative agricultural impacts that may result from the construction operation, or decommissioning of the project. The AIMP and VMP outline ensures the project area may be returned to future agricultural use after the end of the project's useful life, including identifying best management practices (BMPs) that will be used during construction.

Although the project is subject to oversight by the State of Minnesota under the Minnesota Power Plant Siting Act, coordination with the city of Cohasset, Itasca County, and the Leech Lake Band of Ojibwe will be important. It may be necessary to develop area-specific plans, such as a road-use agreement, or an emergency response plan, to ensure impacts to local resources are mitigated in a way that is consistent with community goals.

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[150] SPA, p. 56.; City of Cohasset, Land Use Controls Ordinance, (2017). https://www.cohasset-mn.com/vertical/sites/%7B4DED3294-59E1-4C4A-B675-C7E6970BA170%7D/uploads/Cohasord_05-18-17.pdf

[151] SPA – Appendix D: Agricultural Impact Mitigation Plan (AIMP).

[152] SPA – Appendix F: Vegetation Management Plan (VMP).

The DSP (**Appendix C**) has several permit conditions related to the preservation and restoration of agricultural land:

- Section 4.3.17 requires the applicant to prepare a vegetation management plan to prevent soil erosion and invest in soil health by establishing a plan to protect soil resources by ensuring perennial cover. The applicant's draft VMP is found in Appendix F of the site permit application.[153]
- Section 4.3.18 requires the applicant to prepare an AIMP that details methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use. The applicant's draft AIMP is found in Appendix D of the site permit application.[154]
- Section 9 requires the applicant to prepare a decommissioning plan focused on returning the project site to pre-project condition at the end of the project's useful life. The applicant's draft decommissioning plan is found in Appendix F of the site permit application.[155]
- Section 9.2 requires removal of all project-related infrastructure upon decommissioning.

4.3.5 Property Values

The ROI for property values is the local vicinity. Impacts to property values within the local vicinity could occur; however, changes to a specific property's value are difficult to determine. Because of this uncertainty, impacts to specific properties in the project vicinity could be minimal to moderate and would decrease with distance and over time.

Impacts to property values can be measured in three ways: sale price, sales volume, and marketing time. These measures are influenced by a complex interaction of factors. Many of these factors are parcel specific, and can include condition, size, acreage, improvements, and neighborhood characteristics; the proximity to schools, parks, and other amenities; and the presence of existing infrastructure, for example, highways or transmission lines. In addition to property-specific factors, local and national market trends, as well as interest rates, can affect all three measures. The presence of a solar facility becomes one of many interacting factors that could affect a specific property's value.

Because each landowner has a unique relationship and sense of value associated with their property a landowner's assessment of potential impacts to their property's value is often a deeply personal comparison of the property "before" and "after" a proposed project is constructed. The landowner's judgments, however, do not necessarily influence the market value of a property. Professional property appraisers assess a property's value by looking at the property "after" a project is constructed. Moreover, potential market participants are likely to see the property independent of the changes brought about by a project; therefore, they do not take the "before" and "after" into account the same way a current landowner might. Staff acknowledges this section does not and

[153] SPA – Appendix F: VMP.
[154] SPA – Appendix D: AIMP.
[155] SPA – Appendix G: Decommissioning Plan.

cannot consider or address the fear and anxiety felt by landowners when facing the potential for negative impacts to their property's value.[156]

Electrical generating facilities can impact property values. Often, negative effects result from impacts that extend beyond the project location. Examples include emissions, noise, and visual impacts. Unlike fossil-fueled electric generating facilities, the project would not generate emissions. Potential impacts from operational noise are not anticipated. Aesthetic impacts will occur, but because the project is relatively low in height – as compared to a wind turbine or a smokestack – impacts would be localized.

Large solar facilities exist in Minnesota; however, limited sales information is available. A review of the literature identified one peer-reviewed journal article that addressed impacts to property values based on proximity to utility-scale, PV solar facilities. The Lawrence Berkeley National Lab studied over 1,500 large-scale PV solar facilities in six states (including Minnesota) to determine whether home sale prices were influenced within 0.5 miles (from over 1.8 million home sale transactions).[157] In summary, the study found that effects, "on home sale prices depend on many factors that are not uniform across all solar developments or across all states."

In Minnesota in particular, the study found that homes within one-half mile of large-scale PV solar facilities had a 4 percent reduction in home sale prices compared to homes 2-4 miles away. This finding was considered statistically significant. Additionally, only large-scale PV solar facilities developed on previously agricultural land, near homes in rural areas, and larger facilities (roughly 12 acres or more) were found to be linked to adverse home sale price impacts within one-half mile. The analysis did not include consideration of site features or site design, for example setbacks or landscaping features, which could play a role in nearby property valuation. Another limitation of the study was the lack of examination of the broader economic impacts or benefits to host communities from large-scale PV solar facilities, which might positively impact home sale prices.

Other studies with smaller sample sizes did not find a consistent negative impact to the sales value of properties near large solar facilities. Chisago County Environmental Services and Zoning found that home sales exceeded assessed value near the 100 MW North Star solar facility at a rate comparable to the general real estate market in the area.[158] Additionally, a study prepared by CohnReznick examined compared sale prices of properties near 10 existing large solar facilities (including the North

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[156] This paragraph is based, in part, on the following: Chalmers, James (October 30, 2019) *High Voltage Transmission Lines and Residential Property Values in New England PowerPoint Presentation*, retrieved from: https://www.nhmunicipal.org/sites/default/files/uploads/Annual_Conference/2019/Sessions/Wednesday/market_effects_of_utility_rows_presentation-1045am.pdf; Department of Commerce (2022) *Rights-of-way and Easements for Energy Facility Construction and Operation*, retrieved from: https://apps.commerce.state.mn.us/eera/web/project-file/12227.

[157] Elmallah, S., Hoen, B., Fujita, K.S., Robson, D., & Brunner, E. (2023). Shedding light on large-scale solar impacts, Retrieved from: https://www.sciencedirect.com/science/article/pii/S0301421523000101.

[158] Kurt Schneider, Environmental Services Director, (October 20, 2017) *Email to Commerce staff*.

Star project) with comparable properties, and did not find a consistent negative impact to the sales value of properties near large solar facilities.[159]

POTENTIAL IMPACTS

Impacts to the value of specific properties within the project vicinity are difficult to determine but could occur. Considerations such as setbacks, benefits to the community, economic impact, and vegetative screening could have an unpredictable range of influence over property value. Several, but not all, of the closest residents have some screening from the project.

Based on analysis of other utility-scale solar projects, minimal to moderate property value impacts could occur, but significant negative impacts to property values in the project vicinity are not anticipated. To the extent that negative impacts do occur they are expected to be within one-half mile of the solar facility and to decrease with distance from the project and with time. Aesthetic impacts that might affect property values would be limited to residences and parcels in the project vicinity where the solar panels are easily visible.

MITIGATION

Impacts to property values can be mitigated by reducing aesthetic impacts and impacts to future land use. Impacts can also be mitigated by Minnesota Power through individual agreements with neighboring landowners.

- Section 4.3.8 of the DSP is a standard condition that requires the permittee to consider landowner input with respect to visual impacts and to use care to preserve the natural landscape, minimize tree removal and prevent any unnecessary destruction of the natural surroundings in the vicinity of the project during construction and operation.
- Section 5.1 of the DSP is a special condition requiring the applicant to develop visual screening plans along with adjacent landowners. The Permittee shall develop a site-specific Visual Screening Plan. The Visual Screening Plan shall be designed and managed to mitigate visual impacts to adjacent residences and roadsides.

4.3.6 Tourism and Recreation

The ROI for tourism and recreation is the project area. Potential impacts to recreational opportunities and tourism are anticipated to be minimal. During construction, unavoidable short-term impacts will occur as construction equipment and vehicle traffic will create noise, dust, and visual impacts. These impacts will be intermittent and localized. There are no anticipated long term impacts from this project.

In 2022, the leisure and hospitality industry in the Itasca County accounted for $98,848,192 of gross sales, and 1,517 private sector jobs.[160] Tourism in the project area is largely related to recreational activities including camping, hiking, biking, fishing, golfing, canoeing and kayaking, horseback riding, snowmobiling, cross country skiing, and hunting. Areas within a file-mile radius of the project area

[159] McGarr, Patricia L. et al. (2021), Real Estate Adjacent Property Value Impact Report, https://www.linncountyiowa.gov/DocumentCenter/View/18016/Real-Estate-Adjacent-Property-Value-Impact-Report-PDF?bidId=.

[160] Explore Minnesota (n.d.) *2022 Leisure & Hospitality Industry Data*. https://mn.gov/tourism-industry/assets/24-Suitcase_24.5x12%2Bcounty_data-lo-res_tcm1135-607367.pdf.

include tourist attractions such as the Blueberry Hills Golf Course, Sunset Reins Equine Center, Schoolcraft State Park, and the White Oak Casino, which is owned and operated by the Leech Lake Band of Ojibwe.

The area is also rich in natural resources, which has led to the creation of several lake resorts, and walking and mountain bike trails for the community and tourists to utilize. Community events in the area are hosted by nearby municipalities, Itasca County, and local organizations. The city of Grand Rapids hosts the Grand Rapids Riverfest, Downtown Art Fair, and other events. Itasca County hosts an annual county fair in the city of Grand Rapids. In addition, a wild rice festival is held annually in the city of Deer River.[161]

There are several recreational opportunities provided in the local area. The project site is not directly within any Wildlife Management Areas (WMAs), Public Water Access (PWA) sites, or federal or state parks. Bordering the project site is the Upper Mississippi River, which runs parallel with the southern border of the project site for two miles. This portion of the river is in the Grand Rapids watershed, which is considered a state water trail. The watershed includes a large area of public land, almost half the area, and covers 2,092 square miles of land, including the cities of Grand Rapids, Nashwauk, Coleraine, Hill City, McGregor, Remer, and Cromwell.[162]

Located approximately 0.24 miles west of the project site is Little Drum Lake, which does not have public access. Located approximately 0.30 miles south of the project site is Little Rice Lake, which does not have public access but is known to have aquatic wildlife present, including the black bullhead, black crappie, bluegill, brown bullhead, largemouth bass, northern pile, pumpkinseed, rock bass, tullibee, walleye, yellow bullhead, yellow perch, bowfin and white sucker.[163] Snells Lake is a Public Water Access (PWA) point, and is located approximately 0.5 miles south and east from the site border. This lake is also noted to have black crappie, bluegill, brown bullhead, largemouth bass, northern pile, pumpkinseed, walleye, yellow bullhead, yellow perch, and bowfin species present. Little White Oak Lake is also a PWA point and is located approximately 0.7 miles north and west from the border of the site. Little White Oak Lake has one ramp, one gravel parking lot, but no dock.[164] The Clay Boswell PWA is located approximately 1.94 miles east of the project site, located on Jay Gould Lake. This is the closest PWA to the project site that allows entrance the Mississippi River.

A few miles to the east of the project is the Bass Brook Wildlife Management Area (WMA), a 313 acre area within the city of Cohasset that provides vast land for wildlife and bird viewing, as well as archery hunting, with the primary game species being White-Tail Deer.[165] The area is mostly aspen, birch, red and jack pine and northern hardwoods with small lowland areas intermixed. Bass Brook WMA has 15-foot high striated Pokegama quartzite cliffs on the river shore, which is a rare bedrock bluff this far west in Minnesota. This WMA has 4460 ft of Mississippi river frontage and is across the river from the

[161] SPA, p. 59.
[162] SPA, p. 52.
[163] Id.
[164] Id.
[165] Id.

US Army Corps of Engineers Pokegama Recreation Area. The WMA can be accessed from that side of the river by walking across the Corps dam.[166]

Within the city of Cohasset, there is a softball field located approximately 3.6 miles southeast of the project, as well as a school that has a playground. Located approximately 3 miles from the project there is a free campground adjacent to the Mississippi River. There is one snowmobile trail, the Bushwacker trail, that runs parallel to US Highway 2, located one mile from the project site. This trail is managed by the Deer River Bushwackers Snowmobile & ATV Club.[167]

POTENTIAL IMPACTS

Impacts to tourism and recreation can be direct or indirect. Direct impacts are impacts that directly impede the use of a recreational resource, for example, closing of a trail to facilitate project construction. Indirect impacts reduce the enjoyment of recreational resources but do not prevent use, for example, aesthetic impacts visible from a scenic overlook.

Impacts to tourism and recreation from construction and operation of the project are anticipated to be minimal and temporary. Minnesota Power does not anticipate the need for road closures during active construction, and there are no specific tourism opportunities within the project area. Nearby annual community festivals and events would be held within city limits, and not within the project site. Construction and operation of the project is not anticipated to impact tourism opportunities at the White Oak Casino or other nearby attractions.

Due to construction, there will be temporary short-term increases in traffic and noise that could potentially impact recreational activities near the project area, such as local hunting opportunities. There could also be a temporary increase in dust and visual impacts from construction equipment for local visitors. However, access to the recreational resources, such as the PWA sites and the snowmobile trail, is not likely to be impacted throughout construction and the operation of the project.[168] No significant long-term impacts to recreational activities are anticipated.

MITIGATION

Because impacts to recreational activities are anticipated to be minimal and temporary, no additional mitigation measures are proposed.[169]

If construction activity occurs during time of snow cover, Minnesota Power is advised to coordinate with the Deer River Bushwackers Snowmobile & ATV Club to ensure there will be no impacts to the snowmobile trail.

4.3.7 Transportation and Public Services

The ROI for transportation and public services is the project area. Potential impacts to the electrical grid, roads, and other utilities are anticipated to be short-term, intermittent, and localized during construction. Impacts to water (wells and septic systems), railroads, pipelines, and airports are not

[166] DNR, State Lands; Public Water Access; WMA; Retrieved from: MN Natural Resource Atlas. https://mnatlas.org/gis-tool/.
[167] Id.; MN DNR Snowmobile Trails. Retrieved from: MN Natural Resource Atlas. https://mnatlas.org/gis-tool/.
[168] SPA, pp. 52-53.
[169] Id.

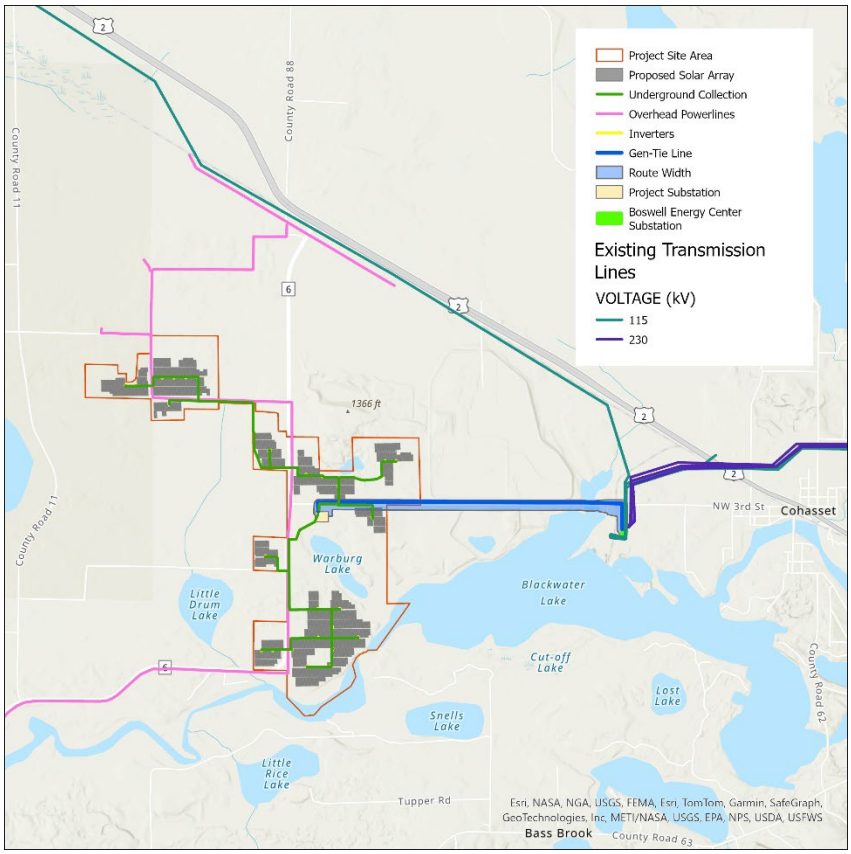
expected to occur. Overall, construction-related impacts are expected to be minimal and are associated with possible traffic increases. During operation, negligible traffic increases would occur for maintenance. Impacts are unavoidable but can be minimized.

Public services are services provided by a governmental entity or by a regulated private entity to provide for public health, safety, and welfare.

Water and Wastewater In Itasca County, most rural residences have water supply wells. Most residents in the surrounding area have private septic systems and/or drain fields.[170]

Electric Utilities The project area includes existing transmission and electric utility infrastructure. Minnesota Power and Lake Country Power are the main electric service providers within the site and the surrounding area. Minnesota Power owns the existing 115 kV transmission line north and east of the project (**Figure 13**).[171] There are also several 230 kV transmission lines near the Boswell Energy Center Substation, which is adjacent to the Boswell Energy Center, located east of the project. In addition to the high-voltage transmission lines, there are also several lower-voltage electric distribution lines throughout the project area.

Figure 14: Electric Utilities Map



[170] SPA, p. 54.
[171] SPA, p. 54.

Pipelines There are no known pipelines within the project site or Gen-Tie Line route.[172]

Roads The major roadways within and near the project site include: County Road 249, which runs east to west along the center of the site on the west side; County Road 251, which runs north to south, and then west to east through the northern most part of the site; MN State Highway 6, which runs from north to south directly west of the site, and County Road 269, which enters part of the site at the southern boundary.[173] The site is also intersected by County Road 87, or Minnesota Power Road, running east to west through the center of the site, and directly alongside the route of the Gen-Tie line. **Table 12** shows traffic data from the Minnesota Department of Transportation for three county roads and one state highway within the project area.

Table 12: Annual Average Daily Traffic in Project Vicinity (2013)

Roadway	AADT Traffic Volume Total
County Road 249	35
County Road 251	25
County Road 269	20
State Highway 6	409

Railroads The closest railroad to the project is located a couple of miles north of the project, running east to west, parallelling Highway 2. The railway breaks off the main track running east to west, and goes south, crossing the Gen-Tie Line near County Road 87/Minnesota Power Road. The primary operating railroad and track owner is Burlington Northern Santa Fe (BNSF) Railway Company.[174]

Airports There are no FAA-registered airports located in the project area. The nearest FAA-registered airport, the Grand Rapids/Itasca County Airport, is located approximately 8.7 miles west of the project.[175] In order to assure safety, both the FAA and MnDOT office of Aeronautics have established guidelines for the location of structures near airports. The FAA has height restrictions for development near public airports and guidelines for placement of buildings and other structures near high frequency omnidirectional range navigation systems. MnDOT has zoning areas around public airports that restrict the area where buildings and other structures can be placed.

Potential Impacts

Large energy projects can impact public services, such as buried utilities or roads. These impacts are usually temporary, for example, road congestion associated with material deliveries. Impacts can be long-term if they change the area in a way that precludes or limits public services.

Water and Wastewater Impacts to water and wastewater systems, are not anticipated. There are three documented wells located within the project site. Minnesota Power states that it will assess any

[172] Id.
[173] SPA, pp. 56-57.
[174] Id.
[175] SPA, p 57.; US FAA, *Airport Data and Information Portal* https://adip.faa.gov/agis/public/#/public.

wells identified prior to and during construction to determine if they are open, and seal them, if necessary, in accordance with MDH requirements.[176]

Minnesota Power indicates that water and sewer will be used from their existing Boswell Energy Center and will not require any additional utilities during project operations. However, a new water well may be required if sheep are used for grazing for vegetation management.[177]

Roads Throughout the project, access to the site will be from the existing state, county, and township road systems, with the possibility of minor field access.[178] However, access from Minnesota Department of Transportation (MnDOT) right-of-way whether at an existing driveway or new driveway is not guaranteed, and new highway access permits will be required in either case. Minnesota Power states that it will secure the appropriate local permits for road access and other aspects of the project, as well as coordination with the appropriate road authority for planned work within the road rights-of-way to support the project utility installation. Minnesota Power is not proposing changes to existing roadways.[179]

Temporary, infrequent localized traffic delays may occur when heavy equipment enters and exists local roadways near the project, or equipment and materials are delivered to the project site. Slow-moving vehicles during construction have the potential to cause some delays, however these are anticipated to be minimal and short in duration.

The number of vehicles traveling to and from the project site will vary by day and fluctuate throughout the construction period. Construction traffic could peak with up to 120 people at the site, consisting of an average of around 60-120 vehicles per day.[180] This increase in traffic will be perceptible to area residents, but because the average daily traffic in the area is relatively low, this increased traffic 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. While construction will create an increase in local traffic, the increase is not expected have an impact on the functional capacity of the local roads. The functional capacity of a two-lane paved rural highway is more than 5,000 vehicles per day; therefore, the surrounding roads will continue to be well below capacity.[181] Except for the temporary increased use of existing state, county and township roads for access to and construction of the project, no changes to the existing public roads are anticipated.

Once construction is complete, traffic impacts will be negligible. During the operations phase a small maintenance crew will use pickup trucks on a regular basis to monitor and maintain the facilities[182]

Railroads The project Gen-Tie Line will cross one railroad, Minnesota Power's Boswell Energy Center rail spur. The rail spur connects the energy facility to the BNSF railroad north of the project. Minnesota

[176] SPA, p. 67.
[177] SPA, p. 54.
[178] SPA, p. 57.
[179] Id.
[180] Id.
[181] Id.
[182] SPA, pp. 57-58.

Power states that communication with the railroad is ongoing, and construction will be coordinated appropriately. If required, Minnesota Power will obtain a crossing license from BNSF for the Gen-Tie Line.[183]

Electric Utilities Minnesota Power will coordinate with Gopher State One Call before and during construction to confirm buried utility locations. The final project is designed to avoid impacts to overhead utilities. No long-term impacts to utilities are anticipated because of the project. The project will not permanently impact existing energy infrastructure, although Minnesota Power indicates that there may be limited, temporary impacts to electrical service that are unavoidable during interconnection. However, these impacts will be short-term, and Minnesota Power will coordinate with local individuals and utilities prior to any temporary shutdowns.[184]

Pipelines The project area does not contain any pipeline corridors.

Air Safety The FAA's Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) Notice Criteria Tool was used to determine if further aeronautical study or FAA filing is needed for the project.[185] The tool generated a "no notice required" result for the solar panels, construction cranes up to 150 ft, electric transmission poles/towers up to 150 ft, or communications towers up to 150 ft. Minnesota Power notes that although it is unlikely, it will determine closer to construction if cranes taller than 150 feet are necessary that require filing with the FAA.[186] No impacts to the Grand Rapids/Itasca County Airport are anticipated.

MITIGATION

Water and Wastewater Minnesota Power states that it will assess any wells identified prior to and during construction to determine if they are open, and seal them, if necessary, in accordance with MDH requirements.[187] A well construction permit from the Minnesota Department of Health (MDH) would be required if a well is installed at the facility for use with vegetation management in the future. In addition, an approved well drilling contractor should be hired prior to well construction.

Utilities

- Section 4.3.5 of the DSP (**Appendix C**) is a standard permit condition that requires the permittee to minimize disruptions to public utilities.

Impacts to electrical infrastructure that cross the project can be mitigated by appropriate coordination with the owners of the existing infrastructure and following industry best practices.

The location of underground utilities can be identified using the Gopher State One Call system during engineering surveys and marking the underground utility locations prior to construction. Minnesota Power will coordinate with Gopher State One Call to confirm buried utility locations prior to

[183] SPA, p. 58.
[184] SPA, p. 54.
[185] SPA, pp. 57-58; Federal Aviation Administration (FAA) Notice Criteria Tool, 2023. Retrieved from: https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp.
[186] SPA, p. 58.
[187] SPA, p. 67.

construction. If a utility is identified, the project component or the utility itself might need to be relocated if it cannot be successfully crossed. Relocation, as well as any necessary crossing, would need to be coordinated with the affected utility.

Roads Changes or additions to driveways from county roads will require permits from the county. Project entrances on State Highways are not guaranteed by MnDOT.

- Section 4.3.22 of the DSP requires permittees to inform road authorities of roads that will be used during construction and acquire necessary permits and approvals for oversize and overweight loads. Permitted fencing and vegetative screening cannot interfere with road maintenance activities, and the least number of access roads shall be constructed.
- Section 5.2 of the DSP is a special condition relating to Roadside Vegetation Management: The Permittee shall coordinate with the Minnesota Department of Transportation (MnDOT) regarding vegetation management between the project area and State Highway 6. The Permittee shall retain or plant vegetation, as requested by MnDOT, necessary to ensure the safe operation of State Highway 6. The Permittee shall coordinate with MnDOT regarding vegetative designs and management necessary to ensure the safe operation of State Highway 6.

In addition to permit requirements for driveway access and the conditions of the draft site permit, the following practices can mitigate potential impacts:

- Pilot vehicles can accompany movement of heavy equipment.
- Deliveries can be timed to avoid traffic congestion and dangerous situations on the roadway.
- Traffic control barriers and warning devices can be used as necessary.
- Photographs can be taken prior to construction to identify pre-existing conditions. Permittees would be required to repair any damaged roads to preconstruction conditions.

Minnesota Power states that it will work with Itasca County and the city of Cohasset to develop a traffic control plan prior to construction to minimize the impact of vehicular traffic on the local area. This traffic control plan will include anticipated temporary road closures and signage coordination. If overweight or oversize loads are necessary, Minnesota Power will obtain the appropriate approvals prior to construction. Construction equipment movement on or across roads will be minimized and conducted in accordance with MnDOT requirements.[188]

Pipelines There are no pipelines within the project site or ROW, therefore no mitigation is proposed.

4.3.8 Socioeconomics

The ROI for socioeconomics is the region. The impact intensity level is anticipated to be minimal to significant and positive. Effects associated with construction will, overall, be short-term and minimal. Significant positive effects may occur for individuals. Impacts from operation will be long-term and significant. Adverse impacts are not anticipated.

[188] SPA, pp. 57-58.

Itasca County is within Minnesota Department of Employment and Economic Development (DEED) Economic Development Region (EDR) 3, the Arrowhead region, located in the northeast part of the state. In 2024, the sectors with the largest employment in Region 3 were Office & Administrative Support (11.7%), Food Preparation & Serving Related (10.3%), sales (8.4%), and Healthcare Practitioners & Technical (8.3%).[189]

Unemployment rates fluctuate with the economy, but the unemployment rate for Itasca County has typically been higher than Minnesota's unemployment rate, with lower labor force participation.[190] In 2024, Itasca County had a slightly higher unemployment rate (5.8%) than the state average (3.9%). The county also has a slowing labor force participation. Moving forward, Itasca County is expected to see a labor force decline from 2025 to 2035, from 20,226 people participating in the workforce in 2025, to 19,637 participating in 2035. The cost of living in Itasca County has also increased over the past 2 years, with costs up in many areas, however it had a lower cost of living than the state overall.[191] In the city of Cohasset, the three largest occupational categories in 2022 included management, business, science and arts occupations (42.7%), sales and office occupations (19.0%), and service occupations (16.3%).[192]

Itasca County is growing slower than Minnesota as a whole; between 2020 and 2023, the population in Itasca County increased by 0.8 percent, compared to a growth of 1.6 percent for the population of the State of Minnesota between 2020 and 2023. This increase in population comes from an in-migration of people from other areas domestically and internationally, not an increase in the population that had lived in Itasca County.[193] Between 2010 and 2020, the population in Itasca County decreased by 0.1 percent, compared to a growth of 7.6 percent for the population of Minnesota.[194] According to the Minnesota State Demographic Center, Itasca County's population is expected to decline from 2025 to 2035 at a rate of change slower than the projected statewide growth rate of 3.7 percent.[195] The median age of Itasca County is also higher than the State, with median ages of 46.8 and 38.5 years, respectively, as the County has a larger percentage the population over 65 years old.[196]

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[189] Minnesota Department of Economic Employment and Development (DEED), *Economic Development Region 3: Northeast Minnesota 2024 Regional Profile. (2025), https://mn.gov/deed/assets/2024_EDR3_RP_tcm1045-133251.pdf*.

[190] DEED. *Economic Development Region Profile, Itasca County 2024 Regional Profile*. (2025), https://mn.gov/deed/assets/052725_itasca_tcm1045-407468.pdf.

[191] Id.

[192] SPA, pp. 46-48.

[193] Id; DEED. *Economic Development Region Profile, Itasca County 2024 Regional Profile*. (2025), https://mn.gov/deed/assets/052725_itasca_tcm1045-407468.pdf.

[194] U.S. Census Bureau, https://data.census.gov/; 2023, Minnesota State Demographic Center, Population Data, Our Estimates, https://mn.gov/admin/demography/data-by-topic/population-data/our-estimates/

[195] DEED. *Economic Development Region Profile, Itasca County 2024 Regional Profile*. (2025), https://mn.gov/deed/assets/052725_itasca_tcm1045-407468.pdf.

[196] ID; SPA, p. 46.

Table 13. Population Characteristics

	2010 Census*	2020 Census*	% Change 2010 - 2020	2023 Estimate **	% Minority‡	Median Household Income ($)	% Below Poverty Level (125% of poverty level)
Minnesota	5,303,925	5,706,494	7.6	5,713,716	22	87,556	12
Itasca County	45,058	45,014	-0.1	45,141	11	66,380	16
City of Cohasset	2,698	2,689	-0.3	2,700	11	87,833	12
LLBO Reservation	10,660	11,388	6.8	10,935	47	72,333	27
Deer Lake Township	3,495	3,664	4.8	3,641	7	62,641	10

* U.S. Census Bureau, https://data.census.gov/

** 2023 American Community Survey 5-year estimates

‡ Minority population includes all persons who do not self-identify as white alone.

From 2010 to 2020, the population of the city of Cohasset decreased by 0.33 percent, the population of the Leech Lake Band of Ojibwe Reservation (LLBO) increased by 6.8 percent, and the population of Deer Lake Unorganized Territory (UT) increased by 4.8 percent.[197] Itasca County, the City of Cohasset, and Deer Lake UT have a lower minority population than the state. The LLBO has a significantly higher population of individuals who do not self-identify as white alone, with a minority population of 47 percent. Itasca County, the LLBO, and Deer Lake UT have lower median household incomes than the state. However, the city of Cohasset has a slightly higher median household incomes compared to the state as a whole. Both Itasca County and the LLBO have a higher percentage of people living below 125% of the poverty level than Minnesota as a whole. (**Table 13**).[198]

Potential Impacts

The impact intensity level is anticipated to be moderately positive. Potential impacts associated with construction will be positive, but minimal and short-term. During project construction and installation phases, Minnesota Power expects to support up to 125 jobs.[199] Significant positive effects might occur for individuals. Impacts from operation will be long-term, positive, and moderate. Minnesota Power notes that during project operations, two to three fulltime jobs will be necessary. The project will not disrupt local communities or businesses and although it is within areas of environmental justice, it is not anticipated to disproportionately impact low-income or minority populations long-term (see

[197] U.S. Census Bureau, 2023 American Community Survey 5-year estimates; https://data.census.gov/all?g=040XX00US27_050XX00US27061_060XX00US2706112412,2706115277_2500000US1940_2800000US271940&y=2023&d=ACS+5-Year+Estimates+Data+Profiles.

[198] U.S. Census Bureau, https://data.census.gov/ ; 2023, Minnesota State Demographic Center, Population Data, Our Estimates, https://mn.gov/admin/demography/data-by-topic/population-data/our-estimates/

[199] SPA, pp. 48-49.

discussion of Environmental Justice (EJ) in Section 4.3.9). Adverse impacts are not anticipated. Potential impacts can be minimized by providing the local EJ community opportunity for engagement and employment.

Construction of the project is likely to result in temporary increased expenditures for lodging, food and fuel, transportation, and general supplies at local businesses during construction. Construction of the project will create local job opportunities for various trade professionals and will also generate and circulate income throughout the community by investing in local business expenditures as well as state and local taxes. This includes the city of Cohasset, as well as the cities of Deer River and Grand Rapids, which may offer other options for restaurant and lodging choices.[200]

Minnesota Power states that it is committed to working with organized labor on the project, citing strong relationships with the building trades, and will pay prevailing wages for applicable positions for the construction of the project. The applicant also anticipates paying construction workers in accordance with the prevailing wage and apprenticeship rules under the Inflation Reduction Act (IRA).[201] Hiring local labor can be beneficial for the area. Local workers are found to generate approximately three times more local economic activity through spending than a non-local worker at the individual level,[202, 203] and a largely local workforce can generate up to double the economic impact of a largely non-local workforce.[204]

The use of local workers who reside in Itasca County could have significant positive impacts, not only through providing employment, but by developing employment opportunities, offering living wage jobs that attract young people and support families, and providing experience for the local labor force tailored to industry needs. Employment in the renewable energy sector provides workers the opportunity to develop the required technical skills to work in the green economy,[205] which can increase opportunities for future employment. Minnesota is anticipated to continue to expand renewable energy development in the coming years,[206] and the state's investments in the development and incentivization of clean energy will enable future renewable projects.

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[200] Id.

[201] Id.

[202] Franco, L. 2020 *A Transformative Investment: Maximizing the Socioeconomic Benefits of the Fargo-Moorhead Diversion Project.* Retrieved from: https://d3ciwvs59ifrt8.cloudfront.net/272d7204-1f87-45d8-a9dc-744c9333acc6/e6f95bb7-5559-4dd9-a0bd-21c636c5b778.pdf

[203] Franco, L. 2019. *Catching the Wind 3.0: The impact of local versus non-local hiring practices on wind farms in North Dakota.* Retrieved from: https://ndlegis.gov/assembly/67-2021/testimony/SNATRES-2301-20210204-5243-F-FRANCO_LUCAS_A.pdf

[204] Franco, L. 2020. *Maximizing The Benefits of Wind Energy Development Through Local Construction Hiring: The Northern Divide Wind Energy Project Case Study.* Retrieved from: https://d3ciwvs59ifrt8.cloudfront.net/272d7204-1f87-45d8-a9dc-744c9333acc6/b5b7e911-3d92-4eab-bbaa-799e0db0ac86.pdf.

[205] Grima, S., Sood, K., Özen, E., & Dalli Gonzí, R.E. (Eds.). (2024). *Greening our economy for a sustainable future*, retrieved from: https://www.sciencedirect.com/book/9780443236037/greening-our-economy-for-a-sustainable-future

[206] The Business Council for Sustainable Energy, *2024 Minnesota Energy Factsheet*, retrieved from: https://www.cleanenergyeconomymn.org/wp-content/uploads/2024/04/2024-Minnesota-Energy-Factsheet.pdf

Once the project is operational, Minnesota Power will pay property tax and production taxes on the land and energy production to local governments. Property taxes are calculated on the land underlying the facility. Because the land for the solar generating facility is used primarily for solar generation, the land is classified as Class 3a (commercial/industrial/public utility) which is taxed at a higher rate than land used primarily for homestead or agriculture. The value of the generation equipment is exempted from the property tax.[207]

Minnesota has adopted a production tax of $1.20/MWh paid 80 percent to counties and 20 percent to the cities and townships.[208] Minnesota Power estimates that the project will generate an annual state and local benefit of approximately $319,000 in solar energy production and property tax revenue over the life of the project.[209]

If the project is constructed, approximately 652.4 acres of agricultural land could be removed from production that is currently used to produce corn, soybeans, spring wheat, and alfalfa.[210] The removal of cultivated land is likely to result in an incremental decrease to agricultural-related businesses, such as farm dealerships, seed dealers, and dealers of agricultural inputs such as fertilizer and pesticides, in the area. The extent of any decrease in sales is difficult to determine, but the project will cause removal of approximately 0.68 percent of the approximately 96,375 acres of farmland in Itasca County, which is not anticipated to have a significant impact.[211] Adverse impacts associated with the loss of agricultural land and agricultural production will be mitigated through lease, easement, or purchase payments to landowners.

MITIGATION

Socioeconomic impacts are anticipated to be overall positive. Adverse socioeconomic impacts will be limited to the temporary loss of agricultural production on the land currently farmed; however, Minnesota Power indicates that these temporary losses are offset by agreements and payment to landowners through lease agreements or purchase contracts.[212]

Several sections of the Draft Site Permit (DSP) address socioeconomic impacts, including employment:

- Section 4.5.3 of the DSP requires the permittee, as well as its construction contractors and subcontractors, to pay no less than the prevailing wage rate. No additional mitigation is proposed.

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[207] Minnesota Statutes 272.02, subdivision 24; Minnesota House Research, *Property Tax 101: Property Tax Variation by Property Type*, October 2024, https://www.house.leg.state.mn.us/hrd/pubs/ss/ssptvart.pdf .

[208] Minnesota Department of Revenue, *Solar Energy Production Tax. 2023.* https://www.revenue.state.mn.us/solar-energy-production-tax#:~:text=The%20Solar%20Energy%20Production%20Tax%20rate%20is%20%241.20%20per%20megawatt,nameplate%20capacity%20exceeding%201%20megawatt

[209] SPA, pp. 48-49.

[210] SPA, p. 46.

[211] USDA, Census of Agriculture County Profile, Itasca County Minnesota (2022). https://data.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp27061.pdf.

[212] SPA, pp. 48-49.

- Section 5.4 of the DSP is a special condition that ensures that the residents within Native American Tribes, including the LLBO nation, have the opportunity to engage with the applicant and create meaningful involvement throughout the life of the project, such as through economic opportunity and employment.
- Section 8.5 of the DSP requires quarterly reports concerning efforts to hire Minnesota workers. Consistent with Minn. Stat. 216E.03, subd. 10 (c).

4.3.9 Environmental Justice

The ROI for environmental justice analysis is the region. The project is within environmental justice (EJ) communities as defined by Minnesota Statute. However, it will not have disproportionately high and adverse human health or environmental effects on low-income, minority, or tribal populations.

Environmental justice is "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[213] The goal of this "fair treatment" is not to shift risks among populations, but to identify potential disproportionately high and adverse effects and identify alternatives that may mitigate these impacts.[214]

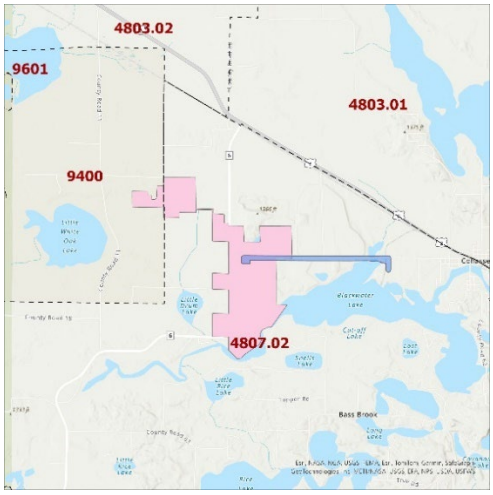
As defined by Minnesota Statute 216B.1691, subd. 1(e), "Environmental justice area" means an area in Minnesota that, based on the most recent data published by the United States Census Bureau, meets one or more of the following criteria:

(a) 40 percent or more of the area's total population is nonwhite;
(b) 35 percent or more of households in the area have an income that is at or below 200 percent of the federal poverty level;
(c) 40 percent or more of residents over the age of five have limited English proficiency; or
(d) the area is located within Indian country, as defined in United States Code, title 18, section 1151.

[213] US EPA Environmental Justice (2024 archive), https://www.epa.gov/environmentaljustice .
[214] US EPA (2024 archive), Guidance for Incorporating Environmental Justice Concern in EPA's NEPA Compliance Analyses (pdf),

Figure 13 shows the census tract used to compare the project area with Itasca County and Minnesota as a whole.

Figure 13: Census Tracts in Project Site



MPCA's "Understanding Environmental Justice in Minnesota" web-based mapping tool was used to determine whether the project intersects any census tracts with EJ populations based on the definitions above.[215] **Table 14** provides data from the MPCA mapping tool to identify EJ communities in the project area. This tool uses information from the U.S. Census Bureau's five-year 2018-2022 American Community Survey data and tribal areas derived from the U.S. Census Bureau's 2023 Cartographic Boundary File and Minnesota Department of Transportation's Tribal Government in Minnesota.

The MPCA defines "Environmental justice" as the right of communities of color, Indigenous communities, and low-income communities, to the enjoyment of a healthy environment and to fair treatment with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. "Environmental justice community" or "EJ community" means a people group or geographic location that experiences environmental justice related harms and risks.

Table 14. Environmental Justice Population Data

Area	% of the population that is nonwhite	% of Households at or Below 200% Poverty Level	% Limited English proficiency	Located in Indian Country?
Region of Comparison				
Minnesota	22.5	22.5	2.2	No
Itasca County	10.5	30.2	0.2	No
Project Census Tract				
Census Tract 4807.02	12.12	26.81	0.34	No
Census Tract 9400	36.04	35.97	0.2	Yes

Potential Impacts

Utility infrastructure can adversely impact low-income, minority or tribal populations. Based on the MPCA's mapping tool, as well as the project area population and demographics data (**Table 13; Table**

[215] MPCA, Understanding environmental justice in Minnesota Mapping Tool, 2023. https://experience.arcgis.com/experience/bff19459422443d0816b632be0c25228/page/Page/?views=EJ-areas.

14.), the proposed site is located partially within one census tract that is considered an EJ community. Census Tract 9400 meets the criteria to be considered an EJ community because it is located within Indian country, as defined in United States Code, title 18, section 1151. In addition, the MPCA's mapping tool also lists this census tract as historically within an EJ area for income, with 35.97% reporting income less than the 200% federal poverty level (+/- 9.31% margin of error).[216] The census tract is also identified as historically within an EJ area for people of color, as 36.04% (+/- 5.32% margin of error) in the census tract are people of color. In sum, parts of the project site located within Census Tract 9400 are sited within an EJ community and have the potential to create impacts within that community.

In their application, Minnesota Power conducted an analysis of the EJ community using the U.S. Environmental Protection Agency's Climate and Economic Justice Screening Tool (CEJST). At the time, the CEJST was an available interactive mapping tool that was used to identify disadvantaged communities that are marginalized by underinvestment, overburdened by pollution or within the boundaries of a Federally Recognized Tribe. According to the EPA's EJScreen Community Report for census tract 9400, there were no environmental burden indicators. Other indicators included a flood risk of 11 percent, three percent above the state average of 8 percent. In addition, the census tract is considered to have a transportation access burden and to be a food desert.

The EJScreen Community Report for the other census tract in the project area, census tract 4807, showed there are no environmental burden indictors or climate indicators. This census tract is also considered a transportation access burdened area and a food desert. Minnesota Power notes that while construction of the project will temporarily increase traffic in the area, no permanent impacts to transportation are anticipated. The project is also not anticipated to impact the fact that both census tracts are in a food desert. [217]

Minnesota Power does not anticipate adverse, disproportionate impacts to EJ communities resulting from the project, including impacts to air quality. The project has the potential for short-term impacts during construction, such as an increase of traffic, or the creation of fugitive dust. However, Minnesota Power notes that the project is expected have positive socioeconomic impacts and will have positive impacts related to climate change. Minnesota Power states that these long-term positive climate impacts come from the project offsetting the cession of coal operations at the Boswell Energy Center Unit 3 by December 31, 2029, and Boswell Unit 4 by 2035.[218]

MITIGATION

This project is partially proposed to be sited within an EJ community, Census Tract 9400. Construction and operation of the project is not anticipated to create disproportionate or adverse impacts to low-income or minority populations. However, because the project site is within an existing EJ community, it is expected that coordination and collaboration with the community will be a priority of the applicant to ensure environmental inequities and related health disparities are not caused or intensified by the construction of the project.

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[216] Id.; SPA pp. 49-50.
[217] SPA, pp. 49-50.
[218] SPA, p. 50.

Minnesota Power states that coordination with the LLBO is ongoing and further discussed in Section 5 of their application.[219]

Section 5.4 of the DSP is a special condition that ensures that the residents within Native American Tribes, such as Census Tract 9400 which includes the LLBO nation, have the opportunity to engage with the applicant and create meaningful involvement throughout the life of the project, such as through economic opportunity and employment.

4.4 Human Health and Safety

Construction and operation of a solar facility has the potential to impact human health and safety.

4.4.1 Electric and Magnetic Fields

The ROI for EMF is the project area. Impacts to human health from possible exposure to EMFs are not anticipated.

Electric and magnetic fields (EMFs) are invisible forces that result from the presence of electricity. They occur naturally and are caused by weather or the geomagnetic field. They are also caused by all electrical devices and found wherever people use electricity. EMFs are characterized and distinguished by their frequency, that is, the rate at which the field changes direction each second. Electrical lines in the United States have a frequency of 60 cycles per second or 60 hertz, which is extremely low frequency EMF ("ELF-EMF"). The strength of an electric field decreases rapidly as it travels from the conductor and is easily shielded or weakened by most objects and materials.

Voltage on a conductor creates an electric field that surrounds and extends from the wire. Using water moving through a pipe as an analogy, voltage is equivalent to the pressure of the water moving through the pipe. The strength of the electric field is measured in kilovolts per meter (kV/m). Electric fields decrease rapidly as they travel from the conductor and are easily shielded or weakened by most objects and materials.

Current moving through a conductor creates a magnetic field that surrounds and extends from the wire. Using the same analogy, current is equivalent to the amount of water moving through the pipe. The strength of a magnetic field is measured in milliGauss (mG). Like electric fields, the strength of a magnetic field decreases rapidly as the distance from the source increases; however, unlike electric fields, magnetic fields are not easily shielded or weakened.

Table 15. Electric and Magnetic Field Strength of Common Household Objects provides examples of electric and magnetic fields associated with common household items. "The strongest electric fields that are ordinarily encountered in the environment exist beneath high voltage transmission lines. In contrast, the strongest magnetic fields are normally found very close to motors and other electrical appliances, as well as in specialized equipment such as magnetic resonance scanners used for medical imaging."[220]

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[219] Id.

[220] World Health Organization. *Radiation: Electromagnetic Fields, What are typical exposure levels at home and in the environment?* (2016). https://www.who.int/news-room/questions-and-answers/item/radiation-electromagnetic-fields.

Table 15. Electric and Magnetic Field Strength of Common Household Objects[221]

Electric Field*		Magnetic Field**			
Appliance	kV/m	Appliance	mG		
	1 foot		1 inch	1 foot	3 feet
Stereo	0.18	Circular saw	2,100 to 10,000	9 to 210	0.2 to 10
Iron	0.12	Drill	4,000 to 8,000	22 to 31	0.8 to 2
Refrigerator	0.12	Microwave	750 to 2,000	40 to 80	3 to 8
Mixer	0.10	Blender	200 to 1,200	5.2 to 17	0.3 to 1.1
Toaster	0.08	Toaster	70 to 150	0.6 to 7	< 0.1 to 0.11
Hair Dryer	0.08	Hair dryer	60 to 200	< 0.1 to 1.5	< 0.1
Television	0.06	Television	25 to 500	0.4 to 20	< 0.1 to 1.5
Vacuum	0.05	Coffee maker	15 to 250	0.9 to 1.2	< 0.1

* German Federal Office for Radiation Safety
** Long Island Power Institute

Health Studies In the late-1970s, epidemiological studies indicated a weak association between childhood leukemia and ELF-EMF levels. "Epidemiologists observe and compare groups of people who have had or have not had certain diseases and exposures to see if the risk of disease is different between the exposed and unexposed groups but does not control the exposure and cannot experimentally control all the factors that might affect the risk of disease."[222]

Ever since, researchers have examined possible links between ELF-EMF exposure and health effects through epidemiological, animal, clinical, and cellular studies. To date, "no mechanism by which ELF-EMFs or radiofrequency radiation could cause cancer has been identified. Unlike high-energy (ionizing) radiation, EMFs in the non-ionizing part of the electromagnetic spectrum cannot damage DNA or cells directly," that is, the ELF-EMF that is emitted from HVTLs does not have the energy to ionize molecules or to heat them.[223] Nevertheless, they are fields of energy and thus have the potential to produce effects.

> "The few studies that have been conducted on adults show no evidence of a link between EMF exposure and adult cancers, such as leukemia, brain cancer, and breast cancer."[224]

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[221] Id.

[222] National Institute of Environmental Health Sciences. *EMF: Electric and Magnetic Fields Associated with the Use of Electric Power.* (2002). https://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf

[223] National Cancer Institute. *Magnetic Field Exposure and Cancer*. (2016). http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet.

[224] National Institute of Environmental Health Sciences. *Electric and Magnetic Fields*, (2024). http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm.

> "Overall there is no evidence that exposure to ELF magnetic fields alone causes tumors. The evidence that ELF magnetic field exposure can enhance tumor development in combination with carcinogens is inadequate."[225]

> "A number of scientific panels convened by national and international health agencies and the U.S. Congress have reviewed the research carried out to date. Most concluded that there is insufficient evidence to prove an association between EMF and health effects; however, many of them also concluded that there is insufficient evidence to prove that EMF exposure is safe."[226]

The Minnesota State Interagency Working Group on EMF Issues, comprised of staff from state agencies, boards, and Commission, was tasked to study issues related to EMF. In 2002, the group published *A White Paper on Electric and Magnetic Field Policy and Mitigation Options*, and concluded the following:

> "Some epidemiological results do show a weak but consistent association between childhood leukemia and increasing exposure to EMF…. However, epidemiological studies alone are considered insufficient for concluding that a cause and effect relationship exists, and the association must be supported by data from laboratory studies. Existing laboratory studies have not substantiated this relationship…, nor have scientists been able to understand the biological mechanism of how EMF could cause adverse effects. In addition, epidemiological studies of various other diseases, in both children and adults, have failed to show any consistent pattern of harm from EMF.
>
> The Department of Health concludes that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health effects. However, as with many other environmental health issues, the possibility of a health risk cannot be dismissed.[227]"

Regulations and Guidelines Currently, there are no federal regulations regarding allowable ELF-EMF produced by power lines in the United States; however, state governments have developed state-specific regulations. For example, Florida limits electric fields to 2.0 kV/m and magnetic fields to 150 mG at the edge of the ROW for 161 kV transmission lines.[228] Additionally, international organizations have adopted standards for exposure to electric and magnetic fields (**Table 16**).

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[225] World Health Organization. *Extremely Low Frequency Fields*. (2007). http://www.who.int/peh-emf/publications/Complet_DEC_2007.pdf?ua=1, page 10.

[226] State of Minnesota, State Interagency Working Group on EMF Issues (2002) *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options*, https://apps.commerce.state.mn.us/eera/web/project-file?legacyPath=/opt/documents/EMF%20White%20Paper%20-%20MN%20Workgroup%20Sep%202002.pdf: page 1.

[227] Id., page 36.

[228] Florida Department of State. *Rule 62-814.450 Electric and Magnetic Field Standards*. (2008). https://www.flrules.org/gateway/ruleNo.asp?id=62-814.450.

Table 16. International Electric and Magnetic Field Guidelines

Organization	Electric Field (kV/m)		Magnetic Field (mG)	
	Public	Occupational	Public	Occupational
Institute of Electrical and Electronics Engineers	5.0	20.0	9,040	27,100
International Commission on Non-Ionizing Radiation Protection	4.2	8.3	2,000	4,200
American Conference of Industrial Hygienists	—	25.0	—	10,000/ 1,000[a]
National Radiological Protection Board	4.2	—	830	4,200

[a] For persons with cardiac pacemakers or other medical electronic devices

The project includes a Gen-Tie Line that will be built concurrently to connect the proposed solar project to the existing Minnesota Power, Boswell Energy Center substation. The estimated maximum electric field and magnetic field strength for the Gen-Tie Line as measured from the centerline and edge of the right of way (ROW) is described in **Table 17**.

Table 17: Electric Field and Magnetic Field Strength of Gen-Tie Line

Area of Gen-Tie Line	Electric Field (kV/m)	Magnetic Field (mG)
Near Centerline	3.18	405.46
Edge of ROW	0.59	8.65

POTENTIAL IMPACTS

Potential impacts are anticipated to be negligible and are not expected to negatively affect human health. Impacts will be long-term and localized but can be minimized. The primary sources of EMF from the generating facility will be from the solar arrays, buried electrical collection lines, and the transformers installed at each inverter. The EMF generated by solar arrays is at the level generally experienced near common household appliances. Measured magnetic fields at utility-scale PV projects drop to very low levels of 0.5 mG or less at distances of 150 feet from inverters.[229] For electrical collection lines, a study found that at 27.5 kV that magnetic fields are within background levels at 1 meter above ground.[230]

The electric and magnetic fields associated with the Gen-Tie Line are below the international electric magnetic field guidelines, and will dissipate to background levels with distance. From the distance of

[229] Flowers, George; Cleveland, Tommy. *Health and Safety Impacts of Solar Photovoltaics*, (2017). North Carolina Clean Energy Technology Center. Retrieved from: https://content.ces.ncsu.edu/health-and-safety-impacts-of-solar-photovoltaics. at p. 13

[230] McCallum L.C., Whitefield Aslund M.L., Knopper L.D., Ferguson G.M., & Ollson C.A. (2014). *Measuring electromagnetic fields (EMF) around wind turbines in Canada: is there a human health concern?* DOI: 10.1186/1476-069X-13-9

the project components to nearby residences and ROW, for both the generated electric and magnetic fields, EMF will dissipate to background levels. Adverse impacts are not anticipated.[231]

There are several residences that are in proximity of the project (**Table 18**). The closest residence is located 48 feet from the site boundary**.**

Table 18: Residences Near Project Site

Residence ID	Distance from Site (feet)
48	48.4
50	107.1
41	185.5
47	228.0
45	273.1
38	294.1
42	436.8
51	483.3

Based on digital mapping, the nearest solar array is estimated to be approximately 500 feet from the closest residence. The nearest inverter is estimated to be approximately 900 feet from the nearest residence. The project Gen-Tie Line runs from the eastern portion of the solar facility directly east to the Boswell Energy Center Substation. There are no residences within 0.25 miles of the Gen-Tie Line. Therefore, due to the distances between the solar facility equipment and residences, there are no anticipated impacts from EMF to residences or human health due to the project.[232]

MITIGATION

No health impacts from EMF are anticipated. EMF diminishes with distance from a conductor or inverter. There are no residences mapped at a distance that will create an impact from EMF from the solar facility, or the Gen-Tie Line. At the distance of all residences, both electric and magnetic fields will dissipate to background levels. No additional mitigation is proposed.

4.4.2 Public Safety and Emergency Services

The ROI for public and work safety is the land control area. Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Public risks involve electrocution. Electrocution risks could also result from unauthorized entry into the fenced area. The project is designed to meet all applicable federal, state, and local safety standards. Several standard permit conditions mitigate the potential for public safety impacts related to the project.

Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Construction might disturb existing environmental hazards on-site, for example, contaminated soils. During operation, there are occupational risks similar to those associated with construction. Other potential health and safety concerns include hazardous materials,

[231] SPA, p. 32.
[232] SPA, pp. 31-32.

electric shock and arc flash, and fire safety. Public risks would result from unauthorized entry into the facility.

Construction crews must comply with local, state, and federal regulations when installing the project. This includes standard construction-related health and safety practices. This generally includes safety orientation and training, as well as daily/weekly safety meetings.

Emergency services in the project area are provided by several local law enforcement and emergency response agencies in nearby communities. The nearest law enforcement in the project area is provided by Deer River Police Department located approximately 4.7 miles from the project, in addition to the Cohasset Police Department, and the Grand Rapids Police Department, both located 8.2 miles from the project. The Itasca County Sheriff's Office is in Itasca, 25.4 miles from the project site. Fire service is provided by the Cohasset Fire Department, located approximately 3.2 miles from the project. Other nearby fire departments include the Deer River Fire Department located 5.3 miles from the project, and the Grand Rapids Fire Department, located 10.2 miles from the project. The closest emergency room is at the Essential Health Clinic in Deer River, located 5.5 miles from the project. Other healthcare providers in the area include the Grand Itasca Clinic and Hospital, located 8.6 miles from the project, and Essentia Health Grand Rapids Clinic, located 9.8 miles from the project.[233]

The Allied Radio Matrix for Emergency Response (ARMER) system is a part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for emergency responders. The ARMER radio system operates by line of sight, and to operate effectively, multiple towers are necessary. System interruption can occur if tall objects are within the line-of-sight, typically at or near the top of a tower over 150-feet tall. There are three ARMER radio towers near the project, all are in Itasca County. The closest tower is in the city of Deer River, located approximately 4.5 miles from the project.[234]

Potential Impacts

Worker safety issues are primarily associated with construction. Public safety concerns would be most associated with unauthorized entry to the project.

The inflow of temporary construction personnel could increase demand for emergency and public health services. On the job injuries of construction workers requiring assistance due to slips, trips or falls, equipment use, or electrocution can create a demand for emergency, public health, or safety services that would not exist if the project were not to be built. Although no road closures are anticipated during construction, any temporary closures could impede police, fire, and other rescue vehicles access to the site of an emergency.

During public scoping meetings, potential fire risk was brought up. Like any electrical system, solar panels do represent a potential fire risk. Research on fire risk in PV systems indicates that electrical arcing is a main cause of fires, arising due to the use of faulty products, installation errors, or irregular

[233] SPA, pp. 29-30.
[234] Id.

maintenance failing to identify issues with system components.[235] Research investigating the causes of fire in PV systems has mainly focused on rooftop installations; considering that ground-mounted PV systems contain similar electrical components as rooftop systems, they likely experience similar fire causes as well.

The non-impervious portions of the project area will contain native vegetation, which could increase the fire hazard if improperly managed. Law enforcement, fire services, and ambulances may need to enter the site in an emergency. If site access or maneuverability is hindered, this may delay their response time. The applicant can work with local emergency services, including fire departments, to ensure proper training and preparation for fire risk.

The closest ARMER tower is located approximately 4.5 miles west of the project site. The project design does not include features will be within the line-of-sight near the top of these towers, or greater than 150 ft tall. Thus, no impacts to the ARMER system are anticipated.

Mitigation

The project is designed to meet applicable federal, state, and local standards, including during construction. Electrical inspections are required to meet state electrical codes, and will ensure proper installation of all components, and the project will undergo routine inspection. Minnesota Power states that construction will comply with applicable local, state, and federal safety regulations.

Proper PV system installation can reduce fire risk resulting from inaccurate construction methods, and proactive maintenance and monitoring of electrical equipment can identify risky system components before a fire occurs. Additionally, site vegetation will be controlled via mowing and/or grazing, preventing the accumulation of biomass and reducing fire hazard. The use of rotating PV arrays alongside vegetation removal techniques such as grazing can reduce fire hazards.[236] Minnesota Power will coordinate with emergency and non-emergency response teams for the project, including fire departments, in addition to law enforcement and ambulance services. The type and number of responding agencies will depend on the incident requiring emergency services. Minnesota Power stated that it will develop a Solar Project Safety Plan and Emergency Action Plans that outline local contacts (first responders and internal construction, and O&M staff) and emergency procedures for evacuation, fire response, extreme weather, injury, and criminal behavior.[237]

Construction is bound by federal and state Occupational Safety and Health Administration (OSHA) requirements for worker safety, and must comply with local, state, and federal regulations regarding installation of the facilities and qualifications of workers. Established industry safety procedures will be followed during and after construction of the project. Minnesota Power indicates that the project will be fenced and locked gates to prevent unauthorized access. Minnesota Power will follow industry

[235] Ong, N., Sadiq, M., Said, M., Jomaas, G., Tohir, M., & Kristensen, J. (2022). *Fault tree analysis of fires on rooftops with photovoltaic systems.* DOI: https://doi.org/10.1016/j.jobe.2021.103752

[236] Vaverková, M., Winkler, J., Uldrijan, D., Ogrodnik, P., Vespalcová, T., Aleksiejuk-Gawron, J., Adamcová, D., & Koda, E. July 2022. *Fire hazard associated with different types of photovoltaic power plants; Effect of vegetation management.* DOI: https://doi.org/10.1016/j.rser.2022.112491

[237] SPA, pp 29-30.

safety procedures during and after construction of the project, such as posting clear signage during construction activities.[238]

Public safety is addressed in several sections of the DSP (**Appendix C**):

- Section 4.3.30 requires the permittee to take several public safety measures, including landowner educational materials, appropriate signs and gates, etc.
- Section 8.12 requires permittees file an *Emergency Response Plan* with the Commission and local first responders prior to operation.
- Section 8.13 requires disclosure of extraordinary events, such as fires, etc.
- Section 9.1 requires a decommissioning plan prior to construction and updated every five years. Periodic updates of the plan will address the developing information on end-of-life options for PV panels.

No additional mitigation is proposed.

4.5 Land-based Economies

Solar facilities impact land-based economies by precluding or limiting land use for other purposes.

4.5.1 Agriculture

The ROI for agriculture is the anticipated development area and the Gen-Tie Line Corridor. Potential impacts to agricultural producers are anticipated to be minimal to moderate — lost farming revenues will be offset by lease agreements with landowners. A loss of farmland in Itasca County would occur for the life of the project. Potential impacts are localized and unavoidable but can be minimized.

Agricultural use dominates the area of anticipated development, with approximately 652.4 acres of agricultural land to be removed from production that is currently used to produce corn, soybeans, spring wheat, and alfalfa.[239] Within the Gen-Tie Line corridor, approximately 34 acres of agricultural land will be temporarily impacted during construction and operation.

In 2022, there were approximately 96,375 acres of farmland in Itasca County, comprising approximately 5 percent of all land in the county. There are a total of 424 individual farms located in Itasca County, with an average farm size of 227 acres. Cropland, which includes grains, beans, fruits, nuts, vegetables, nursery woody crops, and hay, makes up approximately 50 percent of the farmland. Woodland, pastureland, and other uses make up the remaining 50 percent. The market value of agricultural production in Itasca County in 2022 was an average of $32,539 per farm, for a total of approximately $13.8 million. 98 percent of the farms in Itasca County are family farms.[240]

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[238] Id.

[239] USDA, Census of Agriculture County Profile, Itasca County Minnesota (2022). https://data.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp27061.pdf.

[240] Id.

Prime farmland is defined by Federal regulation at 7 C.F.R.657.5(a)(1) as "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses." Minnesota Power conducted a Prime Farmland Analysis in December of 2024.[241] The majority of the site is not classified as prime farmland, with 3 percent of the project consisting of prime farmland (34.5 acres), 17 percent prime farmland if drained (221.9 acres), and 22 percent farmland of statewide importance (289.4). The prime farmland impacted would be removed from agricultural production for the 30-year operating life of the project but not permanently removed, as the land could be restored to agricultural use following decommissioning of the project. With respect to potential impacts to prime farmland, the applicant indicates that no feasible or prudent alternatives to the project exist.[242]

Potential Impacts

The impact intensity level will range from minimal to moderate. The intensity of the impact is likely to be subjective. For example, conversion of farmland to solar energy production can be viewed as a conversion from one type of industrial use to another. Conversely, the conversion of farmland to solar energy production can be viewed as a negative impact to agricultural production. Restoring the site with native grasses and forbs will reduce soil erosion, provide pollinator and wildlife benefits, and improve soil health. This EA acknowledges that the perceived impacts to farmland are subjective and may be difficult to assess given the trade-offs associated with utility scale solar projects.

The project will cause removal of approximately 0.68 percent of the approximately 96,375 acres of farmland in Itasca County, which is not anticipated to have a significant impact.[243] In addition, the construction of the Gen-Tie Line will temporarily impact up to 34 acres of agricultural land, comprising of approximately 0.04 percent of the farmland in Itasca County. Minnesota Power indicates that adverse impacts associated with the loss of agricultural land and agricultural production will be mitigated through lease, easement, or purchase options to landowners.

Rural areas, with large parcels of relatively flat, open land, are ideal for solar development, which requires six to eight acres of land to generate one MW of electricity. The project will result in up to 652.4 acres of farmland being removed from agricultural production for the life of the project, and 34 acres of farmland being temporarily impacted during construction. This change in land use would take productive farmland out of production for the life of the project, representing approximately 0.69 percent of existing agricultural land in Itasca County. The applicant indicates that the land could be returned to pre-construction conditions and uses after the project is decommissioned and the site is restored.

Construction of the project has the potential to damage agricultural soils through compaction or erosion if BMPs are not implemented to minimize damage.

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[241] SPA – Appendix E: Prime Farmland Analysis. eDockets no. 202412-213417-08.
[242] Id; SPA, p. 10
[243] USDA, Census of Agriculture County Profile, Itasca County Minnesota (2022). https://data.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp27061.pdf.

MITIGATION

Several sections of the DSP (**Appendix C**) address agricultural mitigation and soil-related impacts:

- Section 4.3.9 requires protection and segregation of topsoil.
- Section 4.3.10 requires measures to minimize soil compaction.
- Section 4.3.11 requires the permittee to "implement erosion prevention and sediment control practices recommended by the [MPCA]" and to "obtain a [CSW Permit]." A CSW Permit requires both temporary and permanent stormwater controls to ensure that stormwater does not become a problem on or off-site.
- Section 4.3.16 requires the permittee to implement "site restoration and management" practices enhance "soil water retention and reduces storm water runoff and erosion".
- Section 4.3.17 requires the permittee to develop a VMP that defines how the land control area will be revegetated and monitored over the life of the project. Appropriate seeding rates and timing of revegetation will stabilize soils and improve overall soil health. Minnesota Power has included a draft VMP as Appendix F of its joint site and route permit application.[244]
- Section 4.3.18 requires the permittee to develop an AIMP with MDA. Minnesota Power's draft AIMP (Appendix D of its joint site and route permit application) details methods to minimize soil compaction, preserve topsoil, control noxious weeds and invasive species, maintain the existing drainage conditions through appropriate maintenance and repair of existing drain tile, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use.
- Section 4.3.20 requires the permittee to develop an Invasive Species Management Plan to prevent introduction and spread of invasive species during construction of the project.
- Section 4.3.21 requires the permittee to take reasonable precautions against the spread of noxious weeds.
- Section 4.3.29 requires the permittee to fairly restore or compensate landowners for damages to crops, fences, drain tile, etc. during construction.

Minnesota Power indicates that best management practices (BMPs) would be implemented during construction and operation in order to minimize and mitigate short- and long-term impacts to agricultural lands, such as soil compaction, topsoil mixing, soil erosion, invasive and noxious weed species, and rutting.[245] Minnesota Power will maintain the land throughout the life of the project according to strategies and BMPs outlined in project AIMP and VMP. BMPs referenced in these plans include using seed mixes that maintain land cover and habitat, having an environmental monitor on site, developing methods for erosion and sediment control, separating topsoil during earth moving activities, and more.[246]

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[244] SPA, Appendix F – VMP. eDockets no. 202412-213417-09.
[245] SPA, pp. 58-59.
[246] SPA, Appendix D – AIMP. eDockets no. 202412-213417-07.

4.5.2 Forestry

Although portions of the project site contain wooded land, there are no commercial forestry operations in the project area. Woody vegetation is further discussed in Section 4.7.6: Vegetation.

4.5.3 Tourism

The ROI for tourism is the project area. Impact intensity is expected to be minimal, and short-term in duration. There may be potential for impacts to local recreational activities during construction, however, impacts will be temporary.

Tourism in the local area is primarily centered around outdoor recreational activities, as described in Section 4.3.6: Tourism and Recreation. Tourist attractions in the local area include the Blueberry Hills Golf Course, the Sunset Reins Equine Center, Schoolcraft State Park, White Oak Casino, as well as several lakeside resorts, and walking and bike trails.[247]

POTENTIAL IMPACTS

Impacts to tourism and recreation are anticipated to be minimal. There are no specific tourism opportunities within the project area. Local community events occur in areas within city limits, and not within the project site. Short-term impacts to outdoor recreational activities could occur during construction due to noise and traffic increases, however, these impacts will be temporary and short-term in duration. Minnesota Power indicates that construction of the project will not impact tourism opportunities at White Oak Casino, or other nearby attractions.[248]

MITIGATION

Because significant impacts are not anticipated, no additional mitigation measures are proposed.

4.6 Archeological, Cultural, and Historic Resources

The ROI for archeological and historic resources is the project area. The impact intensity level is anticipated to be negligible to minimal. Impacts would be localized. Impacts can be mitigated through prudent siting and routing.

Archeological resources include mounds and earthworks, ancient burial grounds, prehistoric ruins, or historical remains.[249] Historic resources are sites, buildings, structures, or other antiquities of state or national significance.[250]

Construction and operation of the project also has the potential to impact resources that are important to American Indian Tribes with ties to the region. Siting of large energy facilities in a manner that respects historic and cultural ties to the land requires coordination with local tribes, including the Leech Lake Band of Ojibwe (LLBO).

Minnesota Power conducted a Phase I archaeological survey with Barr Engineering in 2024. A records check of previously recorded cultural resources identified one archaeological site within the project area, and eighteen cultural resources documented within 1-mile of the Project, including three

[247] SPA, pp. 59-60.
[248] Id.
[249] Minnesota Statutes, Section. 138.31, subd. 14.
[250] Minnesota. Statutes, Section 138.51.

historic architectural resources and 15 archaeological sites.[251] Minnesota Power coordinated with the Minnesota State Historic Preservation Office (SHPO) and the LLBO Tribal Historic Preservation Officer (THPO) to review the Phase I archaeological survey that was conducted by Barr Engineering. The purpose of the Historic Preservation Office is preserving and protecting the state's historic resources. SHPO and THPOs consults with project proposers and state agencies to identify historic resources to avoid and minimize impacts to both state and tribal resources.

POTENTIAL IMPACTS

Minnesota Power worked with Barr Engineering to complete a Phase Ia literature review (Phase Ia) in June 2024 for the project area and 1-mile around it, consisting of a review of MnSHIP, Minnesota's Statewide Historic Inventory Portal; the Office of the State Archaeologist (OSA) Portal; the National Register of Historic Places (NRHP) Database; and a review of historic maps and aerial imagery. Within the 1-mile study area, the Phase Ia identified 15 previously recorded archaeological sites, and three previously recorded historic architectural resources that have been documented, including one archaeological site (21IC0472) and one historic architectural resource (XX-ROD-00052) within the project site.[252]

After the literature review, Barr Engineering completed a Phase I Archaeological Reconnaissance Survey for the project in July and August of 2024. The survey identified six archaeological sites within the project boundaries. These include a prehistoric lithic scatter (21IC0485), a prehistoric ceramic isolated find (21IC0486), and four historic artifact scatters (21IC0487, 21IC0488, 21IC0489 and 21IC0490). Barr recommended that all six sites be considered Not Eligible for listing on the National Register of Historic Places.

Minnesota Power coordinated with SHPO and the LLBO THPO to review the results of Barr Engineering's survey. Based on the results of the Phase I Archaeological Reconnaissance Survey, SHPO has confirmed that there are "no properties listed in the National or State Registers of Historic Places, or within the Historic Sites Network, that will be affected by this project." In addition, the LLBO THPO has confirmed that the survey has been reviewed with regard to historic properties, and states that "there are no Historic properties affected, and no further archaeological investigations are recommended", requesting that the LLBO standard stipulations apply.[253] These stipulations include:

1. If any archaeological materials or features are encountered during the undertaking, all work must cease and the Leech Lake THPO and the Heritage Sites Program Director must be contacted immediately to assess and execute mitigation procedures.

2. All disturbances must be confined to the inventoried and cleared areas.

3. Should human remains be encountered, all work must cease and the Cass County Sheriff, the Leech Lake THPO, and the Office of the State Archaeologist must be contacted immediately.

[251] SPA, Appendix I - Boswell Solar Phase I Archaeological Survey. eDockets no. 202412-213417-12.
[252] SPA, pp. 60-61.
[253] Minnesota Power, SHPO/THPO Concurrence Letters. May 23, 2025. eDockets no. 20255-219222-01.

Minnesota Power also directed archeological survey work in 2025 for additional limited portions of the project area where ground disturbance is anticipated but prior surveys were not conducted. Minnesota Power indicates that no additional resources were identified, and an addendum report is being prepared to share with the LLBO THPO and SHPO once available. Minnesota Power will file the same addendum, as well as any further correspondence with THPO or SHPO with the Commission in the project docket.[254]

Impacts to archeological and historic resources are not anticipated for this project.

MITIGATION

Prudent siting and routing to avoid impacts to archaeological and historic resources is the preferred mitigation.

- Section 4.3.23 of the DSP (**Appendix C**) address archeological resources and require the permittee to avoid impacts to archaeological and historic resources where possible and to mitigate impacts where avoidance is not possible. If previously unidentified archaeological sites are found during construction, the permit requires the permittee to stop construction and contact SHPO to determine how best to proceed. Ground disturbing activity will stop, and local law enforcement will be notified should human remains be discovered.

- Section 5.3 of the DSP is a special condition requiring the permittee to work with the appropriate LGU regarding cultural discoveries during construction. This includes MnDOT coordination if there are discoveries within MnDOT Right of Way, and coordination with the Leech Lake Band of Ojibwe THPO if there are cultural discoveries within the project site or anticipated impacts to culturally relevant resources.

- Section 5.5 of the DSP is a special condition requiring the permittee to develop an Unanticipated Discoveries Plan (UDP) to identify guidelines to be used in the event previously unrecorded archeological or historic properties, or human remains, are encountered during construction, or if unanticipated effects to previously identified archaeological or historic properties occur during construction. The UDP shall describe how previously unrecorded, non-human burial, archeological sites found during construction shall be marked and all construction work must stop at the discovery location. The UDP shall include that if any archaeological materials or features are encountered during construction of the project, all work must cease, and the Leech Lake THPO and the Heritage Sites Program Director must be contacted immediately to assess and execute mitigation procedures. Should human remains be encountered, all work must cease and the Cass County Sheriff, the Leech Lake THPO, and the Office of the State Archaeologist must be contacted immediately. The permittee is required to file the UDP with the Commission at least 14 days prior to the preconstruction meeting

Minnesota Power indicated in their joint site and route permit application that an Unanticipated Discoveries Plan will be prepared to describe procedures that will be implemented during

[254] Id.

construction, and should an NRHP-eligible site be encountered, the applicant will coordinate with SHPO/THPO and OSA to avoid, minimize, or mitigate adverse effects.[255]

4.7 Natural Resources

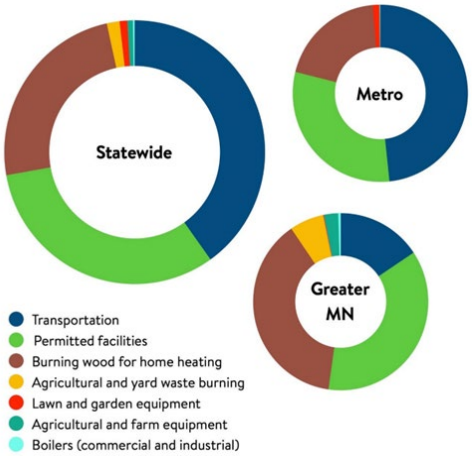
Solar facilities can impact the natural environment. Impacts are dependent upon many factors, such as how the project is designed, constructed, maintained, and decommissioned. Other factors, for example, the environmental setting, influence potential impacts. Impacts can and do vary significantly both within, and across, projects.

4.7.1 Air Quality

The ROI for air quality is the region. Potential impacts to air quality during construction would be intermittent, localized, short-term, and minimal. Impacts are associated with fugitive dust and exhaust. Impacts can be mitigated. Once operational, the solar array will not generate air pollutants. Negligible fugitive dust and exhaust emissions would occur as part of routine maintenance activities. Impacts are unavoidable and do not affect a unique resource. Impacts can be minimized.

Air quality is a measure of how pollution-free the ambient air is and how healthy it is for humans, other animals, and plants. Emissions of air pollutants will occur during construction and operation of the project. Regulation and voluntary action throughout Minnesota has led to a reduction in air pollution over time. As a result, overall air quality in Minnesota has improved over the last 20 years, and the state has generally remained in compliance with tighter national ambient air quality standards (NAAQS).[256] However, current levels of air pollution still contribute to health impacts, and environmental justice communities are still disproportionately affected by air pollution. As illustrated in **Figure 15,** today, most of our air pollution comes from smaller, widespread sources such as our vehicles, local businesses, heating and cooling, and yard and recreational equipment.[257]

Figure 15. Air Pollution Sources by Type



In Minnesota, air quality is tracked using air quality monitoring stations at 59 sites across the State. The MPCA uses data from these monitors to calculate the Air Quality Index (AQI) on an hourly basis, for ozone (O3), particulate matter (PM10/PM2.5), sulfur dioxide (SO2), nitrogen dioxide (NO2), and carbon monoxide (CO). The AQI is used to categorize the air quality of a region as one of five

[255] SPA, pp. 60-62.
[256] USEPA, *National Ambient Air Quality Standards (NAAQS) Table*. (2024).: https://www.epa.gov/criteria-air-pollutants/naaqs-table.
[257] MPCA *The State of Minnesota's Air Quality, January 2023 Report to the Legislature*, https://www.lrl.mn.gov/docs/2022/mandated/221697.pdf

levels: good, moderate, unhealthy for sensitive groups, unhealthy, or very unhealthy.[258]

The nearest air quality monitor to the project is in Leech Lake, Minnesota, approximately 20 miles southwest of the project area. Air quality in the area has been considered "good" between 292 and 340 days of the year from 2018-2023. During the same time period, the number of days classified as moderate varied between 29 and 99. Air quality was considered unhealthy for sensitive groups for one day in 2019, six days in 2021, and five days in 2023. Air quality was classified as unhealthy for four days in 2021. There was one day classified as very unhealthy in 2021. [259]

The MPCA describes a large increase in the number of days with air quality alerts due to unhealthy air quality in 2021 and 2023 as largely attributed to drought conditions in the upper Midwest. Ozone formation is typically more robust during drought conditions due to less precipitation and cloud cover. The drought conditions also contributed to wildfire activity in central Canada. Smoke from these fires made frequent movements into Minnesota, in addition to smaller but closer fires in Minnesota and Ontario, leading to several alert days. Wildfire smoke from Canada and the western U.S. has become increasingly common in Minnesota as wildfires get bigger, hotter, more frequent, and have a longer burning season. This trend is expected to continue in the future due to climate change and past practices of putting out fires as soon as they start, which has allowed fuel to build up. [260]

Potential Impacts

Minimal intermittent air emissions are expected during construction of the project. Air emissions associated with construction are highly dependent upon weather conditions and the specific activity occurring. For example, traveling to a construction site on a dry gravel road will result in more fugitive dust than traveling the same road when wet. Air effects would primarily consist of emissions from construction equipment and other vehicles, and from fugitive dust generated from surface activities. Other factors that influence the amount of fugitive dust released include the level soil type and moisture content, wind speed, precipitation, and vehicle characteristics like weight and speed.[261] Once operational, the generating facility is not expected to generate air pollutants.

Air emissions from project construction activities would primarily consist of carbon dioxide (CO2), nitrogen oxides (NOx) and other particulate matter. Motorized equipment will emit exhaust. This includes construction equipment and vehicles travelling to and from the project. Exhaust emissions, primarily from diesel and other carbon-based fueled equipment, and would vary according to the phase of construction.[262]

All projects that involve movement of soil, or exposure of erodible surfaces, generate some type of fugitive dust emissions. The project would generate fugitive dust from activities such as travel on

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[258] 2025 Air Monitoring Network Plan for Minnesota. https://www.pca.state.mn.us/sites/default/files/aq10-24a.pdf

[259] MPCA. *Annual AQI Days by Reporting Region*, https://data.pca.state.mn.us/views/Minnesotaairqualityindex/AQIExternal?%3Aembed=y&%3AisGuestRedirectFromVizportal=y..

[260] MPCA. The Air We Breathe: The State of Minnesota's Air Quality (2025), p. 12., https://www.pca.state.mn.us/sites/default/files/lraq-1sy25.pdf.

[261] SPA, pp. 63-64.

[262] Id.

unpaved roads, grading, and excavation. Dust emissions would be greater during dry periods and in areas where fine-textured soils are subject to surface activity.

Emissions associated with maintenance are dependent upon weather conditions and the specific activity occurring. Vehicle exhaust will be emitted during maintenance visits to the generating facility; however, this will be temporary, and infrequent throughout the year. Wind-blown fugitive dust emissions are not expected to increase and could potentially be lower than current or historic emissions, due to the establishment of perennial native vegetation within the project site.[263] In addition, during operation of the Gen-Tie Line, small amounts of NOx and O3 are created due to corona from the operation of transmission lines. However, Minnesota Power notes that the emission of O3 from the operation of a transmission line of the voltages proposed for the project will be minimal.[264]

MITIGATION

Exhaust emissions can be minimized by keeping vehicles and equipment in good working order and not running equipment unless necessary. Minnesota Power states that it will minimize emissions from construction vehicles by using modern equipment with lower emissions ratings and properly functioning exhaust systems.[265]

To minimize dust generation from construction, Minnesota Power indicates that construction-related practices may be employed, including the application of water or other commercially available dust control agents on unpaved areas subject to frequent vehicle traffic, reducing the speed of vehicular traffic on unpaved roads, covering open-bodied haul trucks, containment of excavated material, protection of exposed soil, soil stabilization, and treating stockpiles.[266]

Construction of the project will disturb more than 50 acres of soil. As a result, Minnesota Power will prepare and submit a National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) Construction Stormwater (CSW) Permit application and Storm Water Pollution Prevention Plan (SWPPP) to MPCA for review and approval prior to construction in order to obtain coverage under the General Construction Stormwater Permit Program. Implementing this plan prior to construction can minimize the potential for fugitive dust emissions.

The AIMP identifies construction best management practices related to soils and vegetation that will help to avoid, minimize, mitigate, and/or repair potential negative agricultural impacts that may result from the construction, operation, and eventual decommissioning of the project. Several sections of the draft plan indirectly mitigate impacts to air quality, including sections related to construction, clearing and vegetation removal, soils, erosion and sediment control, and restoration of the site to pre-construction conditions.[267]

[263] Id.
[264] SPA, pp. 64-65.
[265] Id.
[266] Id.
[267] SPA - Appendix D: AIMP. eDockets no. 202412-213417-07.

4.7.2 Geology and Groundwater

The ROI for geology and groundwater is the land control area. Impacts to domestic water supplies are not expected. Impacts to geology are not anticipated. Localized impacts to groundwater resources, should they occur, would be intermittent, but have the potential to occur over the long-term. Indirect impacts from surface waters might occur during construction. Impacts can be mitigated through use of BMPs for stormwater management.

The geology of a project area can influence the anticipated impacts of construction and operation. Bedrock geology features within the project area are primarily composed of Archean intrusive rock of foliated to gneissic tonalite, diorite, and granodiorite of the Superior Province of the Giants Ridge batholith.[268] The area also includes portions of magnetic intrusions, which are classified as undifferentiated, typically too small to ascertain gravity expression.[269]

Depth to Bedrock within the project area ranges from 210 to 350 feet beneath ground surface.[270] Surficial sediments within the project area are primarily composed of Gravelly sediment, containing gravel to sand, commonly derived from till; washed by waves and deposited along shorelines. There are also portions of Sandy sediment, containing fine-grained sand with silt and clay layers; proximal meltwater sediments deposited in glacial lakes typically as subaqueous outwash fans, as well as Clayey sediment, containing silt and clay, commonly laminated; dominantly distal meltwater sediments deposited in deep water.[271]

Groundwater in Minnesota is largely a function of local geologic conditions that determine the type and properties of aquifers. Minnesota is divided into six groundwater provinces based on bedrock and glacial geology. Aquafers within these provinces occur in two general geologic settings: unconsolidated sediment (e.g., clay, sand, gravel) deposited by glaciers, streams, and lakes; and bedrock (e.g., limestone, granite) comprising a wide range of rock types and ages. Combining these settings creates the groundwater provinces. The project site is within Province 4, the Central Province, and is characterized by buried sand aquifers and relatively extensive surficial sand plains, part of a thick layer of sediment deposited by glaciers overlying the bedrock. Province 4 has thick glacial sediment, sand and gravel aquifers are common, and the deeper fractured crystalline bedrock has poor aquifer properties and limited use as an aquifer.[272]

Pollution sensitivity of near-surface materials in the project area ranges from the “very low” to “moderate” and “high” categories in certain areas, as well as containing areas of water and open space.[273] The sensitivity to pollution of near-surface materials is an estimate of the time it takes for

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[268] SPA, p. 65-66.; Minnesota Geological Survey (2011), S-21 Geologic Map of Minnesota-Bedrock Geology, https://conservancy.umn.edu/items/96de8d96-46ba-441c-94ca-41080b4335be.

[269] Id.

[270] Minnesota Geological Survey (2023), D-03, Depth to Bedrock – Minnesota. https://mngs-umn.opendata.arcgis.com/content/7d6744ce505d45e781fd4a063baeba14/about.

[271] Minnesota Geological Survey (2023), S-23 Geologic Map of Minnesota - Quaternary Geology, https://conservancy.umn.edu/items/49a5c319-0b36-4502-9d5f-e64f283d5003.

[272] DNR, Minnesota Groundwater Provinces (2021) https://www.dnr.state.mn.us/waters/groundwater_section/mapping/provinces.html

[273] DNR, Pollution Sensitivity – Near Surface Materials (Minnesota Natural Resource Atlas), retrived from https://mnatlas.org/gis-tool/.

water to travel through the unsaturated zone to reach the water table, which for the purposes of the model was assumed to be 10 feet below the land surface.[274] This means that the project area is generally expected to have varying groundwater pollution sensitivity. Low sensitivity indicates that contaminants from the land surface would not reach groundwater for months to a year, whereas high sensitivity indicates that contaminants could travel within hours to a week.[275] Low sensitivity does not guarantee protection. Leakage from an unsealed well, for example, may bypass the natural protection, allowing contamination to directly enter an aquifer.

Depth to bedrock beneath the project is estimated to be greater than 200 ft, up to 350 ft below ground surface. Bedrock is overlaid by thick glacial deposits, and the depth to bedrock is generally deeper than 50 feet. Karst features such as sinkholes, springs, and stream sinks are not known to be present in the project area.[276] The nearest karst feature is a spring, located approximately three miles northeast of the project area, however the DNR Karst Feature Inventory classifies this as a spring that has not been field checked. Additionally, located approximately four miles south and west of the site is the Itasca County Onion Bay-West end Pokegama Lake Spring, located on Pokegama Lake.[277] Depth to water table in the project area ranges from just below the surface up to 50 feet depending on the soil type.[278] Depth to water table is shallower in areas near water features such as wetlands, streams and lakes, and deeper in the non-hydric soil units. The groundwater flow direction in these shallow, unconsolidated sediments is expected to follow surface topography and surface water flow. However, the groundwater flow direction may vary throughout the project depending on factors such as the presence of underground utilities and/or other surficial features.[279]

The project area was reviewed for EPA designated sole source aquifers (SSAs), wells listed on the Minnesota Well Index (MWI) and MDH Wellhead Protection Areas (WHPAs).[280] The MDH maintains the Minnesota Well Index (MWI), which provides basic information (e.g., location, depth, geology, construction, and static water level) for wells and borings drilled in Minnesota. The MWI identified one active domestic water well, and two active monitoring wells within the project area.[281] The wells within the project site and their respective differences are documented in **Table 19**. In addition, multiple active domestic wells and inactive sealed wells are located near and around the project area.

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[274] Adams, R. (June 2016) Pollution Sensitivity of Near-Surface Materials, retrieved from: https://www.leg.state.mn.us/docs/2017/other/170839.pdf , page 3.

[275] DNR (2016), Methods to Estimate Near-Surface Pollution Sensitivity, retrieved from: https://files.dnr.state.mn.us/waters/groundwater_section/mapping/gw/gw03_ps-ns.pdf .

[276] SPA, pp. 65-66.

[277] DNR, Minnesota Karst Feature Inventory (2025). https://arcgis.dnr.state.mn.us/portal/apps/webappviewer/index.html?id=9df792d8f86546f2aafc98b3e31adb62.

[278] USDA Web Soil Survey, retrieved from: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx; DNR Water Table – Depth (Minnesota Natural Resource Atlas), retrived from https://mnatlas.org/gis-tool/.

[279] SPA, pp. 65-66.

[280] Id.; EPA, Sole Source Aquifers, https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=9ebb047ba3ec41ada1877155fe31356b; MPCA, Minnesota Wellhead Protection Areas (WHPA), (2019), https://gisdata.mn.gov/dataset/water-wellhead-protection-areas.

[281] MDH (2025) *Minnesota Well Index* https://www.health.state.mn.us/communities/environment/water/mwi/index.html .

Table 19: Minnesota Well Index[282]

Unique Well ID	Well name	Location in Site	Drilled Depth (ft)	Well Use	Status
809847	Warren	Southwest	79	Domestic	Active
455353	NL	West	19	Monitoring	Active
NL	NA69	Northwest	NL	Monitoring (NPDES)	NL

Under the Safe Drinking Water Act, 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. Wellhead Protection Areas (WHPAs) encompass 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.

A search for WHPAs in the MDH database indicated that the project area is located entirely outside of any WHPA. The nearest WHPA and associated Drinking Water Supply Management Area (DWSMA), the Cohasset Municipal Water System is adjacent to the project site, located east of the Gen-Tie Line and project substation. MDH assesses the vulnerability of WHPAs and DWSMAs based on the perceived risk of a well. This perceived risk is informed by a variety of factors, including geologic sensitivity, well construction, maintenance and use, water chemistry and isotopic composition.[283] The Cohasset DWSMA is ranked as having moderate vulnerability.[284] In addition, MDH designates Special Well and Boring Construction Areas, that of which there are currently none identified within Itasca County, or within the project area.[285]

Potential Impacts

Potential impacts to geology and groundwater can occur directly or indirectly. Impacts to geological resources are likely to be minimal, due to the anticipated depth of construction being relatively shallow, and the absence of karst features. There are no identified SSAs, WHPAs, or DWSMAs within the project site. Located adjacent to the project is the Cohasset DWSMA, which is ranked as moderate

[282] Id: SPA, Map 12: Groundwater Resources.
[283] MDH (2018), Wellhead Protection Vulnerability Fact Sheet. https://www.health.state.mn.us/communities/environment/water/docs/swp/vulnerability.pdf.
[284] MDH (2019), Drinking Water Supply Management Areas (DWSMAs). https://gisdata.mn.gov/dataset/water-drinking-water-supply.
[285] SPA, pp. 66-67.,; MDH (2025) *Minnesota Well Index* https://www.health.state.mn.us/communities/environment/water/mwi/index.html .

vulnerability, suggesting there is a moderate likelihood that activities at the land surface, such as construction may degrade drinking water quality at a public water supply well.[286] Minnesota Power completed a geotechnical engineering report with Terracon Consultants in December of 2022. During this, shallow groundwater was encountered in several borings completed within the project area, ranging at depths from 4 to 19 feet below ground surface.[287]

Direct impacts to groundwater are generally associated with construction, for example, structure foundations that could penetrate shallow water tables or groundwater usage. Indirect impacts could occur through spills or leaks of petroleum fluids or other contaminants that contaminate surface waters, which could ultimately contaminate groundwater. The disturbance of soil and vegetative cover could affect water quality in groundwater resources. Impacts to groundwater resources, including aquifers, are not anticipated as water supply needs will be limited and sole source aquifers are not common in the area.

There are three documented water wells within the project site. Minnesota Power states that prior to and during construction, any wells identified will be assessed to determine if they are open, and sealed, if necessary, in accordance with MDH requirements.[288]

Solar panels, roads, and gravel surfaces associated with the project are considered impervious surfaces by MPCA. Therefore, the project will increase the amount of impervious surface in the area, potentially impacting groundwater recharge. Minnesota Power indicates that an increase in impervious surfaces has the potential to increase stormwater runoff and, in turn, reduce groundwater recharge. Minnesota Power will manage surface water that flows or falls onto impervious surfaces in accordance with conditions of the National Pollutant Discharge Elimination System (NPDES) stormwater permits.[289]

Current project design for the solar facility includes a steel pile foundation, which is driven into the ground with a hydraulically powered high-frequency hammer mounted on a tracked carrier. Concrete pad foundations are expected to be used for the solar array if a steel pier rack foundations is not driven.[290] The project Gen-Tie Line structure foundations are expected to range from 20 to 60 feet in depth. Minnesota Power states that all foundation materials will be non-hazardous. In areas where shallow depths to bedrock or groundwater resources are encountered, specialty structures that require wider and shallower excavations may be used.[291]

The storage of large quantities of hazardous material creates the potential for spills or leaks into groundwater. Minnesota Power will prepare and implement a Spill Prevention, Countermeasures and

[286] MDH (2018), Wellhead Protection Vulnerability Fact Sheet. https://www.health.state.mn.us/communities/environment/water/docs/swp/vulnerability.pdf.
[287] SPA, pp. 66-67.
[288] Id.
[289] Id.
[290] SPA, p. 14.
[291] SPA, p. 67.

Control (SPCC) plan for the main transformer located at the project substation to prevent spills or leaks in accordance with USEPA regulations.[292]

Some solar panels can be considered hazardous waste if they exhibit toxicity, ignitability, reactivity, or corrosivity, or leach heavy metals. Final solar panel selections have not been made for the project; however, it is anticipated that the project will use the Q.Tron XL-G2.3 610w,n-type monocrystalline, bifacial solar module.[293] Minnesota Power's Spill Prevention, Control, and Countermeasure (SPCC) Plan will be developed to address releases, should panels break or become damaged, in addition to the plan to prevent spills and leaks at the project substation.[294]

MITIGATION

Stormwater management is important to ensure that structure foundations maintain their integrity and that rainwater and surface runoff drain away from the project structures and roads in a way that does not adversely affect existing drainage systems, roads, or nearby properties. Appropriate permanent stormwater management measures, including minimizing the area of impervious surfaces at the site to reduce the volume and velocity of the stormwater runoff and the establishment of stormwater ponds, can address drainage from the newly established impervious areas. Minnesota Power included permanent stormwater detention and retention basins in the project design, in accordance with MPCA requirements, which can help release stormwater runoff at the existing or a reduced rate.[295]

Construction of the project will disturb more than 50 acres of soil. Minnesota Power must obtain coverage under the General Construction Stormwater Permit Program and prepare and submit a National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) Construction Stormwater (CSW) Permit and Stormwater Pollution Prevention Plan (SWPPP) to the MPCA. The CSW Permit will identify BMPs for erosion prevention and sediment control. The SWPPP describes construction activity, temporary and permanent erosion and sediment controls, BMPs, permanent stormwater management that will be implemented during construction and through the life of the project. Implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion and detail stormwater management methods during construction and operation of the facility.

Section 4.3.11 of DSP (**Appendix C**) requires the permittee to obtain a MPCA CSW Permit and implement the BMPs within for erosion prevention and sediment control. Impacts to groundwater can also be minimized by mitigating impacts to and soils and surface waters as discussed in Sections 4.7.3 and 4.7.4.. Minnesota Power indicates that it will prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) in accordance with Minnesota Pollution Control Agency (MPCA) standards and guidance specific to solar projects. The SWPPP will include erosion and sediment control best management practices (BMPs) such as construction track out controls, silt fence, permanent seeding, and vegetated buffers. The implementation of the SWPPP and associated BMPs will minimize the

[292] SPA, pp. 66-67.
[293] SPA, p. 13.
[294] SPA, pp. 66-67.
[295] SPA, p. 20.

potential for downstream water quality impacts throughout the duration of construction and operation of the project.[296]

Any dewatering required during construction will be managed in accordance with the SWPPP and DNR temporary dewatering permit by discharging to the surrounding surface. If dewatering of more than 10,000 gallons per day or 1,000,000 gallons per year, a Water Appropriations Permit from DNR is required. Minnesota Power indicates that it will obtain a Water Appropriation/Dewatering Permit from the DNR if dewatering is necessary during construction. Minnesota Power states that construction trench water will be discharged to surrounding areas using appropriate BMPs to minimize erosion and allow the water to infiltrate back into the ground in accordance with applicable permits (SWPPP, etc.).[297]

4.7.3 Soils

The ROI for soils is the land control area. Impacts to soils will occur during the construction and decommissioning of the project. The impact intensity level is expected to be minimal. Potential impacts will be both positive and negative, and short- and long-term. Isolated moderate to significant negative impacts associated with high rainfall events could occur. Because the soil at the solar facility will be maintained with native perennials and other beneficial vegetation for the life of the project, soil health is likely to improve.

The soils in the project area are made up of sandy loam, loamy sand, loam, muck, and mucky peat, with slopes ranging from 0% to 25% (**Table 20** and **Table 21**). Soils in the project site are mostly comprised of topsoil with a depth of less than 12 inches (1,256 acres, 93 percent). There is also about five acres of soils with topsoil deeper than 12 inches within the project area, however there are no soils in the site with a topsoil thickness greater than 18 inches.[298] A portion of soils within the project site are susceptible to erosion, with 31 percent of the soils having a moderate, severe, or very sever erosion hazard rating.[299]

Most of the soils within the site are relatively well drained, however there are still areas that are prone to compaction (19 percent). The majority of soils within the site are at risk for rutting, with a large amount of soils present that are rated as severe for rutting (67 percent) (**Table 22**). The severe rating indicates that ruts form readily due to the hydric texture of the soil. The degree of soil rutting and compaction corresponds to the soil texture and moisture levels, which worsen when heavy equipment traffic impacts wet soils with fine or medium textures. Within the Gen-Tie line, soils are largely well drained, decreasing the likelihood for runoff or rutting (**Table 23**).

Over half of soils within the project site are considered vulnerable to drought (55 percent).[300] Most of the soils within the solar facility project site not designated as prime farmland (59 percent). However, there are still areas considered prime farmland within the project site, with a small amount

[296] Id.
[297] SPA, pp. 66-67.
[298] SPA – Appendix D: AIMP, p. 16.
[299] SPA, p. 22.
[300] SPA, Appendix D: AIMP, Table 4.

of soils identified as prime farmland (3 percent), a larger amount as prime farmland of statewide importance (22 percent) and of prime farmland if drained (16 percent).[301]

Table 20. Soil Types in Solar Facility Project Site[302]

Soil Type	Slopes	Drainage Class	Acres	Percent of Project Site (%)
Wawina-Cedar Valley complex	1-18%	Well drained	418.6	31
Cutaway loamy sand	0-8%	Well drained	289.4	22
Effie-Ashlake-Effie, frequently ponded, complex	0-2%	Poorly drained	122.1	9
Ashlake-Effie complex	0-4%	Somewhat poorly drained	99.7	7
Sago and Roscommon soils	0-2%	Very poorly drained	58.3	4
Mooselake and Lupton soils	0-1%	Very poorly drained	50.4	4
Seelyeville-Bowstring association	0-2%	Very poorly drained	48.9	4
Redby loamy fine sand	0-3%	Somewhat poorly drained	48.1	4
Cowhorn-Onega-Sago, frequently ponded complex	0-3%	Somewhat poorly drained	35.6	3
Ashlake-Suomi complex	1-8%	Somewhat poorly drained	22.4	2
Histosols, ponded	0-1%	Very poorly drained	16.7	1
Nebish loam	1-8%	Well drained	12.1	1
Tawas muck	0-2%	Very poorly drained	12.0	1
Bearville loamy sand	0-2%	Poorly drained	11.1	1
Sandwick loamy fine sand	0-2%	Poorly drained	6.9	1
Hamre-Tacoosh-Effie complex, frequently ponded	0-1%	Very poorly drained	5.1	0.4
Warba-Menahga complex	10-25%	Well drained	3.9	0.3
Water	--	--	83.2	6.2
Solar Facility Subtotal			**1344.5**	100%

[301] SPA, Appendix D: AIMP, Table 3.
[302] Soil data gathered from: SPA at p. 69, Table 4-16; USDA National Cooperative Soil Survey Soil Series Soil Survey Geographic Database (NRCS SSURGO) Web Soil Survey Map Viewer. Retrieved from: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

Table 21: Soil Types in Gen-Tie Line Route[303]

Soil Type	Slopes	Drainage Class	Acres	Percent of Project
Wawina-Cedar Valley complex	1-18%	Well drained	39.9	31
Cutaway loamy sand	0-8%	Well drained	12.4	10
Udorthents, nearly level to rolling	2-12%	Well drained	9.1	7
Mooselake and Lupton soils	0-1%	Very poorly drained	5.2	4
Bearville loamy sand	0-2%	Poorly drained	3.7	3
Redby loamy fine sand	0-3%	Somewhat poorly drained	2.8	2
Cathro muck, occasionally ponded	0-1%	Very poorly drained	1.5	1
Dora mucky peat	0-1%	Very poorly drained	0.5	0
Water	--	--	52.1	41
Project Gen-Tie Line Subtotal			127.2	100%

Table 22: Drainage Class of Soils in Solar Facility

Drainage Class	Acres	Percent of Project Site (%)
Well drained	724	57
Poorly drained	140.1	11
Somewhat poorly drained	205.8	16
Very poorly drained	191.4	15

Table 23: Drainage Class of Soils in Gen-Tie Line

Drainage Class	Acres	Percent of Project Site (%)
Well drained	61.4	82
Poorly drained	3.7	5
Somewhat poorly drained	2.8	4
Very poorly drained	7.2	10

POTENTIAL IMPACTS

The impact intensity level is expected to be low to moderate. Primary impacts to soils include compaction from construction equipment, soil profile mixing during grading and pole auguring, rutting from tire traffic, and soil erosion. There would likely be impacts during decommissioning of

[303] Soil data gathered from: SPA at p. 70, Table 4-17; USDA National Cooperative Soil Survey Soil Series Soil Survey Geographic Database (NRCS SSURGO) Web Soil Survey Map Viewer. Retrieved from: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

the project. During construction, soils will be impacted by grading activities required to provide a level surface for safe operation of the construction equipment.[304] Potential impacts will be positive and negative, and short- and long-term. Isolated moderate to significant negative impacts associated with high rainfall events could occur, such as from rutting. Because the soil at the solar facility would be maintained with native perennials and other beneficial vegetation, soil health would likely improve over the life of the project.

Construction will take place on approximately 1,344.5 acres land for the solar facility and 127 acres of soil for the Gen-Tie line, of which 498.6 acres will be for the operation of the project (Anticipated Development Area).[305] Minnesota Power surveyed an area of 695 acres as the area of potential disturbance for the project.[306] As with any ground disturbance, there is potential for soil compaction and erosion. Heavy rainfall events during construction or prior to the establishment of permanent vegetation increase the risk that significant sedimentation and erosion could occur.

The soils within the site are generally loamy, sandy, or muck, in texture and over a third of the site is poorly drained. During wet conditions, most soils within the site are prone to rutting with a moderate a severe rating, and less than a quarter of soils are prone to compaction. Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils. Construction equipment traveling over wet soils could disrupt the soil structure, reduce pore space, increase runoff potential, and cause rutting. The degree of compaction depends on moisture content and soil texture.[307] Half of the soils in the project site are susceptible to drought. Specifically, areas with higher slopes may be more susceptible. Existing drain tiles may be used or new can be tiles installed to ensure proper drainage.

Most soils within the Gen-Tie Line corridor are susceptible to moderate or severe rutting. However, soils have a less hydric texture, with only 8 percent of the Gen-Tie Line corridor containing soils with poor drainage, and only 5 percent of the Gen-Tie Line corridor containing soils that are susceptible to compaction.[308]

Soil cover and management at the solar facility will change from cultivated cropland to a mixture of pervious areas with native perennial and other beneficial ground cover plantings, and semi-impervious surfaces. Once permanent vegetation is properly established, stormwater management, as well as general soil health, will improve due to the use of native perennial plants.

MITIGATION

Minnesota Power describes measures and best management practices (BMPs) that will be implemented to minimize impacts to soil and designated farmland in their joint site application. This includes strategies outlined in the AIMP, such as methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation cover, allowing the land to be returned to its original (agricultural) use after decommissioning. The project VMP also includes methods to plant and stabilize soil during and after construction, outlining methodologies for proper vegetation

[304] SPA, pp. 71-72.
[305] SPA, p. 1; SPA – Appendix D: AIMP
[306] SPA, p. 61.
[307] SPA, p. 72.
[308] Id.

installation, including guidance for soil preparation, seeding, and seed mixes. Minnesota Power states that the establishment of perennial vegetation will preserve or improve soil quality over time, and studies indicate that planting pollinator habitat may increase yields of adjacent cropland that relies on insect pollinators, such as soybeans.[309]

Additionally, in accordance with MPCA requirements, Minnesota Power will develop and implement a SWPPP to minimize soil erosion and impacts during construction. The SWPPP will include BMPs such as silt fencing, temporary seeding/stabilization, permanent stormwater basins, and project phasing.[310]

In addition, several sections of the DSP (**Appendix C**) address soil-related impacts

- Section 4.3.9 requires protection and segregation of topsoil;
- Section 4.3.11 requires the permittee to obtain a MPCA CSW Permit and implement the BMPs within for erosion prevention and sediment control.
- Section 4.3.16 requires the permittee to implement "site restoration and management" practices enhance "soil water retention and reduces storm water runoff and erosion".
- Section 4.3.17 requires the permittee to develop a VMP that defines how the land control area will be revegetated and monitored over the life of the project. Appropriate seeding rates and timing of revegetation will stabilize soils and improve overall soil health. Minnesota Power has included a draft VMP as Appendix F of its joint site permit application.
- Section 4.3.18 requires the permittee to develop an AIMP which details methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use. Minnesota Power has included a draft AIMP as Appendix D of its joint site permit application.
- Section 5.12 of the DSP is a special condition that requires the permittee to consult with the MNDNR and the Mississippi Headwaters Board regarding potential impacts to the Mississippi River due to construction activities, including tree removal and erosion on the shoreline.

4.7.4 Surface Water and Floodplains

The ROI for surface water resources is the project area. The impact intensity level is anticipated to be minimal. Direct impacts to surface waters are not expected. Indirect impacts to surface waters might occur, such as during increased rain events. These impacts will be short-term, of a small size, and localized. Impacts can be mitigated. Significant impacts to floodplains are not anticipated. However, the project site has increased risk for flooding events due to the presence of water features.

Solar farm projects have the potential to impact surface water resources and floodplains. These projects could directly impact water resources and floodplains if these features cannot be avoided through project design. Projects also have the potential to adversely impact surface waters through

[309] SPA, p. 72.
[310] Id.

construction activities that move, remove, or otherwise handle vegetative cover and soils. Changes in vegetative cover and soils can change runoff and water flow patterns.

Surface waters

The project is sited within the Mississippi River-Headwaters Watershed HUC 8 (HUC 07010101).[311] The Mississippi River-Headwaters Watershed is located in the northernmost region of the Upper Mississippi River Basin in north central Minnesota.[312] This watershed is characterized as a heavily forested region, consisting of an area of over 1.2 million acres (1,961 square miles). The forest resources are a vital component to the economy of the area and provide habitat for a variety of wildlife species. The watershed includes the headwaters of the Mississippi River at Itasca State Park, and spans into six counties, including Itasca County. The watershed has approximately 685 river miles and contains more than 1,00 lakes.[313] The northwest corner of the site is split between two subwatersheds, the White Oak Lake-Mississippi River, and the Rice Lake-Mississippi River. This watershed is rich in surface water resources, including some of Minnesota's most famous lakes and streams. It is a common destination for those interested in search of walleye and other game fish.[314]

The surface waters within the project site consist of lakes, ponds, streams and wetlands, flowing into the Mississippi River, which borders the project site on the southern border.[315] There are two lakes designated as public waterbodies within the project site, Warburg Lake and Blackwater Lake. For public waterbodies within the project site, a shoreline management classification is assigned, classifying Warburg as a natural lake environment, and Blackwater Lake as recreational development.[316] In addition, Blackwater Lake is classified as a lake of biological significance and receives a rating of "outstanding", signifying the presence of unique plant or animal communities. Within one mile of the project boundary, Little White Oak Lake has received a "high" rating and is also considered a lake of biological significance.[317] There are no designated trout streams, trout lakes, or wildlife lakes within the project site. The area of the Mississippi River bordering the southern area of the project site is designated as an outstanding resource value (ORV) restricted water. ORV designated waters have additional protections that protect their unique values, which can include high water quality, exceptional recreation, cultural, aesthetic, or scientific value. The reach of the Mississippi River in this area is classified as restricted.[318]

Under Section 303(d) of the Clean Water Act, states are required to assess all waters of the state to determine if they meet water quality standards, list waters that do not meet standards and update the list biannually and conduct total maximum daily load studies to set pollutant-reduction goals

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[311] MN DNR *Minnesota's watershed basins.* https://www.dnr.state.mn.us/watersheds/map.html.

[312] SPA, p. 72.; MPCA (2017), Groundwater Report: Mississippi River Headwaters Watershed. https://www.pca.state.mn.us/sites/default/files/wq-ws1-12.pdf,

[313] Id.; MPCA, Mississippi River – Headwaters. https://www.pca.state.mn.us/watershed-information/mississippi-river-headwaters.

[314] MPCA (2018), Water Restoration and Protection Strategy (WRAPS). https://www.pca.state.mn.us/sites/default/files/wq-ws4-50b.pdf.

[315] Id.

[316] SPA, pp. 72-73.

[317] SPA, pp. 72-73,

[318] Id.

needed to restore waters to the extent that they meet water quality standards for designated uses. The list, known as the 303(d) list, is based on violations of water quality standards. The MPCA has jurisdiction over determining 303(d) waters in the State of Minnesota.

There are two impaired waterbodies near project area, including Blackwater Lake which is impaired for mercury in fish and included in the statewide total maximum daily load (TMDL) study in 2010, and Guile Lake which is also impaired for mercury in fish and was included in the statewide mercury TMDL in 2007. There are no impaired streams or wetlands within the project site boundary, or within one mile of the project.[319]

Floodplains

Floodplains are flat, or nearly flat, land adjacent to a river or stream that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which includes areas covered by the flood, but which do not experience a strong current. Floodplains prevent flood damage by detaining debris, sediment, water, and ice. The Federal Emergency Management Agency (FEMA) delineates floodplains and determines flood risks in areas susceptible to flooding. Within floodplains, FEMA also classifies areas as flood zones, designating areas at risk for minimal or moderate flood hazard, and Special Flood Hazard Areas (SFHA). Flood zones defined as Zone A or AE are identified as a SFHA. SFHA's include areas at risk for a 1-percent annual chance flood, also referred to as the base flood or 100-year flood. The base flood that FEMA uses, known as the 100-year flood, has a one percent chance of occurring during each year. Other flood zones at a moderate or minimal risk of flooding would be classified as Zone X, or Zone C.[320]

At the state level, the DNR oversees the administration of the state floodplain management program by promoting and ensuring sound land use development in floodplain areas in order to promote the health and safety of the public, minimize loss of life, and reduce economic losses caused by flood damages. The DNR also oversees the national flood insurance program for the state of Minnesota. Floodplains are also regulated at the local level.

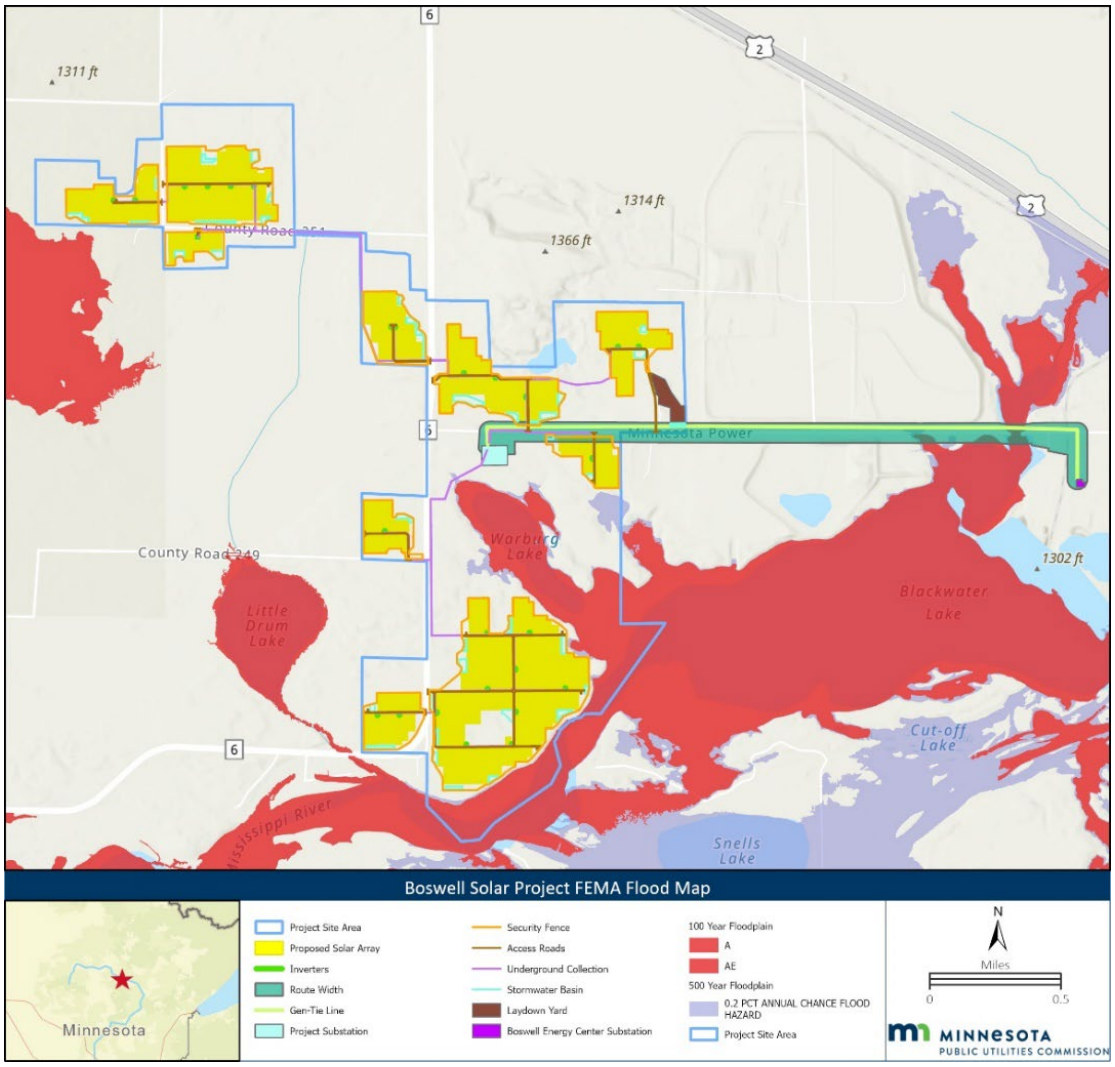
According to the FEMA floodplain maps, there are flood hazard zones in the center of the site near Warburg Lake, around the Mississippi River, and within the route of the Gen-Tie Line that are mapped as Flood Hazard Zone A or AE (**Figure 16**).[321] These zones represent areas at risk for 100-year storms and floods. This means there is a 1.0 percent chance of flooding annually in these areas. There are also portions of the site near a 500-year floodplain, meaning there is a 0.2 percent chance of flooding annually. However, most of the site and Gen-Tie Line are within a C Zone, or an area with minimal flooding.[322] Due to Minnesota's warmer and wetter climate, there is increased risk for damaging rain events and more frequent flooding. These events could impact the project (Section 4.7.9).

For this assessment, the Climate Resilience Evaluation and Awareness Tool (CREAT) was used to determine additional risk of extreme rainfall and floods within the project area. CREAT is a risk

[319] MPCA, MPCA Impaired Waters Viewer. https://gisdata.mn.gov/dataset/impaired-waters-viewer
[320] FEMA, Flood Zones. Glossary. https://www.fema.gov/about/glossary/flood-zones.
[321] FEMA, *FEMA Flood Map Service Center,* (n.d.), https://msc.fema.gov/portal/home.
[322] SPA, pp. 72-73.

assessment and scenario-based planning application for water, wastewater, and combined utilities of all sizes. CREAT guides utility owners and operators through the development of potential climate-related threat scenarios and assessment of the subsequent risk for their utilities. Although this project is not a wastewater facility, the CREAT tool can still be a useful predictor of the stormwater risks in the area, due to the large amount of water resources. These risks can help inform the need for emergency planning related to flood zones within the project site. The types of threats CREAT analyses include location-based scenarios for drought, flood, service demand, water quality, and ecosystem changes. An analysis for this project site with the CREAT tool identified a baseline 100-year storm event as a precipitation of 5.04 inches/24 hours, or 5.78 inches/72 hours. An analysis of the project site using the CREAT tool generated a risk of approximately 26 percent for a 100-year storm event under hotter, drier and stormier future conditions using projected climate data (2025 – 2100).[323]

Figure 16: FEMA Flood Map



[323] Appendix E – CREAT Report

POTENTIAL IMPACTS

Surface waters may experience permanent and temporary impacts as a result of the project. Surface waters that are within the water systems connected to and adjacent to the site have the potential to be indirectly impacted, including Blackwater Lake, which is rated "outstanding" for biological significance, and the Mississippi River. In addition, The Gen-Tie Line will cross a portion of Blackwater Lake and connect into the existing Boswell Substation. Minnesota Power notes that the public water crossing will be less than 500 feet and does not require structures within the water.[324]

The vast majority of the surface water resources within Mississippi River-Headwaters watershed meet Minnesota's surface water quality standards for conventional parameter pollutants (not including mercury). However, they emphasize that these resources continue to experience increased pressure from development and subsequent loss of shoreline and aquatic habitat. The threat of aquatic invasive species is also a primary concern for local partner groups, conservation groups, and the citizens within this watershed.[325] The major threats to the watershed include: loss of shoreline and aquatic habitat due to development, increased sedimentation due to forest management practices, increased nutrient, contaminant, and sedimentation loading from stormwater runoff from development and other non-point sources, and loss of biodiversity due to competition from invasive species.[326] Minnesota has adopted a watershed approach to address the state's 80 major watersheds, looking at the drainage area as a whole, rather than focusing on lakes and streams.

The MPCA developed a Water Restoration and Protection Strategy (WRAPS) report for the Mississippi River-Headwaters Watershed, which provides data on water quality, as well as strategies to restore and protect the watershed's water bodies through reports and projects.[327] A large amount of land in the watershed is privately owned, accounting for approximately 44 percent of the overall watershed, with the remaining portion being state, county, or federal public land, or owned by tribal land owners. Only 10 percent of the land use within the watershed includes agriculture.[328] Construction of the project creates a potential for indirect impacts if sediment or fugitive dust created by excavation, grading, vegetation removal, and construction traffic reaches nearby surface waters. Overall, and due to the establishment of native perennials and other vegetation at the solar facility, the project is expected to have a long-term positive impact on water quality.

There is also the potential for flood risk at the site. The project site is within a floodplain that has been designated as an area at risk for flooding. The solar facility site includes areas of FEMA floodplains classified as Zones A or AE, which are special flood hazard areas (SFHA's). The Gen-Tie Line route is also planned to cross a Zone A floodplain. There are also areas near the site at risk for a 500-year storm event. In addition, the project site has increased risk for 100-year storm events and 100-year flood events under hotter, drier and stormier future conditions. Therefore, areas of the project site

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[324] SPA, p. 72-73.
[325] MPCA, Mississippi River – Headwaters. https://www.pca.state.mn.us/watershed-information/mississippi-river-headwaters.
[326] Id.
[327] MPCA (2018), Water Restoration and Protection Strategy (WRAPS). https://www.pca.state.mn.us/sites/default/files/wq-ws4-50b.pdf.
[328] MPCA, Mississippi-River Headwaters. https://www.pca.state.mn.us/watershed-information/mississippi-river-headwaters.

along Blackwater Lake, the Mississippi River, and low-lying areas connecting to Warburg Lake could experience flooding.

Most of the project infrastructure is designed to be placed outside of the class-A flood zone into areas within the site that are at a lower risk for flooding. Minnesota Power will limit grading in these areas to not create fill in the floodplain, reducing the risk of flood events. In addition, Minnesota Power indicates that floodplain disturbances will be temporary and will not require placing structures within the floodplain.[329] Construction and maintenance vehicles and equipment may need to access areas designated 100-year flood plain during project construction and operation, but no vehicles or equipment would be permanently placed within the designated 100-year floodplain. Proper planning and emergency response in the case of a 100-year storm or flood event will be necessary to ensure additional impacts to floodplains and surface waters do not occur.

MITIGATION

Standard construction management practices, including, but not limited to containment of excavated soils, protection of exposed soils, stabilization of restored soils, and controlling fugitive dust, would minimize the potential for eroded soils to reach surface waters.

Minnesota Power will control runoff from the site by implementing stormwater best management practices to minimize the impact on surface waters. This includes implementing strategies such as installing stormwater basins, as well as limiting sedimentation from adjacent construction, and limiting grading to reduce impacts to floodplains.[330] Minnesota Power states that it will submit a utility crossing license to the DNR prior to construction activities that occur within public water crossings.[331]

In their scoping comments MnDOT noted that the proposed locations of stormwater basins may warrant a (modeling) review by MnDOT District 3 Hydraulics Engineer to ensure the proposed work will not change the peak runoff rates to the Trunk Highway 6 ROW. This review may be used to determine if a drainage permit from MnDOT would be required.[332]

The DSP (**Appendix C**) has several standard conditions that address potential impacts to surface waters and floodplains:

- Section 4.3.11 requires the permittee to "implement erosion prevention and sediment control practices recommended by the [MPCA]" and to "obtain a [CSW Permit]." A CSW Permit requires both temporary and permanent stormwater controls. This section also requires implementation of erosion and sediment control measures, contours graded to provide for proper drainage, and all disturbed areas be returned to pre-construction conditions. Minnesota Power will also develop a Stormwater Pollution Prevention Plan (SWPPP) that complies with MPCA rules and guidelines. The SWPPP describes construction activity, temporary and permanent erosion and sediment controls, BMPs, permanent stormwater management that will be implemented during construction and through the life

[329] SPA, p. 74
[330] Id.
[331] SPA, p. 74.; DNR, *Utility Crossing License,* https://www.dnr.state.mn.us/permits/utility_crossing/index.html.
[332] MNDOT, Scoping Comments. April 28, 2025. eDockets no. 20255-218589-01.

of the project. Implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion during construction.

- Section 4.3.16 requires the permittee to implement "site restoration and management" practices enhance "soil water retention and reduces storm water runoff and erosion".
- Section 4.3.17 requires the permittee to develop a VMP, which will allow for revegetation of the area with native vegetation, creating deep-rooted systems that allow better ground infiltration of rainfall.
- Section 4.3.25 require the permittee to replace or repair any damaged drain tile for the life of the project, unless otherwise negotiated with the landowner.
- Section 5.12 of the DSP is a special condition that requires the permittee to consult with the MNDNR and the Mississippi Headwaters Board regarding potential impacts to the Mississippi River due to construction activities, including tree removal and erosion on the shoreline.
- Section 8.12 requires permittees file an *Emergency Response Plan* with the Commission and local first responders prior to operation. The plan requirements have been amended to include specific training and response plans for impacts related to 100-year storm or flooding events.

4.7.5 Wetlands

The ROI for wetlands is the project area. The impact intensity level is anticipated to be minimal to moderate. Although there is a potential for wetlands to be temporarily affected during construction, direct permanent impacts to wetlands are not expected. Anticipated impacts will be short-term, of a small size, and localized. Impacts can be mitigated.

Wetlands are areas with hydric (wetland) soils, hydrophilic (water-loving) vegetation, and wetland hydrology (inundated or saturated during much of the growing season). Wetland types include marshes, swamps, bogs, and fens. Wetlands vary widely due to differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors.[333]

Wetlands are important to the health of waterways and communities that are downstream. Wetlands can be one source of hydrology in downstream watercourses and water bodies, detain floodwaters, recharge groundwater supplies, remove pollution, and provide fish and wildlife habitat. Wetland health also has economic impacts because of their key role in fishing, hunting, agriculture, and recreation. Infrastructure projects can temporarily or permanently impact wetlands if these features cannot be avoided through project design. During construction, temporary disturbance of soils and vegetative cover could cause sediment to reach wetlands which could in turn affect wetland functionality.

This EA uses the National Wetland Inventory for Minnesota (NWI-MN) to allow for comparison of wetland types across the solar facility. This includes portions of wetlands that have been delineated for this project, as well as additional wetland areas such as ditches that are mapped within the project area. The NWI-MN is a publicly available GIS database that provides information on the location and characteristics of wetlands in Minnesota. Wetlands listed on the NWI-MN may be inconsistent with

[333] USEPA. 2025. *What is a Wetland?* https://www.epa.gov/wetlands/what-wetland.

local wetland conditions on the ground; however, the NWI-MN provides readily available reference database of wetland resources within the project area that can be used to identify wetlands at the solar facility through desktop review (**Figure 17**).

There are approximately 233 acres of NWI wetlands mapped in the project area (**Table 24).** Wetland types include Freshwater Emergent Wetlands (Seasonally Flooded/Saturated), Freshwater Forested/Shrub wetlands (Hardwood and Shrub), Freshwater Pond, Lakes and Riverines.

Table 25. NWI-MN Wetlands in Project Footprint[334]

Wetland type	Acres
Freshwater Emergent	95.9
Freshwater Forested/Shrub	79.1
Freshwater Pond	6.0
Lake	47.4
Riverine	4.5
Total	**232.9**

Minnesota Power completed an onsite wetland delineation in 2023, delineating wetlands across the project area totaling approximately 109 wetlands consisting of 293.4 acres, in addition to lakes and streams.[335] **Table 26** summarizes delineated waterbodies within the survey area, using data provided by Minnesota Power in their application. [336]

Table 27. Delineated Waterbodies in Project Footprint

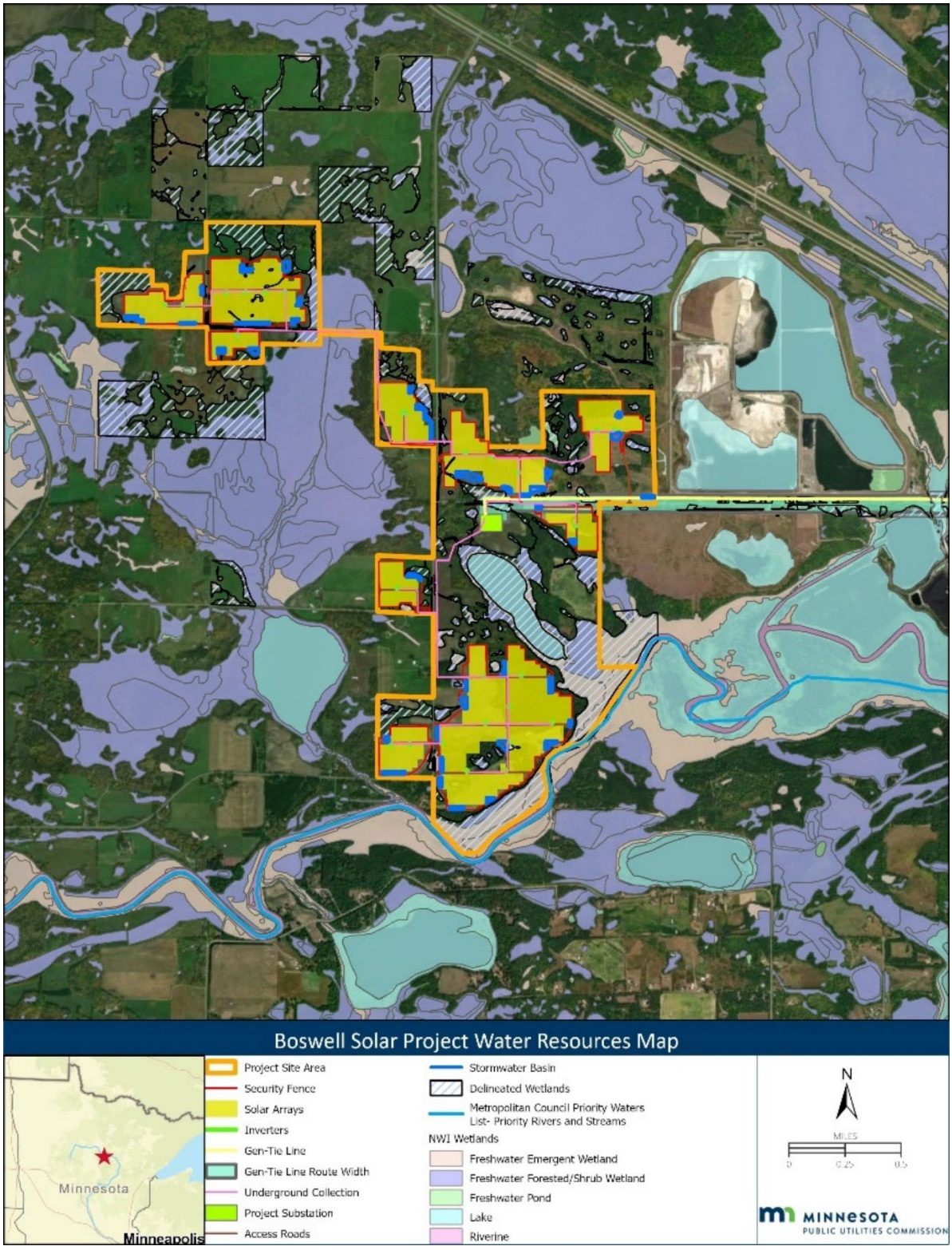
Feature Type	Acres in project area
Wetland	293.4
Lake	45.5
Stream	4.7
Total	**343.6**

[334] DNR. National Wetland Inventory of Minnesota. (2015). https://resources.gisdata.mn.gov/pub/gdrs/data/pub/us_mn_state_dnr/water_nat_wetlands_inv_2009_2014/metadata/metadata.html#Distribution_Information

[335] SPA, p. 73.

[336] SPA, p. 7: Table 4-19.

Figure 18: Water Resources Map



Potential Impacts

The NWI-MN mapping identified approximately 233 acres of Freshwater Emergent, Freshwater Forested/Shrub, Freshwater Pond, Lake and Riverine wetland within the project site. Most of this is comprised of Freshwater Emergent wetlands, and Freshwater Forested/Shrub located around the solar array blocks and collector lines. Outside of these wetlands, there is also a lake wetland located in the center of the project site, between the solar arrays, collector lines, and project substation. On the southern border of the site is the Mississippi River, which encompasses the small number of riverine wetlands mapped within the site.

Minnesota Power's wetland delineation report identified approximately 293 acres of wetlands within the project site, as well as approximately 46 acres of lakes and 5 acres of stream as delineated waters for the project.[337]

Although wetlands have been identified within the project area, the preliminary site layout for the solar facility avoids locating solar arrays and associated equipment within wetland areas (**Figure 19: Water Resources Map**). There is potential for temporary, short-term impacts to wetlands to occur during construction, including disturbances in wetlands adjacent to Blackwater Creek, Blackwater Lake, and the Mississippi River. Direct impacts to wetlands are not anticipated.

Mitigation

The project site layout has been designed to avoid placing solar generation facility infrastructure in wetlands. Construction disturbances occurring in wetlands will be temporary, and Minnesota Power states that it will restore disturbed wetlands to preconstruction conditions.[338] If wetland impacts are required for the final layout, coordination with the appropriate agency, such as the USACE under Section 404 and 401 of the Federal Clean Water Act (CWA) and Itasca County Soil and Water Conservation District (SWCS) under the Minnesota Wetland Conservation Act (WCA), would need to occur prior to construction. If unavoidable wetland impacts take place, impacts should be replaced in accordance with Section 404 of the Federal CWA and the Minnesota WCA. Minnesota Power states that the project will be designed to reduce impacts by maintaining existing wetland contours, coordinated with the USACE and the LGU under the Clean Water Act and WCA, to identify minimization measures for permanent wetland impacts.[339]

- Section 4.3.13 of the DSP (**Appendix C**) generally prohibits placement of the solar energy generating system or associated facilities in public waters and public waters wetlands. The permit condition does allow for electric collector or feeder lines to cross or be placed in public waters or public waters wetlands subject to permits and approvals by the DNR and the USACE, and local units of government as implementers of the WCA.
- Section 5.12 of the DSP is a special condition that requires the permittee to consult with the MNDNR and the Mississippi Headwaters Board regarding potential impacts to the Mississippi River due to construction activities, including tree removal and erosion on the shoreline.

[337] SPA, p. 73.
[338] SPA, p. 74.
[339] SPA, pp. 73-74.

4.7.6 Vegetation

The ROI for vegetation is the project area. The solar facility will convert farmland and forest land to perennial vegetation for the life of the project. Permanent tree removal will occur during project construction. Potential impacts of the solar facility can be mitigated through the development of a VMP.

The solar facility project area within the Chippewa Plains subsection, adjacent to the St. Louis Moraines Subsection, of the Northern Minnesota Drift and Lake Plains Section of the Laurentian Mixed Forest Province. This subsection consists of level to gently rolling plains and till, with three heavily used lakes: Leech Lake, Lake Winnibigoshish, and Cass Lake. Pre-settlement vegetation was a mixture of deciduous and conifer forests. White pine and red pine were present on the moraines. Jack pine was the dominant cover type on outwash plains and sandy lake plains. Hardwoods (northern red oak, sugar maple and basswood) grew in sheltered areas of the moraines, generally close to large lakes. Forested lowlands were occupied by black spruce, tamarack, white cedar, and black ash. Non-forested wetlands were dominated by sedge meadow communities.[340]

Currently, forestry is one of the most important land uses. Aspen is the most common tree species, found in both pure stands and mixed stands with birch, maple, oak, white spruce, jack pine, and red pine. Tourism and recreation and agriculture are the other important land uses. Fire was an important disturbance within the white pine-red pine forests and jack pine forests/woodlands. However, it is not clear whether the fires were from the Bemidji Outwash Plain immediately to the south or from lightning fires originating within the pine stands themselves.[341] The present-day land cover within the project site consists predominantly of cultivated cropland/hay pastureland and forest, including forested wetlands and upland deciduous and mixed forest, as well as developed land, shrub/scrub, upland and wetland herbaceous, and open water. Minnesota Power notes that based on field biological resources reviews conduction in September 2022, most of the site is dominant with wetlands, forest and grassland/herbaceous vegetation.[342] There are several wetland vegetation species present in the site, as identified by Minnesota Power in their Wetlands and Waters Survey Report, completed in March 2023.[343] Some lands designated as high value resources, as defined by the DNR's Commercial Solar Siting Guidance,[344] are also present near the project site, such as Blackwater Lake.

In Minnesota, native prairie is defined as grass-dominated communities with a diversity of forbs and wildlife. They are grasslands dominated by native prairie vegetation, usually occurring where the sod has never been broken.[345] Unbroken pastureland used for livestock grazing can be considered native prairie if it has predominantly native vegetation originating from the site and conservation practices have maintained biological diversity. Native Prairie is generally not present in Itasca County, and there

[340] DNR, Chippewa Plains Subsection. https://www.dnr.state.mn.us/ecs/212Na/index.html.
[341] Id.
[342] SPA, p. 74.
[343] SPA, Appendix F: VMP. eDockets no. 202412-213417-09.
[344] DNR (2023), Commercial Solar Siting Guidance. https://files.dnr.state.mn.us/publications/ewr/commercial_solar_siting_guidance.pdf.
[345] Minnesota Statute 84.02 Subd. 5. Native Prairie.

is no native prairie present within the project site.[346] However, there is DNR mapped Native Upland Prairie near the site.

Potential Impacts

Construction of the solar facility will eliminate vegetative cover, including temporary vegetation removal and permanent tree removal. Tree removal will occur within the solar arrays and substation area. Construction of the project will also create some additional impermeable surfaces, which could affect water runoff. Removal of vegetative cover exposes soils and could result in soil erosion. Temporary or permanent removal of vegetation also has the potential to affect wildlife habitat. Most of the current land use within the project area is in cultivated, agricultural land or forest land, with some areas of forested wetlands, developed land, and open water. The project will require the removal of woody vegetation in order to clear the ROW for the Gen-Tie Line for safe operation. Permanent loss of vegetation will occur in areas where transmission line structures are installed. Minnesota Power notes that the project was designed to avoid tree clearing to the greatest extent practical, however, tree clearing will still occur for the project.[347]

There are some areas present near the site that are designated as high value resources, representing areas with more vegetation diversity compared to the surrounding agricultural areas. Minnesota Power notes that the implementation of the project VMP will not impact the surrounding properties since management will be confined to the Site. Management of invasive weeds at the project site will also reduce this invasive plant seed source for the surrounding area.[348]

Non-impervious portions of agricultural or forested land within the solar facility would be converted to a native, low-growing vegetative cover in accordance with the project's vegetation management plan (VMP). The seed mix will promote pollinator habitat, establish stable ground cover, reduce erosion and runoff, and improve infiltration. The establishment of native vegetation will be compatible with the project's operations and beneficial to the site's native ecosystem, resulting in a net benefit in vegetative cover for the life of the project.[349]

Under the arrays, short-statured primarily native vegetation species will be used. The seed mix utilizes species which do not typically grow taller than 3 feet and are therefore anticipated to not impede or shade solar panels or obstruct maintenance and access. Establishment of diverse, native perennial vegetation will occur in over 70 percent of the plantable areas within the site, including, herbaceous species that flower during the growing season and act as a nectar source throughout the growing season to support native pollinators. A variety of species are included in the project seed much such that at least four species will be flowering during each season (Spring, Summer, Fall).[350] A recent Minnesota study found that utility-scale solar habitats with pollinator vegetation increased native bee abundance, resulting in increased pollination visits to bordering agricultural fields.[351] In addition, using

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[346] SPA, p. 80.
[347] Id.
[348] SPA, Appendix F: VMP.
[349] SPA, p. 75; Appendix F: VMP.
[350] Id.
[351] Walston, L., Hartmann, H., Fox, L., Macknick, J., McCall, J., Janski, J., & Jenkins, L. (2023). *If you build it, will they come? Insect community responses to habitat establishment at solar energy facilities in Minnesota, USA*, retrieved from: https://iopscience.iop.org/article/10.1088/1748-9326/ad0f72

diverse native plant species will stabilize soil health and carbon sequestration with their deep and varied root structures.[352]

Construction activities at the solar facility could introduce or spread invasive species and noxious weeds and the early phases of site restoration and seeding of native species can result in populations of non-native and invasive species on site. Control of invasive and noxious weeds will be ongoing during the construction and operation of the project.[353]

MITIGATION

Several sections of the DSP (**Appendix C**) address impacts to vegetation:

- Section 4.3.17 requires the permittee to develop a vegetation management plan (VMP) in coordination the Commission and with state agencies through the Interagency Vegetation Management Plan Working Group to file the VMP prior to construction. The applicant has prepared a draft VMP as Appendix E of the Site Permit application. The VMP must include the following:
    - Management objectives addressing short term (year 0-5, seeding and establishment) and long term (year 5 through the life of the Project) goals;
    - a description of planned restoration and vegetation management activities, including how the site will be prepared, timing of activities, how seeding will occur (e.g., broadcast, drilling, etc.), and the types of seed mixes to be used;
    - a description of how the site will be monitored and evaluated to meet management goals;
    - a description of the management tools used to maintain vegetation (e.g., mowing, spot spraying, hand removal, fire, grazing, etc.), including the timing and frequency of maintenance activities;
    - identification of the third-party (e.g., consultant, contractor, site manager, etc.) contracted for restoration, monitoring, and long-term vegetation management of the site;
    - identification of on-site noxious weeds and invasive species (native and non-native) and the monitoring and management practices to be utilized; and
    - a marked-up copy of the Site Plan showing how the site will be revegetated and that identifies the corresponding seed mixes.

    Best management practices should be followed concerning seed mixes, seeding rates, and cover crops.
- Section 4.3.18 requires the permittee to develop an AIMP which details methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation to ensure the project is designed, constructed, operated, and ultimately restored in a manner that would preserve soils to allow for the land to be returned to agricultural use. Minnesota Power has included a draft AIMP as Appendix D of its application.

[352] SPA, Appendix F: VMP.
[353] Id; SPA, p. 75.

- Section 4.3.15 requires the permittee to minimize the number of trees removed and to leave existing low growing species in the ROW undisturbed to the extent possible, or to replant to blend in with adjacent areas following construction.
- Section 5.1 is a special condition requiring the permittee to develop a Visual Screening Plan (See Section 4.3.1 Aesthetics).
- Section 5.2 is a special condition requiring the permittee to consult with the Minnesota Department of Transportation (MnDOT) regarding vegetation alongside State Highway 6.
- Section 5.12 is a special condition that requires the permittee to consult with the MNDNR and the Mississippi Headwaters Board regarding potential impacts to the Mississippi River due to construction activities, including tree removal and erosion on the shoreline.

4.7.7 Wildlife and Habitat

The ROI for non-avian wildlife and their habitats is the project area, the ROI for birds is the local vicinity. Potential impacts may be positive or negative and are species-dependent. Long-term, minimal positive impacts to small mammals, insects, reptiles, amphibians, etc. would occur. Impacts to large wildlife species will be minimal. Project fence design has the potential to impact deer. Significant negative impacts could occur to individuals during the construction and operation of the project. There are several aquatic ecosystems within the project site, that have the potential for downstream impacts from dust or erosion control. Potential impacts can be mitigated by prudent design, and adherence to MNDNR recommendations.

Once restored, the land control area will provide native habitat for the life of the project. The project does not contribute to significant habitat loss or degradation or create new habitat edge effects. The introduction of PV panels, fencing and the Gen-Tie Line creates the potential for bird collisions and funneling wildlife towards roads in certain areas. Potential impacts can be mitigated in part through design and BMPs. The impact intensity level is expected to be minimal.

The project area landscape is made of a diverse mix of forest, wetlands, waterbodies, and agriculture land. Landscape types and vegetation communities vary throughout the local vicinity. The diverse landscape provides habitat for a variety of resident and migratory wildlife species, including large and small mammals, songbirds, waterfowl, raptors, fish, amphibians, reptiles, and insects. The wildlife uses the area for forage, shelter, breeding, overwintering, and/or stopover during migration. Since the area has a mix of land use, which includes roads, agricultural and, and energy infrastructure, wildlife inhabiting the area would likely be adapted to human disturbance.[354]

Species of mammals that may use agricultural and grassland areas within the project area as habitat. Reptile and amphibian species may also occur in agricultural lands and grasslands within the project. Several existing lakes, wetlands, and river streams within the project area may provide habitat for fish and other aquatic species.

Most of the project is located within the Chippewa Plains Important Bird Area (IBA) designated by the National Audubon Society. The National Audubon designates sites as IBAs when they meet certain

[354] SPA, p. 75.

criterial related to providing habitat for vulnerable species.[355] The Chippewa Plains IBA is a biologically diverse area, as there are several lakes, wetlands, river streams, and forest communities present. The area is also rich in bird diversity, containing species and habitats that are unique to only a few areas of Minnesota. Specifically, the Chippewa Plains IBA is important for migrating waterfowl, with 160,000 Ring-necked Ducks and 30,000 Lesser Scaup recorded in 2011. Nesting waterbirds include Ring-billed and herring gulls, American white pelicans, common terns, and Minnesota's only site for Caspian terns.[356]

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-712), which prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests.[357]

Potential Impacts

The impact intensity level is expected to be minimal to moderate. Impacts could be positive or negative and depend on species type. Potential direct and indirect impacts will be short- and long-term, and can be mitigated.

Non-Avian Wildlife Direct significant impacts to individuals might occur. Individuals will be displaced to adjacent habitats during construction. Because the project area does not provide critical habitat, this should not impact life cycle functions, for example, nesting. Direct impacts may occur during construction activities because of vehicle movement and ground disturbing activities. Vehicles and other equipment moving within the project site during construction and operations could injure or kill individuals, such as small mammals, amphibians, reptile species, and nesting birds. Potential indirect impacts to wildlife may occur due to temporary and permanent habitat loss and displacement. During construction, indirect impacts to wildlife species could occur from habitat alteration and increased noise and human activity which could disrupt wildlife species in the vicinity of the project site, causing them to abandon habitat.[358] Population level impacts are not anticipated.

The largest impact to wildlife associated with solar facilities is fencing. Although deer can jump many fences, they can become tangled in both smooth and barbed-wire fences, especially if the wires are loose or installed too closely together.[359] Predators can use fences to corner and kill prey species.[360] The project fence was originally designed to be 7-feet tall, and contains a string of barbed wire, which is not recommended by the Minnesota DNR.[361] This fence design may increase the risk of larger wildlife, such as deer, getting stuck within the facility; the presence of project components may hinder

[355] Audubon Society, Important Bird Areas. Minnesota Natural Resource Atlas. https://mnatlas.org/resources/birds-important-areas/.
[356] SPA, pp. 75-76.
[357] Id.
[358] SPA, p. 76.
[359] Colorado Division of Wildlife. *Fencing with Wildlife in Mind.* (2009). https://cpw.state.co.us/Documents/LandWater/PrivateLandPrograms/FencingWithWildlifeInMind.pdf, p.. 3.
[360] Huijser, Marcel et al. *Construction Guidelines for Wildlife Fencing and Associated Escape and Lateral Access Control Measures*, (2015). http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25%2884%29_FR.pdf, page 27.
[361] Minnesota DNR. *Commercial Solar Siting Guidance*. (2023). Retrieved from: https://files.dnr.state.mn.us/publications/ewr/commercial_solar_siting_guidance.pdf

wildlife from reaching the speed necessary to clear the fence from the inside. Fences can act as barriers that block wildlife movement,[362] interrupt behavior patterns,[363] and prevent them from accessing resources. This can be particularly impactful if fences remove or reduce wildlife travel corridors in fragmented landscapes where wildlife must increase movement between habitat patches to obtain adequate resources.[364] Even small animals may need to move between habitat patches in search of food, shelter, and mating opportunities.[365]

Fences can also direct wildlife onto roads, increasing both wildlife and motorist fatalities where the ends of fence lines provide openings for road crossings. This "fence-end effect" can displace roadkill locations to road sections at fence end points,[366] creating high risk collision zones. Mobile wildlife that frequently cross roads between habitats experience increased wildlife-vehicle collision risk, and roads in connected landscapes with suitable wildlife habitat are more dangerous.[367]

The impacts of project fencing on animal movement must be considered in context with the project landscape. There is a considerable amount of wildlife habitat near the project in the form of DNR high-value lands. In addition, fencing does not negatively impact all wildlife. Smaller animals who can move through fence openings may be protected within facility fences, giving them a safe refuge for shelter or rearing their young.[368] The establishment of native herbaceous cover within the site following construction will likely benefit wildlife species by creating habitat, such as small mammals, ground nesting birds, insects, and pollinators. This includes bird species within the Chippewa Plains IBA, which will be impacted by portions of the project.[369]

Plastic erosion control netting is frequently used for erosion control during construction and landscape projects and can negatively impact wildlife populations. Wildlife entanglement and death from plastic netting and other plastic materials has been documented in birds, fish, mammals, and reptiles. and can lead to injuries, such as lacerations or spinal damage, and even result in death due

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[362] Sawyer, H., Kauffman, M.J., Middleton, A.D., Morrison, T.A., Nielson, R.M., & Wyckoff, T.B. (2012). *A framework for understanding semi-permeable barrier effects on migratory ungulates*. https://doi.org/10.1111/1365-2664.12013.

[363] Maida, J.R., Bishop, C.A., & Larsen, K.W. (2019). *Migration and disturbance: impact of fencing and development on Western Rattlesnake (Crolatus oreganus) spring movements in British Columbia.* https://doi.org/10.1139/cjz-2019-0110.

[364] Marable, K.M., Belant, J.L., Godwin, D., & Wang, G. (2012). *Effects of resource dispersion and site familiarity on movements of translocated wild turkeys on fragmentated landscapes*. https://doi.org/10.1016/j.beproc.2012.06.006.

[365] Nordberg, E., Ashley, J., Hoekstra, A., Kirkpatrick, S., & Cobb, V.A. (2021). *Small nature preserves do not adequately support large-ranging snakes: Movement ecology and site fidelity in a fragmented rural landscape.* https://doi.org/10.1016/j.gecco.2021.e01715.

[366] Plante, J., Jaeger, J.A.G., & Desrochers, A. (2019). *How do landscape context and fences influence roadkill locations of small and medium-sized mammals?* https://doi.org/10.1016/j.jenvman.2018.10.093.

[367] Bénard, A., Lengagne, T., & Bonenfant, C. (2024). *Integration of animal movement into wildlife-vehicle collision models*. https://doi.org/10.1016/j.ecolmodel.2024.110690

[368] Brooks, M.L. 1999. *Effect of protective fencing on birds, lizards, and black-tailed hares in the western Mojave Desert.* DOI: 10.1007/s002679900194

[369] SPA, p. 76.

to strangulation or overheating.[370] The DNR recommends using non-plastic netting as a wildlife-friendly erosion control, along with other BMPs.[371]

Aquatic wildlife is also present in the project site, with several aquatic species being documented in the wetlands, lakes, and river streams within and adjacent to the site. Water resources that connect to the site include important aquatic ecosystems for biodiversity. Construction and operation of the facility can create fugitive dust from soil movement or transportation on unpaved roads. Minnesota Power has indicated they plan to use water or other dust control agents to suppress fugitive dust. Dust control agents used during construction frequently contain chloride, which can persist in the environment and accumulate to toxic levels. Chlorides readily spread through water systems and harm aquatic wildlife. Low concentrations of chloride exposure can impact growth, reproduction, and physiology, while high concentrations can result in death.[372]

Aquatic wildlife can be injured or killed by entanglement in plastic erosion control netting. Additionally, the use of erosion control methods containing plastic, such as plastic erosion control netting or hydro-mulch products with synthetic plastic fibers, can result in macro- or micro-plastic drainage into aquatic systems. Plastic pollution has consequences across aquatic trophic levels; it can be ingested by a variety of aquatic wildlife, impacting their growth and survival.[373] Malachite green dye is commonly used in hydro-mulch erosion control products, and it can easily drain into aquatic systems. Malachite green dye has a wide range of negative toxicological effects on aquatic wildlife, including, but not limited to, carcinogenesis, mutagenesis, respiratory toxicity, multi-organ tissue injury, and developmental abnormalities.[374]

Reduced pesticide use, as compared to agricultural production, has the potential to benefit insects, including pollinators, and smaller wildlife such as rodents, birds, insects, and reptiles. Revegetating the site with pollinator friendly species will also benefit these species by creating habitat for mating, nesting, and nectar-providing sources.

Birds Bird injuries or mortality may occur due to lack of fencing visibility. Raptors in pursuit of prey may be vulnerable to the nearly invisible wire strands, although other low flying birds such as grouse and owls are also vulnerable to fence collisions.

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[370] Stuart, J.N., Watson, M.L., Brown, T.L., & Eustice, C. (2001). *Plastic netting: An entanglement hazard to snakes and other wildlife*, retrieved from: https://www.researchgate.net/publication/286280488_Plastic_netting_An_entanglement_hazard_to_snakes_and_other_wildlife.

[371] DNR. *Wildlife-friendly Erosion Control*. (2013).http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf.

[372] Southeastern Wisconsin Regional Planning Commission. 2024. *Impacts of Chloride on Biological Systems.* Retrieved from: https://www.sewrpc.org/SEWRPCFiles/Environment/ChlorideImpactStudy/TR-62-Chapter3PreliminaryDraft.PDF.

[373] Ali, N., Khan, M.H., Ali, M., Sidra, Ahmad, S., Khan, A., Nabi, G., Ali, F., & B, M. (2024). *Insight into microplastics in the aquatic ecosystem: Properties, sources, threats, and mitigation strategies.* DOI: 10.1016/j.scitotenv.2023.169489

[374] Srivastava, S., Sinha, R., & Roy, D. (2004). *Toxicological effects of malachite green.* DOI: 10.1016/j.aquatox.2003.09.008.

Risks to birds have been identified near PV solar facilities. Preliminary findings in one report, based on limited data, suspect the danger is this appearance of water causing migrating birds to attempt to land, consequently incurring trauma and related predation.[375]

Birds are also susceptible to electrocution from transmission lines. Electrocution is a risk if the conductors or ground wires are close enough together that a bird can touch two conductors simultaneously with its wings or other body parts. Independent of the risk of electrocution, birds might be injured or killed by colliding with transmission line structures and conductors. The risk of collision is influenced by several factors including habitat, flyways, foraging areas, and bird size. Waterfowl, especially larger waterfowl such as swans and geese, are more likely to collide with transmission lines. Once the Project is operational, there will be a potential risk of avian collision and electrocution with transmission conductors and equipment associated with the Gen-Tie Line, which could result in injury or death of individuals. Avian collision risk may be greater for certain at-risk species (e.g., waterfowl, waterbirds) during certain behaviors such as flushing, courtship displays, and aerial displays, potentially increasing risk if birds are distracted. To minimize potential impacts to avian species, Minnesota Power states that it will incorporate recommendations in the Avian Powerline Interaction Committee's (APLIC) 2012 guidelines.[376]

Habitat There are no DNR WMAs or USFWS Waterfowl Production areas within one mile of the site. The project is within the Chippewa Plains IBA, an important area for migrating waterfowl. Over one mile east of the site is the Bass Brook WMA. Other nearby ecological resources, including areas of biological significance, Wildlife Action Networks (WAN's) and Outstanding Resource Value Streams, are identified in the Natural Resources Map in **Figure 18**. The project area includes a small portion of a Wildlife Action Network in the northwest corner. These resources are not anticipated to be impacted by the construction or operation of the project.

Constructing solar projects within large block habitats causes habitat loss and fragmentation, which is detrimental to species who require large areas for nesting, food, population success, etc.[377] Wildlife habitat is currently present in the project area, although it is somewhat fragmented, due to the landscape being comprised of agriculturally managed lands with large blocks of forested area, in addition to several lakes, wetlands, and river streams. The project area is likely used by avian species, due to its presence within an IBA.

Once restored, the developed area within the solar facility will provide cover and habitat for the life of the project. The extent and quality of this habitat will depend on the relative abundance of perennial native species that provide forage and nesting resources. Fencing will restrict ingress and egress of larger wildlife, and habitat benefits will be limited to small-sized mammals, birds, and reptiles who can successfully cross the fence. Minnesota Power plans to use plant species that provide habitat and nectar sources throughout the growing season to support native pollinators. This

[375] USFWS Forensics Lab. *Avian Mortality at Solar Energy Facilities in Southern California*. (2014). http://www.ourenergypolicy.org/wp-content/uploads/2014/04/avian-mortality.pdf
[376] SPA, p. 76.
[377] SPA, p. 81.

herbaceous cover within the site following construction will likely benefit wildlife species, such as small mammals, ground nesting birds, insects, and pollinators.[378]

A recent Minnesota study found that utility scale solar habitats with pollinator vegetation increased native bee abundance, resulting in increased pollination visits to bordering agricultural fields.[379] Solar habitat can also enhance bird species richness and diversity in agricultural landscapes,[380] likely because these sites provide beneficial foraging and nesting habitat in a resource-limited landscape. The magnitude of these benefits is determined by the extent of habitat restoration within the solar facility. The conversion of agricultural land within the project area to perennial vegetation will positively impact terrestrial wildlife within the land control area, as well as aquatic wildlife in nearby lakes, such as Blackwater Lake, which is rated "outstanding" for biological significance, as well as surrounding wetlands, and the Mississippi River, by reducing pesticide use. Overall, the project is not anticipated contribute to significant habitat loss or degradation, or create new habitat edge effects, and can result in higher quality of habitat for wildlife, including pollinator species, with proper vegetation establishment and management.

MITIGATION

Impacts to wildlife can be mitigated if the project adopts wildlife-impact mitigation measures where applicable in the project's design, and BMPs throughout construction. Minnesota Power indicates that the project SWPPP will include erosion and sediment control best practices, including vegetated buffers.[381] In addition to implementing the project's SWPPP, AIMP, and VMP, all streams must be buffered by 16.5 feet per the Minnesota Buffer Law administered by BWSR.[382] This buffer will manage run-off and erosion to reduce the amounts of pollutants that enter the stream, such as phosphorus, nitrogen, and sediment, further benefitting aquatic wildlife.

Minnesota Power will implement the DNR's recommendation of a 50 foot setback from road rights-of-way to provide space for animals to travel around the project.[383]

Several sections of the DSP (**Appendix C**) specify measures that will minimize impacts to wildlife:

- Section 4.3.16 requires the permittee to implement "site restoration and management practices that provide for native perennial vegetation and foraging habitat beneficial to gamebirds, songbirds, and pollinators".
- Section 4.3.32 requires the permittee to coordinate with the DNR to ensure that the fence used in the project minimizes impacts to wildlife

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[378] Id; Appendix F – VMP.
[379] Walston, L., Hartmann, H., Fox, L., Macknick, J., McCall, J., Janski, J., & Jenkins, L. (2023). *If you build it, will they come? Insect community responses to habitat establishment at solar energy facilities in Minnesota, USA*, retrieved from: https://iopscience.iop.org/article/10.1088/1748-9326/ad0f72
[380] Jarčuška, B., Gálffyoá, M., Schnürmacher, R., Baláź, M., Mišík, M., Repel, M., Fulín, M., Kerestúr, D., Lackovičova, Z., Mojžiš, J., Zámečník, M., Kaňuch, P., & Krištín, A. (2024). *Solar parks can enhance bird diversity in agricultural landscape*. DOI: https://doi.org/10.1016/j.jenvman.2023.119902.
[381] SPA, p. 20.
[382] Minnesota Statute 103F.48.
[383] Id.

- Section 5.6 is a special condition requiring the permittee to use shielded and downward facing lighting and LED lighting that minimizes blue hue at the project substation and operations and maintenance facility. Downward facing lighting must be clearly visible on the site plan submitted for the project.
- Section 5.7 is a special condition requiring the permittee to utilize non-chloride products for onsite dust control during construction.
- Section 5.8 is a special condition requiring the permittee to use only "bio-netting" or "natural netting" types of erosion control materials and mulch products without synthetic (plastic) fiber additives or malachite green dye
- Section 5.12 is a special condition that requires the permittee to consult with the MNDNR and the Mississippi Headwaters Board regarding potential impacts to the Mississippi River due to construction activities, including tree removal and erosion on the shoreline.
- Section 8.14 requires permittees to report "any wildlife injuries and fatalities" to the Commission on a quarterly basis.

Other potential mitigation measures include:

- Siting facilities away from wildlife movement corridors can avoid or minimize impacts to wildlife movement.
- Checking open trenches and removing any wildlife caught in trenches before backfilling mitigates impacts.
- Once permanent vegetation is established, restricting mowing from April 15 to August 15 to improve the potential for ground nesting habitat.

4.7.8 Rare and Unique Resources

The ROI for rare and unique resources is the local vicinity. The impact intensity level is anticipated to be minimal to moderate during construction, and minimal during operation. Impacts could be both short and long term and could be positive (e.g., through introduction of habitat), or negative (e.g., by removing trees during nesting season). Impacts can be mitigated.

Construction and operation of solar facilities may adversely impact rare and unique resources through the taking or displacement of individual plants or animals, invasive species introduction, and habitat loss. Conversely, in some cases solar sites can be managed to provide habitat. For example, the introduction of native vegetation into a landscape otherwise dominated by cultivated row crops could create habitat for pollinators, such as the rusty patched bumble bee.

The Minnesota DNR classifies rare plant or animal communities across the state. These include Scientific and Natural Areas, High Conservation Value Forest, Minnesota Biological Survey (MBS) Native Plant Communities, and MBS Sites of Biodiversity Significance

The Division of Ecological and Water Resources within DNR manages the Natural Heritage Information System (NHIS). The NHIS "provides information on Minnesota's rare plants, animals, native plant communities, and other rare features. The NHIS is continually updated as new information becomes available and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. Its purpose is to foster better understanding

and conservation of these features."[384] NHIS data includes federally endangered, threatened, or candidate plant species, and endangered or threatened animal species. The system also includes state endangered, threatened, or special concern species.

The Minnesota DNR and the Minnesota Board of Water and Soil Resources (BWSR) administer conservation easements for the state. The purpose of a conservation easement is to protect critical natural resource land throughout Minnesota, allowing landowners to participate by stopping crop/grazing of the land, and establishing conservation practices such as native grass and forbs, trees, or wetland restorations.[385] The Minnesota Conservation Reserve Enhancement Program (CREP) is a voluntary, federal-state funded natural resource conservation program that places land into conservation easements, targeting environmentally sensitive land such as riparian areas and marginal agricultural land.[386] Minnesota's Reinvest in Minnesota (RIM) reserve program accomplishes conservation goals by placing lands in perpetual conservation easements, restoring certain marginal and environmentally sensitive agricultural land to protect soil and water quality and support fish and wildlife habitat.[387]

The EA does not map federal- or state-listed species found in the NHIS database, because DNR requires that public display of NHIS data either mask the identity or location of rare features due to the vulnerability of some species to exploitation. Moreover, the NHIS database masks the occurrence of rare species of by randomly incorporating their location into a larger map polygon. Additional existing ecological resources are identified in the Natural Resources Map in **Figure 18.** This map identifies MBS sites, DNR managed lands, and BWSR conservation easements within the project area, and extending 5 miles outside the project area.

Potential Impacts

Construction of the project has the potential to impact rare and natural resources, including areas of biological significance, and wildlife habitat. Impacts will likely be indirect, short-term, and temporary.

Natural Communities

The Minnesota Biological Survey (MBS) systematically collects, interprets, and provides baseline data on the distribution and ecology of rare plants, rare animals and native plant communities.[388] The MBS uses four classifications denoting the level of biological diversity to rank sites:[389]

- **Below**. Sites lack occurrences of rare species and natural features or do not meet MBS standards for outstanding, high, or moderate rank. These sites may include areas of conservation value at the local level, such as habitat for native plants and animals, corridors for animal movement, buffers surrounding higher- quality natural areas, areas

[384] Minnesota Department of Natural Resources (n.d.) *Natural Heritage Information System*, http://www.dnr.state.mn.us/nhnrp/nhis.html.
[385] BWSR, What are Conservation Easements? https://bwsr.state.mn.us/what-are-conservation-easements.
[386] BWSR, MN CREP, https://bwsr.state.mn.us/mn-crep-landowners.
[387] BWSR, Reinvest In Minnesota Reserve, https://bwsr.state.mn.us/sites/default/files/2019-01/RIM_overview_0.pdf.
[388] DNR. *Minnesota County Biological Surveys*, http://www.dnr.state.mn.us/eco/mcbs/index.html.
[389] DNR, *Minnesota Biological Survey*, MBS Site Biodiversity Significance Ranks, https://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html.

with high potential for restoration of native habitat, or open space.

- **Moderate**. Sites contain occurrences of rare species, moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of native plant communities and characteristic ecological processes.
- **High**. Sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes.
- **Outstanding**. Sites contain the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most ecologically intact or functional landscapes.

Within the project area, there is one site that is ranked as having moderate biodiversity significance, the Blackwater - Guile Lakes site. There is also the White Oaks Meadows area located less than a mile east of the site, which is characterized as a site of high biodiversity significance.[390] Blackwater Lake is classified as a Lake of Outstanding Biological Significance. Other lakes nearby are classified as Lakes of Moderate Biological Significance. The Mississippi River is also an area designated as a restricted Outstanding Resource Value stream (**Figure 18**).

In their Natural Heritage Review Letter, the DNR notes that there has been one or more DNR MBS native plant communities (NPCs) documented in the project site, including a rare native plant community.[391] The DNR recommends that the project be designed to avoid impacts to these ecologically significant areas. In addition, there are several NPCs located adjacent to the site, including forested wetlands, wet meadows/shrub carr wetlands, and shrub swamps. (**Figure 18**). There are also several Wildlife Action Network (WAN) corridor polygons scattered throughout the area, including in the northwest portion of the site, and an area associated with Blackwater Lake along the southeastern edge of the project site and the eastern part of the Gen-Tie Line. Wildlife Action Networks are areas composed of terrestrial and aquatic habitat cores and corridors to support biological diversity and ecosystem resilience with a focus on Species in Greatest Conservation Need.[392] The WAN polygons within the site are ranked as low-medium in the northwest area, and medium within Blackwater Lake.

Conservation Easements

For this project, Minnesota Power has secured 100% land control within the project area through leases or easements, and the project area is comprised entirely of private land. The project avoids lands in conservation programs or with conservation easements such as the Conservation Reserve Enhancement Program (CREP) and Conservation Reserve Program (CRP). A Reinvest in Minnesota (RIM) is more than one mile west of the Site.[393]

Figure 18 shows the existing rare and unique natural resources that are within, adjacent to, and near the project site.

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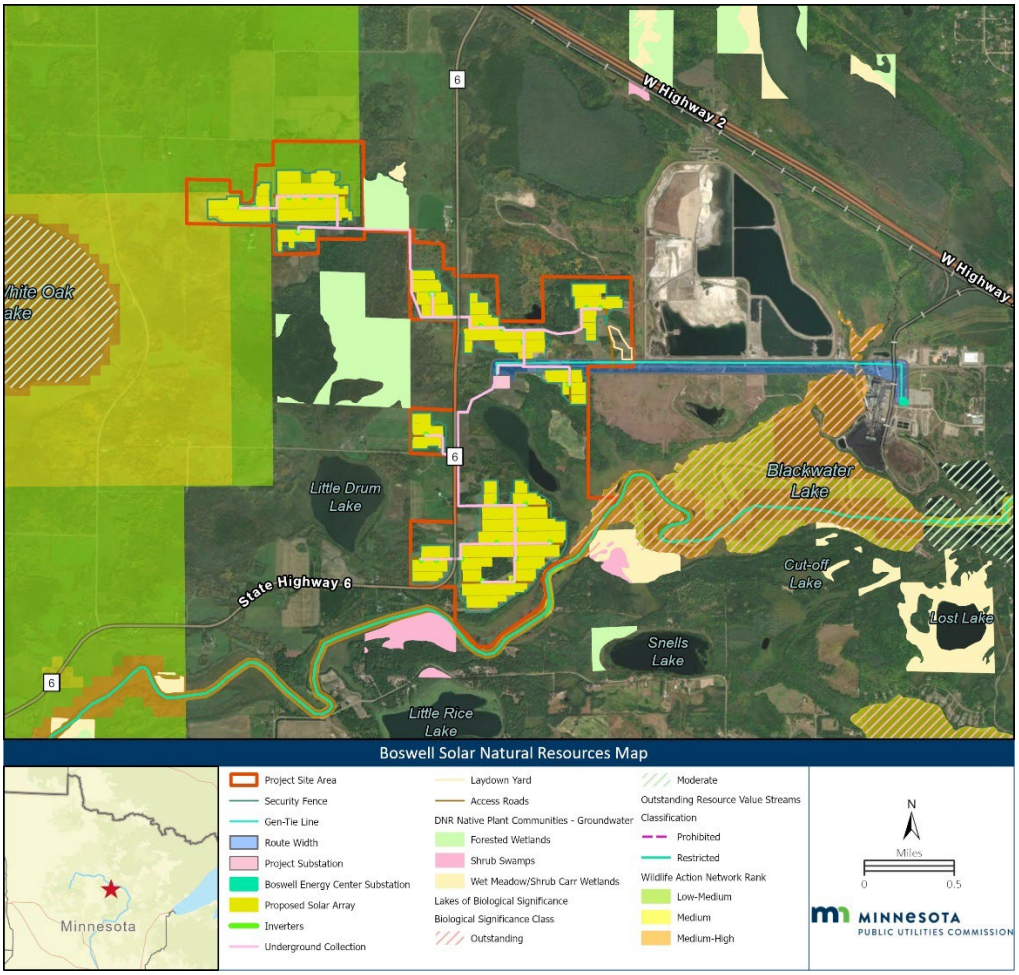
[390] DNR. *Biodiversity Significance,* retrieved from*:* https://mnatlas.org/resources/?id=k_0004.
[391] DNR, Natural Heritage Review Letter, April 28, 2025. eDockets no. 20254-218237-02.
[392] SPA, p. 81.; DNR, Wildlife Action Plan. https://www.dnr.state.mn.us/mnwap/mnwap_resources.html.
[393] SPA, pp 53-54.

Figure 20: Natural Resources near the Project Area



Rare Species

Canada Lynx (Danaus plexippus)

The Canada lynx (*Lynx canadensis*) is a federally-listed threatened species. It is a mid-sized boreal forest carnivore that occurs across most of northern North America. In the contiguous United States, Canada lynx were designated as a distinct population segment and listed as threatened under the Endangered Species Act in 2000. This was due solely to the inadequacy, at that time, of regulatory mechanisms on federal public lands, where most potential lynx habitat occurs. In all regions within the distinct population segment range, timber harvest, recreation and their related activities are the predominant land uses with the potential to affect lynx habitats and populations.[394]

Canada Lynx live in dense forests in northern Minnesota. Lynx do not occur where snowshoe hares, their preferred prey, are absent.[395] Although most Canada lynx reports in Minnesota are from St. Louis

[394] USFWS, *Canada Lynx.* https://www.fws.gov/species/canada-lynx-lynx-canadensis.
[395] DNR, *Canada Lynx*. https://www.dnr.state.mn.us/mammals/canadalynx.html.

and Lake counties, they have also been documented in Itasca County. The forested areas within and adjacent to the Project could provide suitable habitat for Canada lynx.[396]

Gray Wolf (Canis lupus)

In Minnesota, the gray wolves are classified as a federally threatened species. Gray wolves can thrive in a wide range of habitats, including temperate forests, mountains, tundra, grasslands, and more. In North America, wolves are primarily predators of medium and large hooved mammals, such as moose, elk, white-tailed deer, mule deer, caribou, muskox and bison.[397] The current density of the gray wolf is approximately one per 10 square miles and Alaska is the only U.S. state with a higher population of gray wolves than Minnesota.[398] The project and its vicinity could provide suitable habitat for gray wolves.[399]

Northern Long-Eared Bat (Myotis septentrionalis)

The Northern Long-Eared Bat (NLEB) is a federally listed species and state-listed species of concern. During the winter this species hibernates in caves and mines, and during the active season (approximately April-October) it roosts underneath bark or in cavities or crevices of both live and dead trees. The spread of white-nose syndrome across the eastern United States has become a major threat to the species. Activities that might impact this species include but are not limited to, any disturbance to hibernacula and destruction or degradation of habitat including tree removal.

Suitable active-season habitat for the NLEB is present in the forested areas within and adjacent to the project. During winter, the NLEB in caves and mines. Minnesota Power notes that according to the DNR Natural Heritage Information System (NHIS) database, there are no known hibernacula in Itasca County and the nearest documented maternity roost trees are over 10 miles from the project.[400]

Potential impacts to individual northern long-eared bats may occur if clearing or construction takes place when the species is roosting in its summer habitat, in trees outside of the hibernacula. Bats may be injured or killed if occupied trees are cleared during this active window. Tree clearing activities conducted when the species is in hibernation and not present in the landscape will not directly impact bats, however, could result in indirect impacts due to the removal of suitable roosting habitat. The preferred mitigation strategy to avoid impacts to the NLEB is avoidance of tree-clearing to the extent possible. However, tree removal will occur during construction of this project. When tree clearing is necessary, it should be done outside the pup rearing season from June 1 to July 31 and outside the active NLEB season from April 1 to October 31.

Monarch Butterfly (Danaus plexippus)

The monarch butterfly is a federal candidate species. The species is common throughout Minnesota during summer months and is most frequently found in habitats where milkweed and native plants are common, including roadside ditches, open areas, wet areas, and urban gardens.[401] Suitable

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[396] SPA, p. 77.
[397] USFWS, *Gray Wolf.* https://www.fws.gov/species/gray-wolf-canis-lupus.
[398] DNR, *Gray Wolf.* *https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AMAJA01030.*
[399] SPA, p. 77.
[400] SPA, p. 78.
[401] DNR, *Monarch Butterfly* https://www.dnr.state.mn.us/insects/monarchbutterfly.html

habitat for monarchs may be present within the project area. Monarch butterflies forage on flowering plants and rely exclusively on the presence of milkweed (*Asclepias* spp.) to complete the caterpillar life stage (reference (128)). Milkweed plants were not identified during field surveys; however, they could be present within the project. In addition, the non-forested and non-agricultural parts of the project that contain flowering plants could provide suitable foraging habitat for monarch butterflies.[402]

Bald Eagles and Golden Eagles

In Minnesota, the bald eagle nesting season is generally January through early July. Bald eagles are primarily found near rivers, lakes, and other waterbodies in remote and, more recently, within metropolitan areas.[403]

Bald eagles are afforded additional protections under the Bald and Golden Eagle Protection Act, which is administered by the USFWS. Bald eagle incidental take permits and nest removal permits are considered to be voluntary permits, meaning a project proposer must make the determination to pursue a permit based on the respective risk of their project's potential to take a bald eagle.

Bald eagles typically nest in mature trees near large lakes or streams. Surveys conducted in April 2023 identified two bald eagle nests within the site and one within the Gen-Tie Line; an additional nest was also observed in the site, but it was determined to not be bald eagles.[404] In the case that encounters with bald eagles do occur, consultation with the USFWS will be necessary. The USFWS will coordinate appropriate mitigation measures for bald eagles for the project. Mitigation measures may include setbacks from nests, timing restriction for construction activities, and possibly seeking a USFWS permit for removal of a nest.

Minnesota Power coordinated with the Minnesota DNR to identify state-listed species, and determined that there are no known occurrences of state threatened or endangered species within 1 mile of the project site. However, the NHIS database indicated that two species of state special concern have been documented within one mile of the project site, although not within the project site. This includes the small green wood orchid (*Platanthera clavellata*) and the peregrine falcon (*Falco peregrinus*). Although the DNR tracks and monitors state special concern species, they are not legally protected under state law. However, like all migratory birds, the MBTA provides protection for the peregrine falcon. No field surveys have been conducted to determine whether any state-protected species

are present in the Project. However, based on field biological resources reviews conducted in September 2022, there is a moderate potential that state-protected species could be present.[405]

Small Green Wood Orchid (Platanthera clavellate)

The small green wood orchid is a perennial, insect-pollinated orchid of mossy peatlands. The fleshy root/tuber system tends to be confined to the layer of living moss rather than the actual peat below, and it renews itself each year. The primary objectives in managing the habitat of the orchid are to

[402] SPA, p. 78.
[403] DNR, *Bald Eagles in Summer*. https://www.dnr.state.mn.us/birds/eagles/summer.html
[404] SPA, p. 78.
[405] SPA, p. 70.

maintain the structure and integrity of the biotic community and to safeguard the delicate hydrology. With these objectives in mind, the impacts of logging must be carefully considered. The loss of canopy trees and the damage to the ground layer caused by heavy equipment (even in winter) would pose significant threats to orchid populations. Alterations to the hydrologic regime may be even more serious and often more difficult to anticipate. It will be necessary to evaluate the effects of the project on the movement of both ground water and surface water in the general area of known populations.[406]

The small green wood orchid primarily inhabits coniferous swamps that have a continuous or interrupted canopy of black spruce (*Picea mariana*) or tamarack (*Larix laricina*). Based on the wetland delineations conducted for the Project and review of aerial photographs, habitat suitable for this species is not present.[407]

Peregrine Falcon (Faclo peregrinus)

The Peregrine Falcon (*Falco peregrinus*), which occurs on every continent but Antarctica, is probably the most wide-ranging land bird in the world. In the past, Peregrine Falcons in Minnesota nested on cliff ledges along rivers or lakes. Presently, they nest primarily on buildings and bridges in urban settings and also use historic eyries on cliffs along Lake Superior and several lakes in the Boundary Waters Canoe Area Wilderness and along the Mississippi River in the rugged bluff country of the southeastern part of the state. Because Peregrine Falcons specialize in direct aerial pursuit of avian prey, they prefer open non-forested areas for hunting. Many Peregrine Falcons migrate thousands of miles to spend the winter in Mexico and Central and South America but some overwinter in the United States, including Minnesota. They return to their northern breeding grounds in late April to early May.[408]

Continued threats to Peregrine Falcon populations include collisions with buildings, disease, environmental pollutants, predation, and potential loss or disturbance of natural cliff nesting sites. To ensure that there is adequate nesting habitat for these birds, cliffs in areas considered essential for nesting should be protected from development and recreational climbing. Providing nest-boxes as protection from the weather and from predators may improve reproductive success in these cliff habitats.[409] The documented occurrences of peregrine falcons are located within the footprint of the Boswell Energy Center. There is a peregrine falcon nesting box on a stack at the Boswell Energy Center and a nesting pair has been observed there annually. Minnesota Power works with the Raptor Resource Project on this nesting site.[410]

MITIGATION

The project has the potential to impact rare and natural resources, including areas of biological significance, and wildlife habitat. Impacts will likely be indirect, short-term, and temporary. Minnesota

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[406] DNR, Small Green Wood Orchid. https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PMORC1Y050#:~:text=Platanthera%20clavellata%20is%20a%20perennial,it%20renews%20itself%20each%20year.

[407] SPA, p. 79.

[408] DNR, Peregrine Falcon. https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNKD06070.

[409] Id.

[410] SPA, p. 79.

Power states that it will minimize impacts to these sensitive ecological resources by reestablishing native vegetation in non-impervious areas. Construction of the site will not impact Blackwater Lake, a Lake of Biological Significance. Minnesota Power states that it will develop a SWPPP for the Project that outlines erosion and sediment control measures necessary during construction to minimize the potential for sedimentation to sensitive resources.[411]

Construction and operation of the solar facility are not likely to permanently impact state-threatened, endangered, or special concern species. Minnesota Power submitted a Natural Heritage Review (NHR) request through the DNR MCE (Project ID 2024-00660) for the Project on August 6, 2024. The DNR responded with a letter on April 28, 2025.[412] Construction of the Gen-Tie Line is not likely to impact state threatened, endangered, or special concern species. Peregrine falcons nesting at the Boswell Energy Center are accustomed to human activity and disturbance. Minnesota Power will also minimize impacts to avian species, such as bald eagles and peregrine falcons, by incorporating recommendations in the APLIC 2012 guidelines.[413]

The USFWS has guidance concerning construction-related activities near bald eagle nests and recommends a minimum buffer of 660 feet around bald eagle nests during the nesting season of mid-January through July. Additionally, no tree clearing can occur within 330 feet of a bald eagle nest at any time of the year or within 660 feet during the nesting season. Minnesota Power will consult further with the USFWS if the Project cannot maintain these minimum buffers or if a bald eagle nest removal is necessary.[414]

Techniques for minimizing impacts to wildlife and vegetation also minimize impacts to rare species. Avoiding identified areas of species occurrence or preferred habitat is the preferred mitigation measure.

The DSP (**Appendix C**) proposes special conditions related to the rare and sensitive resources.

- Section 5.9 requires the permittee to comply with DNR recommendations provided in their Natural Heritage Review Letter to avoid or minimize impacts to high-value biological resources. If impacts to resources occur, the permittee shall document the impact and consult with the DNR to determine mitigation strategies.
- Section 5.10 requires the permittee to comply with the USFWS and DNR guidance and requirements in effect regarding NLEB, including tree clearing restrictions if applicable.
- Section 5.11 requires the permittee to file documentation authorizing any Bald Eagle nest removal prior to construction.
- Section 5.12 requires the permittee to consult with the MNDNR and the Mississippi Headwaters Board regarding potential impacts to the Mississippi River due to construction activities, including tree removal and erosion on the shoreline.

[411] SPA, p. 54.
[412] DNR, Natural Heritage Review Letter, April 28, 2025. eDockets no. 20254-218237-02.
[413] SPA, p. 79.
[414] Id.

4.7.9 Climate Change

The project will help to shift energy production in Minnesota and the upper Midwest toward carbon-free sources. Construction emissions will have a short- term negligible increase in greenhouse gases that contribute to climate change. Overall, the project will generate energy that can be used to displace energy otherwise generated by carbon-fueled sources. The total GHG emissions produced by construction and operation of the project will be minimal when compared to the reduction in GHG emissions long-term. The project's design incorporates design elements that minimize impacts from the increase in extreme weather events such as hail, storms, and wind events that are expected to accompany a warming climate. The project area has the potential for increased flood risk in the case of a warmer, wetter climate due to the large presence of water resources in the area.

Climate change refers to any significant change in measures of climate lasting for an extended period. Greenhouse gases (GHG) are gaseous emissions that trap heat in the atmosphere and contribute to climate change. These emissions occur from natural processes and human activities. The most common GHGs emitted from human activities include carbon dioxide, methane, and nitrous oxide. A change in climate can have a wide range of impacts on living species, as well as infrastructure, and may create compounding weather-related events. An increase of extreme weather events, such as flooding, storms, and heat waves, is expected to accompany a warming climate.

Minnesota Statute 216H.02 sets statewide greenhouse gas emissions goals to reduce emissions from 2005 levels to net zero by 2050.[415] Minnesota has also set a carbon-free energy standard requiring 100% of the retail energy sales in Minnesota to come from carbon-free energy by 2040. In 2020, the electricity sector was the second largest source of Minnesota GHG emissions at 15.8 million tons of 137 million tons, or 11.5%.[416] GHG from electricity generation have decreased by about 60% in Minnesota since 2005 due to a shift in generation to lower- and non-emitting sources and an increase in end-use energy efficiency.[417]

The applicant indicates that the Boswell solar project will contribute to Minnesota's goal to reduce GHG emissions by providing a renewable source of energy as an alternative to more carbon-intensive sources of energy, such as coal and natural gas, as well as other national and international goals.[418]

POTENTIAL IMPACTS

General

The DNR Minnesota Climate Explorer Tool was used to determine current climate conditions for Itasca County.[419] This tool uses temperature and precipitation provided by the National Oceanic and Atmospheric Administration (NOAA), National Centers for Environmental Information, and the Parameter-elevation Regression on Independent Slopes Model Climate Group to provide historical

[415] Minn. Statute 216H.02
[416] Minnesota Pollution Control Agency, *Greenhouse gas emissions data*. (2025). https://data.pca.state.mn.us/views/Greenhousegasemissionsdata/TotalGHGemissionsgoals?%3Aembed=y&%3AisGuestRedirectFromVizportal=y.
[417] Id.
[418] SPA, p. 85.
[419] DNR, Minnesota Climate Explorer Tool. https://arcgis.dnr.state.mn.us/climateexplorer/main/historical.

climate data for various geographical regions across Minnesota. For Itasca County, the historic annual average temperature trends show a temperature increase of 0.33 °F per decade from 1895 to present, and 0.59 °F per decade from 1970 to present (2024). For precipitation, total annual precipitation has increased at a rate of 0.17 inches per decade from 1895 to present, and has decreased at a rate of 0.19 inches per decade from 1970 to present.[420]

The DNR Minnesota Climate Explorer tool was also used to project climate conditions for Itasca County. Temperature models were created to project climate data for two scenarios, Representative Concentration Pathway (RCP) 4.5 and RCP 8.5. RCP is a measure adopted by the Intergovernmental Panel on Climate Change to represent various GHG concentration pathways. The numbers (i.e., 4.5 and 8.5) represent the amount of net radiative forcing the earth receives in watts per meter squared, where a higher RCP signifies a more intense GHG effect, resulting in a higher level of warming. RCP 4.5 represents an "middle of the road", or intermediate scenario where emissions begin to decrease around 2040. RCP 8.5 represents a fossil fuel dependent scenario, with no emissions reductions through 2100.[421] **Table 28** shows the results of the climate trend modeling and includes trend predictions under different emissions scenarios for average temperature and precipitation.

The climate models predict that under RCP 4.5, the average mean temperature for Itasca County is projected to increase by approximately 3.9 °F by Mid-Century (2040 to 2059) compared to modeled present day trending conditions (1970-2024). Late-Century (2080-2099) air temperature is projected to increase by approximately 5.9 °F for RCP 4.5, and approximately 9.8 °F for RCP 8.5. Mid-century annual precipitation is projected to increase by approximately 1.7 inches for RCP 4.5. Late-Century annual precipitation is projected to increase by approximately 4.6 inches for RCP 4.5, and 6.5 inches for RCP 8.5.[422]

Table 29: Modeled Present and Future Climate Trends

GHG Concentration Pathway Scenario	Climate Factor			
	Average Temperature (°F)	Increase from present trends (°F)	Average Precipitation (inches)	Increase from present trends (inches)
Modeled Present (1970-2024)	39.0	--	26.8	--
Mid-Century (2040-2059) RCP 4.5	42.9	3.9	28.5	1.7
Late-Century (2080-2099) RCP 4.5	44.9	5.9	31.4	4.6
Late-Century (2080-2099) RCP 8.5	48.8	9.8	33.3	6.5

[420] Id.

[421] Noe, Ryan R; Keeler, Bonnie L; Twine, Tracy E; Brauman, Kate A; Mayer, Terin; Rogers, Maggie. (2019). Climate change projections for improved management of infrastructure, industry, and water resources in Minnesota. Retrieved from the University of Minnesota Digital Conservancy, https://hdl.handle.net/11299/209130.

[422] DNR, Minnesota Climate Explorer Tool. https://arcgis.dnr.state.mn.us/climateexplorer/main/historical

Greenhouse gases

Construction and operation of the project will release Greenhouse Gases (GHG), contributing to the warming of the planet. The National Renewable Energy Laboratory released a 2012 report on PV solar project life cycles. It is estimated that approximately 60-70 percent of GHG emissions from solar projects are from the upstream process of manufacturing of the PV panels and construction, approximately 21-26 percent are from operational processes of power generation and maintenance, and the remaining 5-20 percent of emissions are from downstream processes of decommissioning and disposal.[423]

For the Boswell Solar project, construction activities will result in short-term increases in GHG emissions from the combustion of fossil fuels in construction equipment and vehicles. Construction activities for the project are expected to produce a total of 3,465 tons of CO_2e. The majority of these emissions come from land use change associated with the site, in addition to emissions from fuel combustion.[424] Minnesota Power indicates that GHG emissions from construction vehicles will be minimized by keeping construction equipment in good working order. Upon completion of the construction activities, emissions from heavy equipment, delivery vehicles, and construction personnel will cease. Generally, the project's estimated construction emissions are insignificant relative to Minnesota's overall emissions of approximately 126 million tons in 2022.[425] Potential impacts due to construction GHG emissions are anticipated to be negligible.

Once operational, the project will generate minimal GHG emissions. Emissions that do occur would result from vehicle usage to and from the solar array and substation for maintenance and operation. During the operations phase a small maintenance crew will use pickup trucks on a regular basis to monitor and maintain the facilities.[426] Total emissions from commuter vehicles and maintenance trucks are estimated to be 36 short tons of CO_2e annually. Other emissions generated from the operation of the solar farm will result from land use change, creating approximately 504 short tons of CO_2e annually for project operation.[427] The majority of land-use emissions will occur during construction due to the change from agricultural and forested land to settlement, however, the establishment of perennial vegetation and prairie can reduce this impact.

If electrical energy from the project displaces energy that would otherwise be generated by carbon-fueled power plants (e.g., coal, natural gas), the project would reduce overall GHG emissions. Minnesota Power indicates that the project supports the achievement of Minnesota's carbon-free and renewable energy standards, and notes that the project will ultimately be a large contributor to GHG reduction.[428] In addition, the project will beneficially impact the climate through the reduction of more carbon-intensive sources of energy, and temporarily reduce emissions from agricultural activities such as combustion of farm equipment and use of agricultural herbicide and pesticides.

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[423] National Renewable Energy Laboratory, Life Cycle Greenhouse Gas Emissions from Solar Photovoltaics. https://www.nrel.gov/docs/fy13osti/56487.pdf.

[424] SPA, pp. 84-85: Table 4-24.

[425] MPCA (2025), *Greenhouse gas emissions data,* retrieved from *https://data.pca.state.mn.us/views/Greenhousegasemissionsdata/TotalGHGemissionsgoals?%3Aembed=y&%3AisGuestRedirectFromVizportal=y*.

[426] SPA, p. 58.

[427] SPA, p. 86: Table 4-25.

[428] SPA, p. 85.

Minnesota Power states that the average amount of GHG emissions associated with the generation of the amount of energy created by the project is approximately 78,725 short tons of carbon dioxide equivalent (CO2e) annually.[429] Thus, compared to non-renewable energy generation, the project would be beneficial with respect to total annual GHG emissions. Total GHG emissions resulting from construction and operation of the project are anticipated to be minimal when compared to the long-term reduction in GHG emissions facilitated by the project.

The generation of carbon-free electricity can reduce harmful particulate matter in the air. Due to the reduction in pollution and greenhouse gas emissions from the decrease of fossil fuels and the increase in solar energy production, the overall impact of solar development on human health can be viewed as positive. However, the entire life cycle of the PV systems must be taken into account. After the end of the project's life, panels must be properly disposed of in a special facility, or recycled if recyclers are available.

Climate resilience

Assessing climate resilience allows an understanding of the risks related to a warmer, wetter climate on project construction and operation. For the purposes of this EA, online climate screening tools were used to determine the projected climate change and storm intensity impacts on the project area.

The EPA Climate Resilience Evaluation and Awareness Tool was used to create a projected climate scenario for the project area for a wide range of future conditions (2025-2100) As previously stated in Section 4.7.4, an analysis for this project site with the CREAT tool identified a baseline 100-year storm event as a precipitation of 5.04 inches/24 hours, or 5.78 inches/72 hours. An analysis of the project site using the CREAT tool generated a risk of approximately 25.77% for a 100-year storm event under hotter, drier and stormier future conditions using projected climate data (2025 – 2100).[430] Minnesota Power also used the CREAT tool to conduct an assessment of two future climate scenarios 2035, and 2060.[431] The tool expects the area to experience an increase in 100-year storm intensity of 2.2 to 13.2 percent by 2035, and 4.2 to 25.8 percent by 2060. The EPA Streamflow Projections Map anticipates a change in average streamflow of the Mississippi River by a ratio of 1.11 (90th percentile) under wetter projections and a ratio of 0.79 (10th percentile) under drier projections in 2071 to 2100 (RCP 8.5) compared to baseline historical flow (1976 to 2005). The Mississippi River borders the southern portion of the site. This indicates a potential risk for increased water intake and flow from the river, and therefore increased risk for flooding in areas along the shore under projected climate scenarios.[432]

A warming climate is expected to cause increased flooding, storms, and heat wave events. These events, especially an increased number and intensity of storms, could increase risks to the project. Changes in precipitation patterns, particularly greater storm intensities, may generate additional floods associated with high flow events. More extreme events can lead to combined sewer overflows and reduce the capacity of sewer systems already impacted by inflow and infiltration. More extreme storms also mean more frequent heavy rainfall events, which can cause localized soil erosion or

[429] Id.
[430] Appendix E – CREAT Report
[431] SPA, p. 84.; EPA, Climate Resilience Evaluation and Awareness Tool. https://www.epa.gov/crwu/climate-resilience-evaluation-and-awareness-tool.
[432] SPA, 84.

flooding. These flooding events may challenge current infrastructure for water management and flood control.[433] Flooding could damage the project's electrical collection system, including inverters and collection wiring.

The project has been sited and designed with resiliency in mind as climate continues to change in Minnesota, including resilience from impacts such as severe weather events, strong winds, and lightning, however, a wetter climate may impact flood size and frequency in the area. Flooding events due to climate change could have the potential to impact project operations during heavy rainfall events, specifically the areas that are adjacent to the Mississippi River, which is could potentially increase in streamflow. These heavier rainfall events due to climate change could also influence stormwater management for the project.

Based on local hydrology and topography, there is potential for soils to become rutted due to increased rain events.

The FEMA National Risk Index[434] rates Itasca County as having "relatively low" risk for hail and "relatively low" risk for strong winds. The project will be designed to comply with all applicable state and local building codes and industry standards. Minnesota Power states that the tracker system and associated posts will be designed to withstand wind, snow, and seismic loads anticipated at the project site.[435] Tracking systems can also be designed to automatically stow the panels in the safest position based on the weather conditions (wind, hail, flooding, deep snow, etc.). For example, panels can be stowed in a nearly vertical position during hail events by re-orienting the trackers, which limits direct impacts between hailstones and the panels.

MITIGATION

Mitigation to reduce emissions during construction is discussed in the Air Quality section of this EA. Strategies to reduce emissions include keeping vehicles in good working order, which will reduce the amount GHG emissions from diesel or gasoline.

Risk of extreme storm and flood events can be mitigated through planning, project design, and preparedness on how to respond in the case of an event.

- Section 5.12 of the DSP is a special condition that requires the permittee to consult with the MNDNR and the Mississippi Headwaters Board regarding potential impacts to the Mississippi River due to construction activities, including tree removal and erosion on the shoreline.

- Section 8.12 of the DSP requires permittees file an *Emergency Response Plan* with the Commission and local first responders prior to operation. The requirements of this have been amended to include specific training and response plans for impacts related to 100-year storm or flooding events.

[433] EPA's Creating Resilient Water Utilities initiative – epa.gov/crwu; 2014 National Climate Assessment (2024 archive) – nca2014.globalchange.gov
[434] FEMA National Risk Index. https://hazards.fema.gov/nri/
[435] SPA, p. 70.

> In their joint application, Minnesota Power indicates that it will develop an Emergency Action Plans that outline emergency procedures for evacuation, fire response, extreme weather, injury, and criminal behavior.[436]

Impacts related to increased precipitation and flooding can be mitigated. Minnesota Power will develop a SWPPP to implement, which includes developing stormwater basins. Minnesota Power indicates that storm events will also be considered during development of the SWPPP to design permanent stormwater features. In addition, the project AIMP and VMP each provide methods to reduce impacts on wet soils, including soil compaction and rutting. During operation of the project, vegetative cover will minimize potential for impacts to waterways.[437]

Project developers can employ location, design, and construction strategies to mitigate impacts resulting from a warmer, wetter, and more energetic climate by:

- Avoiding sites with high probability for extreme weather events to the extent possible.
- Designing solar panels and solar arrays to withstand stronger storms and winds.
- Planning for the potential repair and replacement of solar arrays damaged by storms.
- Designing the project's stormwater system to prevent flooding during heavy rainfall events.
- Designing the project's electrical collection system to be resistant to flooding damage.

4.8 Unavoidable Impacts

Resource impacts are unavoidable when an impact cannot be avoided even with mitigation strategies.

Potential impacts and the possible ways to mitigate against them are discussed in this chapter. However, even with mitigation strategies, certain impacts cannot be avoided. Most adverse unavoidable impacts are associated with construction; therefore, they would be temporary.

Unavoidable adverse effects associated with construction of the project (in some instances a specific phase of construction) would last through construction and include:

- Fugitive dust.
- Noise disturbance to nearby residents and recreationalists.
- Visual disturbance to nearby residents and recreationalists.
- Soil compaction and erosion.
- Vegetative clearing (loss of woody vegetation)
- Disturbance and temporary displacement of wildlife, as well as direct impacts to wildlife inadvertently struck or crushed.

[436] SPA, p. 30.
[437] SPA, p. 10; p. 59; Appendix D: AIMP; Appendix F: VMP.

- Minor amounts of marginal habitat loss, including temporary wetland impacts.
- Possible traffic delays.
- Minor GHG emissions from construction equipment and workers commuting.

Unavoidable adverse impacts associated with the operation would last as long as the life of the project, and include:

- Visual impacts of the project.
- Cultural impacts due to a change in the sense of place for local residents.
- Loss of land for agricultural purposes.
- Change in land use from forested land.
- Injury or death of birds that collide with PV panels or Gen-Tie equipment.
- Injury or death of wildlife from fencing.
- Infrequent vehicle trips from maintenance vehicles.
- Potential decrease to property values.

4.9 Irretrievable or Irreversible Impacts

Resource commitments are irreversible when it is impossible or very difficult to redirect that resource to a different future use; an irretrievable commitment of resources means the resource is not recoverable for later use by future generations.

Irreversible and irretrievable resource commitments are primarily related to project construction, including the use of water, aggregate, hydrocarbons, steel, concrete, wood, and other consumable resources. Project infrastructure has been designed to avoid or minimize impacts on residences, the environment, and other sensitive resources. Nearby environmentally sensitive resources include wetlands, lakes and rivers, and the project is not anticipated to cause any irretrievable or irreversible impacts to these resources. Some other impacts, like fossil fuel use, are irretrievable. Others, like water use, are irreversible. Still, others might be recyclable in part, for example, the raw materials used to construct PV panels would be an irretrievable commitment of resources, excluding those materials that may be recycled at the end of the panels' useful life. The commitment of labor and fiscal resources to develop, construct, and operate the project is considered irretrievable.

4.10 Resource Topics Receiving Abbreviated Analysis

Resource topics that will have negligible impacts from the project and that do not impact the Commission's site permit decision receive less study and analysis.

Many environmental factors and associated impacts from a project are analyzed during the environmental review process. However, if impacts are negligible and will not impact the permit decision, those resource impacts receive less study and analysis. The following resource topics meet this threshold, which is based on information provided by the applicant, field visits, scoping comments, environmental analysis, and staff experience with similar projects.

4.10.1 Displacement

Displacement can occur when residences or other buildings are located within a proposed site or right-of-way. If the buildings would potentially interfere with the safe operation of a project, they are typically removed from the site or ROW and relocated. Displacements from large energy facilities are rare and are more likely to occur in heavily populated areas where avoiding all residences and businesses is not always feasible than in rural areas where there is more room to adjust site boundaries or ROWs to accommodate the proposed energy facility.

There are no residences, businesses, or structures such as barns or sheds located within the project site that will be displaced by the project. There are 8 residences within 500 feet of the Site boundary, with the closest being 48 feet away (insert reference to map). There are no residences within 0.25 miles of the Gen-Tie Line.[438] No displacement will occur; therefore, no mitigation is proposed.

4.10.2 Communications

Electronic interference from the proposed project is not anticipated. The project area is served by about 24 AM and FM radio stations or digital television channels. There are no radio, microwave, or television towers located within the boundary of the solar facility. There are no cell phone towers located within one mile of the project site, with the closest tower being located approximately 5 miles northwest of the site. Cellular phone service in the service area is provided by national operators.[439]

Because the solar facilities are relatively low (less than 20 feet tall), they are well below the line of sight used in many communication system signals. Electronic interference associated with communications infrastructure is related to a phenomenon known as corona. Impacts are not expected, because anticipated electric fields are below levels expected to produce significant levels of corona.

- Section 4.3.24 of the DSP requires the permittee to take whatever action is feasible to restore or provide equivalent reception should interference occur to "radio or television, satellite, wireless internet, GPS-based agriculture navigation systems or other communication devices" as a result of the project. Additional mitigation is not proposed.

4.10.3 Implantable Medical Devices

Electromagnetic fields (EMF) might interfere with implantable electromechanical medical devices, such as pacemakers, defibrillators, neurostimulators, and insulin pumps. Impacts to implantable medical devices and persons using these devices are not expected to occur, but, if they did occur, moving away from the project would return the pacemaker to normal operation.

- Section 4.3.30 of the DSP requires the permittee to provide educational materials about the project to adjacent landowners. Additional mitigation is not proposed.

4.10.4 Mining

Itasca County is home to multiple mining operations that extract and process materials such as aggregates, clay, iron, and limestone. However, there are no mining pits within the area of land

[438] SPA, p. 32.
[439] SPA, p. 36.

control. The closest aggregate pit is located approximately 1.5 miles east from the project site.[440] Impacts to mining will not occur and no mitigation is proposed.

4.10.5 Topography

While grading will occur, significant impacts to topography, such as the creation of abrupt elevation changes or modifications to natural drainage patterns, are not expected. The project will be graded to natural contours, where possible, and soil will be de-compacted in accordance with the project VMP and SWPPP.[441] Appropriate permanent stormwater management measures will address drainage from the newly established impervious areas. Impacts to topography will be negligible.

4.11 Cumulative Potential Effects

Cumulative potential effects result from the incremental effects of a project in addition to other projects in the environmentally relevant area.

Minnesota Rule 4410.0200, subpart 11a, defines "cumulative potential effects," in part, as the "effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects ... regardless of what person undertakes the other projects or what jurisdictions have authority over the project."

The "environmentally relevant area" includes locations where the potential effects of the project coincide with the potential effects of other projects to impact the elements studied in this EA.

Consideration of cumulative potential effects is intended to aid decision-makers so that they do not make decisions about a specific project in a vacuum. Effects that may be minimal in the context of a single project may accumulate and become significant when all projects are considered.

4.11.1 Analysis Background

The ROI for cumulative potential effects varies across elements and is consistent with the ROI identified in potential impacts and mitigation throughout this document. Cumulative potential effects—where they coincide—increase or decrease the breadth of the impact to the resources and elements studied in potential impacts and mitigation. This may or may not change the impact intensity level assigned to the resource or element.

Cumulative potential effects are impacts to the environment that results from "the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects."[442]

[440] SPA, p. 60.
[441] SPA, p. 24.
[442] Minn. R. 4410.0200, subp. 11a

The "environmentally relevant area" includes locations where the potential effects of the project coincide with the potential effects of other projects to impact the elements studied in this EA. Generally, this area includes the ROI for the different resource elements.

Minnesota Power contacted local governments, as well as reviewed desktop resources including Itasca County's website, the LLBO Division of Resource Management Website, MnDOT's district projects, and the Environmental Quality Board's interactive project database to identify foreseeable projects.[443] Projects that are geographically and temporally similar to the project, and therefore could potentially interact with the environmental effects of the project include the following:

US Highway 2: Based on the DOT's 2024-2033 10-Year Capital Highway Investment Plan, a 1.4-mile section of US Highway 2 will be resurfaced in fiscal year 2031 (State Project No. 3103-72). This highway section begins west of Pincherry Road and extends to E. Bass Lake Road in the city of Cohasset, 2.5 miles east of the Project.

County Road 62: Based on Itasca County Transportation Department's 5-Year Plan for Highway Improvement Projects document, a 2.4-mile section of County Road 62 will receive a bituminous overlay and rehabilitation in 2024. This county road section begins north of County Road 63 and extends north to US Highway 2, 2.8 miles east of the Project.

Both of these projects have the potential to cumulatively impact transportation in the region, such as increasing traffic. The addition of the Boswell solar project will lead to additional traffic, and the potential for traffic delays due to slow-moving construction vehicles in the region. However, Minnesota Power notes that resurfacing of US Highway 2 will not occur until 2031 and rehabilitation of County Road 63 will occur in 2024; therefore, construction of these two projects will not overlap with the construction of the project. Given the distance between the projects and construction of the solar project in location and time, no significant adverse cumulative effects on the region's overall transportation network are anticipated.

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