Application to the Minnesota Public Utilities Commission for a Route Permit for the Benton 115-kV High Voltage Transmission Line

Benton Solar Project

Benton County, Minnesota

Minnesota Public Utilities Commission Docket Number: IP7115/TL-23-425

Prepared for

Benton Solar, LLC
700 Universe Boulevard
Juno Beach, Florida 33408

September 20, 2024

CONTENTS

Appendices

Figures

Images

Tables

ABBREVIATIONS AND DEFINITIONS

AC	alternating current
ACS	American Community Survey
Applicant	Benton Solar, LLC
ANSI	American National Standards Institute
APLIC	Avian Power Line Interaction Committee
AQI	air quality index
ARMER	Allied Radio Matrix for Emergency Response
Benton Solar	Benton Solar, LLC
Benton Solar Project	A proposed 100-megawatt alternating current nameplate capacity solar energy conversion facility and a 100-megawatt battery energy storage system, and associated facilities to be located in Minden Township, Benton County, Minnesota. The Benton Solar Project is addressed in detail in Commission Docket Numbers IP7115/GS-23-423 and IP7115/ESS-24-283 and is separate from the 115-kilovolt transmission line project addressed in this Application.
BMP	best management practice
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Commission	Minnesota Public Utilities Commission
dBA	A-weighted decibel
DBS	Direct Broadcast Satellite
DC	direct current
ECOS	Environmental Conservation Online System
ECS	Ecological Classification System
EF	electric fields
EPA	U.S. Environmental Protection Agency

EPRI	Electric Power Research Institute
EPS	Economic Profile System
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GHG	greenhouse gas
GIS	geographic information system
GRE	Great River Energy
GPS	global positioning system
GWP	global warming potential
H_2S	hydrogen sulfide
HUC	Hydrologic Unit Code
HVTL	high-voltage transmission line
Hz	hertz
IEEE	Institute of Electrical and Electronic Engineers
IPaC	Information for Planning and Conservation
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram
kV	kilovolt(s)
kV/m	kilovolts per meter
m	meter(s)
mG	milliGauss
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
MF	magnetic fields
Minn. R.	Minnesota Administrative Rule
Minn. Stat.	Minnesota Statutes

mmBtu	1 million British thermal units
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MW	megawatt(s)
N_2O	nitrous oxide
NAC	Noise Area Classifications
NEER	NextEra Energy Resources, LLC
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NHIS	Natural Heritage Information System
NO_2	nitrogen dioxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O&M	operation and maintenance
O_3	ozone
OSA	Office of the State Archaeologist
OSHA	Occupational Safety and Health Administration
Pb	lead
permanent	in the context of Project facilities, existing for the life of the Project
$PM_{2.5}$	particulate matter 2.5 microns in diameter or smaller
PM_{10}	particulate matter 10 microns in diameter or smaller
PCO	point of change of ownership
Project	The 0.5-mile long 115-kilovolt transmission line that will deliver energy from the Benton Solar Project to the electric grid and the subject of this Application.
Project Alignment	Anticipated location of the transmission line within the Project Right-of-Way and Project Route.
Project Right-of-Way (ROW)	The Project Alignment plus 50 feet either side. The area in which all construction activities will occur.

Project Route	The location within which the Project Right-of-Way and Project Alignment are located. Exits the proposed Benton Solar collector substation and travels south for 0.11 mile; turns east for 0.16 mile; turns south for 0.22 mile; then turns southwest for 0.02 mile where it terminates at the point of change of ownership structure to be designed and installed by Great River Energy. The Project Route varies in width ranging from 454.7 feet to 1,308.3 feet.
ROW	right-of-way
SHPO	State Historic Preservation Office
SMU	soil map unit
SO_2	sulfur dioxide
SSA	sole source aquifer
SSURGO	Soil Survey Geographic database
SWCA	SWCA Environmental Consultants
SWPPP	stormwater pollution prevention plan
temporary	in the context of Project facilities, existing during construction and subsequently removed
UADP	unanticipated discovery plan
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WHPA	wellhead protection area
WMA	wildlife management area

COMPLETENESS CHECKLIST

Rule	Description	Application Section(s)
Minnesota Statutes 216E.04 – Alternative Review of Applications		
	Subdivision 1. Alternative Review - An applicant who seeks a site permit or route permit for one of the projects identified in this section shall have the option of following the procedures in this section rather than the procedures in section 216E.03. The applicant shall notify the commission at the time the application is submitted which procedure the applicant chooses to follow.	1.0
	Subdivision 2(3). Applicable projects - The requirements and procedures for alternative review in this section apply to the following projects: high-voltage transmission lines of between 100 and 200 kilovolts.	1.0
	Subdivision 3. Application – The applicant for a site or route permit for any of the project listed in subdivision 2 who chooses to follow these procedures shall submit information as the commission may require, but the applicant shall not be required to propose a second site or route for the project. The applicant shall identify in the application any other sites or routes that were rejected by the applicant and the commission may identify additional site or routes to consider during the processing of the application. The commission shall determine whether an application is complete and advise the applicant of any deficiencies.	1.0, 3.2
Minnesota Administrative Rules (Minn. R.) Part 7850.2800, subpart 1(C). Eligible Projects		
	An applicant for a Site Permit or a Route Permit for one of the following projects may elect to follow the procedures of parts 7850.2800 to 7850.3900 instead of the full permitting procedures in part 7850.1700 to 7850.2700: for high voltage transmission lines (HVTLs) of between 100 and 200 kilovolts (kV).	1.0
Minn. R. 7850.2800, subpart 2. Notice to Public Utilities Commission		
	An applicant for a permit for one of the qualifying projects in subpart 1, who intends to follow the procedures of parts 7850.2800 to 7850.3700, shall notify the Public Utilities Commission of such intent, in writing, at least 10 days before submitting an application for the project.	Appendix A
Minn. R. 7850.3100, Contents of Application (Alternative Review Process)		
	The applicant shall include in the application the same information required in part 7850.1900, except the applicant need not propose any alternative sites or routes to the preferred site or route. If the applicant has rejected alternative sites or routes, the applicant shall include in the application the identity of the rejected sites or routes and an explanation of the reasons for rejecting them.	Throughout application as indicated below
Minn. R. 7850.1900, subpart 2 (Applicable per Minn. R. 7850.3100), Application Contents, Route Permit for HVTL		
	A. a statement of proposed ownership of the facility at the time of filing the application and after commercial operation	1.1
	B. the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated	1.3
	C. at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and the reasons for the preference	3.0
	D. a description of the proposed high voltage transmission line and all associated facilities including the size and type of the high voltage transmission line	2.0

Rule		Description	Application Section(s)
	E.	The environmental information required under 7850.1900, subpart 3	7.0
	F.	identification of land uses and environmental conditions along the proposed routes	7.0
	G.	the names of each owner whose property is within any of the proposed routes for the high voltage transmission line	Figure 2
	H.	United States Geological Survey topographical maps or other maps acceptable to the commission showing the entire length of the high voltage transmission line on all proposed routes	Figure 1
	I.	identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share the right-of-way with the proposed line	7.1.2; 7.2.11
	J.	the engineering and operational design concepts for the proposed high voltage transmission line, including information on the electric and magnetic fields of the transmission line	2.0; 7.2.1.4
	K.	cost analysis of each route, including the costs of constructing, operating, and maintaining the high voltage transmission line that are dependent on design and route	2.9
	L.	a description of possible design options to accommodate expansion of the high voltage transmission line in the future	2.11
	M.	the procedures and practices proposed for the acquisition and restoration of the right-of-way, construction, and maintenance of the high voltage transmission line	4.0 and 5.0
	N.	a listing and brief description of federal, state, and local permits that may be required for the proposed high voltage transmission line	2.11
	O.	a copy of the Certificate of Need or the certified HVTL list containing the proposed high voltage transmission line or documentation that an application for a Certificate of Need has been submitted or is not required	1.4
Minn. R. 7850.1900, subpart 3 (Applicable per Minn. R. 7850.2800) – Environmental Information Requirements			
	A.	a description of the environmental setting for each site or route	7.1
	B.	a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services	7.2
	C.	a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining	7.3
	D.	a description of the effects of the facility on archaeological and historic resources	7.4
	E.	a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna	7.5
	F.	a description of the effects of the facility on rare and unique natural resources	7.6
	G.	identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route	7.7
	H.	a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigative measures	7.2–7.6

1 INTRODUCTION

Benton Solar, LLC (Benton Solar or Applicant), a wholly owned, indirect subsidiary of NextEra Energy Resources, LLC (NEER), submits this Application to the Minnesota Public Utilities Commission (Commission) for a Route Permit pursuant to Minnesota Statutes (Minn. Stat.) Chapter 216E and Minnesota Administrative Rules (Minn. R.) Chapter 7850. Benton Solar requests a Route Permit to construct and operate an approximately 0.5-mile,[1] 115-kilovolt (kV) high-voltage transmission line (HVTL; referred to hereafter as the Project) to deliver energy from the Benton Solar Project to the electric grid in Minden Township, Benton County, Minnesota. The Benton Solar Project is a proposed 100-megawatt (MW) alternating current (AC) nameplate capacity solar energy conversion facility paired with a 100-MW battery energy storage system and associated facilities to be located in Minden Township, Benton County, Minnesota. Contemporaneous with the submittal of this Application, Benton Solar is submitting to the Commission a separate Joint Site Permit Application for the Benton Solar Project (Commission Docket Nos. IP7115/GS-23-423 and IP7115/ESS-24-283).

The Project is located approximately 4.0 miles east of St. Cloud, Minnesota, in a rural area setting. No state, county, or local roads intersect the Project. The majority (0.4 mile; 80.0%) of the Project Alignment (i.e., centerline) is located on a single parcel privately owned by Great River Energy (GRE), an electric cooperative. The remaining 0.1 mile (20.0%) is located on a second, privately owned parcel. GRE has designated its parcel for use by electric utilities. Benton Solar will construct the Project using primarily 115-kV single-circuit monopole structures. The Project also will require a collector substation (i.e., the proposed Benton Solar collector substation) to step up the voltage from the associated Benton Solar Project to 115 kV. The proposed Benton Solar collector substation is addressed in Benton Solar's Joint Site Permit Application, which can be found at Commission Docket Nos. IP7115/GS-23-423 and IP7115/ESS-24-283.

The Project will begin at the proposed Benton Solar collector substation and end at a point of change of ownership (PCO) structure to be installed by GRE. GRE will be responsible for designing and installing the < 0.1 mile of 115-kV transmission line from the PCO structure into the existing GRE Benton County Substation (Figure 1). The segment from the PCO structure into the GRE Benton County Substation is therefore not part of the Project and is not included in this Route Permit Application.

Benton Solar is working closely with Benton County, Minden Township, governmental agencies and entities, and landowner participants to develop the Project in compliance with the applicable standards and criteria set forth in Minn. Stat. § 216E.03, subd. 7, and Minn. R. § 7850.4100. Benton Solar identified the Project Route (Section 2.2) through a comprehensive review, involving study and analysis of engineering options, environmental conditions, and socioeconomic considerations with the objective of minimizing impacts to landowners and the environment. The Project will support 1) the State's goals to conserve resources and minimize environmental, human settlement, and land use impacts, and 2) the State's electric energy security through the construction of efficient, cost-effective electric transmission infrastructure.

[1] The length of the transmission line is approximately 0.51 mile. However, all measurements (e.g., acres, miles) presented in this Application are approximate and have been rounded.

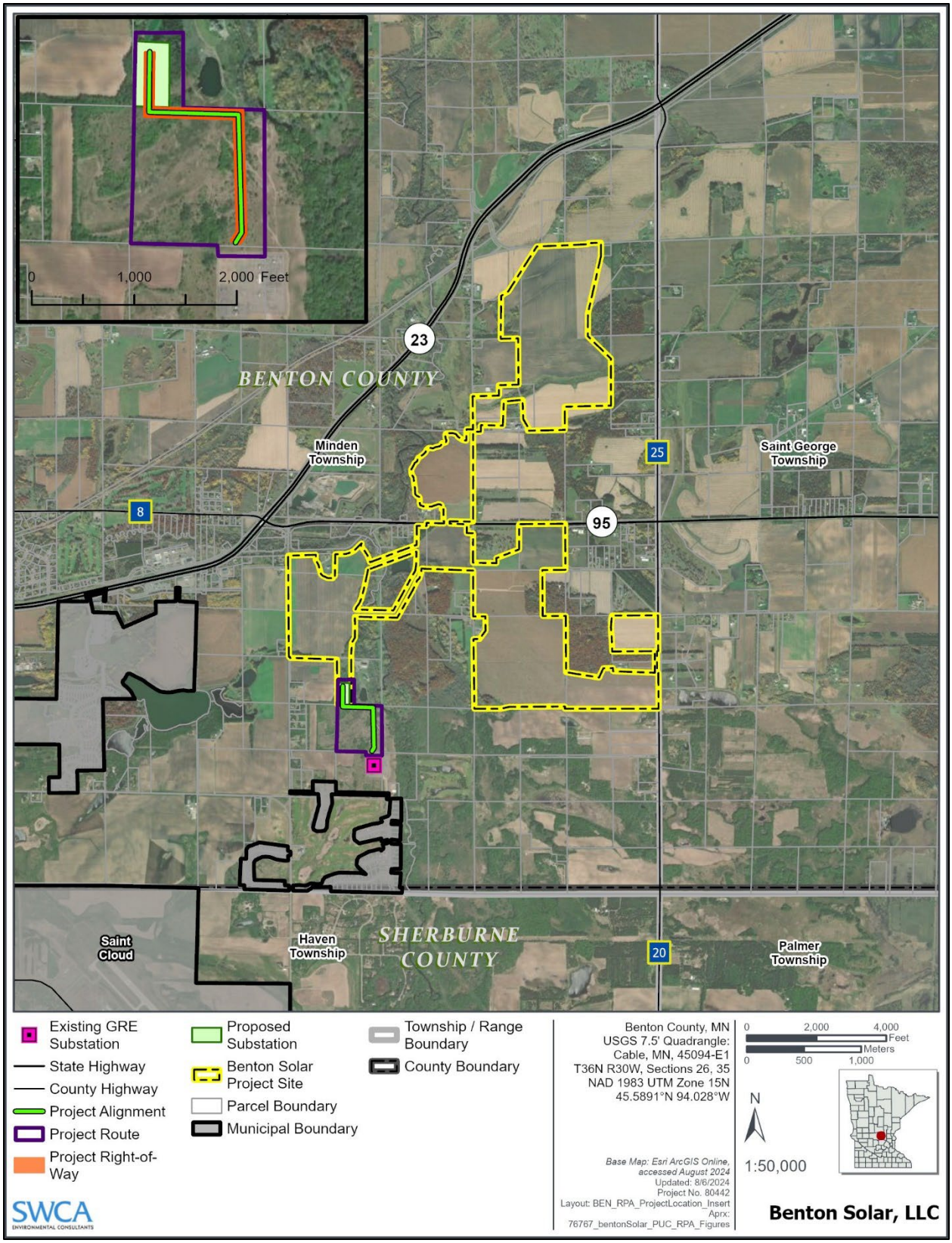

Figure 1. Project location.

1.1 Statement of Ownership

Benton Solar will develop, construct, own, and operate the Project. As a member of the NEER family of companies, Benton Solar benefits from the project development and technical expertise of its affiliated companies. For example, Benton Solar's NEER affiliates own, operate, and maintain approximately 1,023 substations and 87,929.0 miles of transmission and distribution lines, allowing Benton Solar to draw from its NEER affiliates' capabilities in transmission project development and ownership. Benton Solar affiliates have financial interests in several wind and solar projects in Minnesota:

- The 110-MW Buffalo Ridge Wind Project in Lincoln County (in operation);
- The 109.7-MW Walleye Wind Project in Rock County (in operation);
- The 62.3-MW Marshall Solar Energy Project in Lyon County (in operation);
- The 78.8-MW Minnesota Community Solar Gardens Project in various counties (in operation);
- The 15-MW Gopher Battery Storage Project in Anoka and Isanti counties (in operation); and
- The 260-MW Dodge County Wind Project in Dodge County (approved by Commission).

If the Commission grants the requested Site Permits (see Commission Docket IP7115/GS-23-423 and IP7115/ESS-24-283) and Route Permit, Benton Solar plans to develop, construct, own, operate, and maintain the facilities and will be responsible for fulfilling all of the conditions set forth in the Site Permits and Route Permit granted by the Commission.

1.2 Alternative Review Process

The Minnesota Power Plant Siting Act provides that no person may construct a HVTL without a Route Permit from the Commission (Minn. Stat. § 216E.03, subd. 2). Under the Minnesota Power Plant Siting Act, an HVTL includes a transmission line that is 100 kV or more and is greater than 1,500 feet in length (Minn. Stat. § 216E.01, subd. 4). Because the 115-kV Project is an HVTL greater than 1,500 feet in length and greater than 100 kV, a Route Permit is required from the Commission prior to construction.

The Project qualifies for review under the alternative review process authorized by Minn. Stat. § 216E.04, subd. 2(3), and Minn. R. § 7850.2800, subp. 1(C), because the Project is an HVTL between 100 and 200 kV. Accordingly, Benton Solar is following the provisions of the alternative review process outlined in Minn. R. § 7850.2800 to 7850.3900 for this Project. Under the alternative review process, the Applicant may propose a single route (Minn. R. § 7850.3100). The Applicant also must describe any alternative routes that were considered but rejected and provide its reasons for rejecting them. Benton Solar respectfully requests that the Commission approve the Project Route as described in detail in Section 2.2. Alternative routes evaluated are described in Section 3.0.

1.3 Permittee/Project Manager

The Permittee for the Route Permit is:

Benton Solar, LLC
c/o NextEra Energy Resources, LLC
700 Universe Boulevard
Juno Beach, Florida 33408

The authorized representatives for the Applicant are:

Adam Gracia
Senior Project Manager, Development
Benton Solar, LLC
700 Universe Boulevard
Juno Beach, Florida 33408
(561) 797-5048
Adam.Gracia@nexteraenergy.com

Mark R. Johnson
Senior Attorney
NextEra Energy Resources, LLC
700 Universe Boulevard
Juno Beach, Florida 33408
(561) 694-3330
Mark.R.Johnson@nexteraenergy.com

1.4 Certificate of Need

The Project does not require a Certificate of Need. The Project is exempt from the Certificate of Need requirements because it does not meet the definition of a large energy facility to which those requirements apply (Minn. Stat. § 216B.2421, subd. 2).

1.5 Notice to Commission

On August 20, 2024, Benton Solar filed its Notice of Intent by Benton Solar, LLC to Submit a Route Permit Application and Joint Site Permit Application under the Alternative Permitting to the Commission indicating that it intended to use the alternative review process of Minn. R. § 7850.2800 to 7850.3900. Benton Solar's notice complies with the requirements to notify the Commission of this election at least 10 days prior to submitting a Route Permit Application pursuant to Minn. R. § 7850.2800, subp. 2.

2 PROJECT INFORMATION

2.1 Project Location

The Project is located in the southeastern portion of Benton County in Minden Township, central Minnesota (Sections 26 and 35, Township 36 North, Range 30 West) (Table 2.1-1) (see Figure 1). The Project is located entirely on private land. Figure 2 shows participating landowners and parcels as required by Minn. R. § 7850.1900.

Table 2.1-1. Project Location

Political Boundary	Township	Range	Section
Minden Township	36N	30W	26, 35

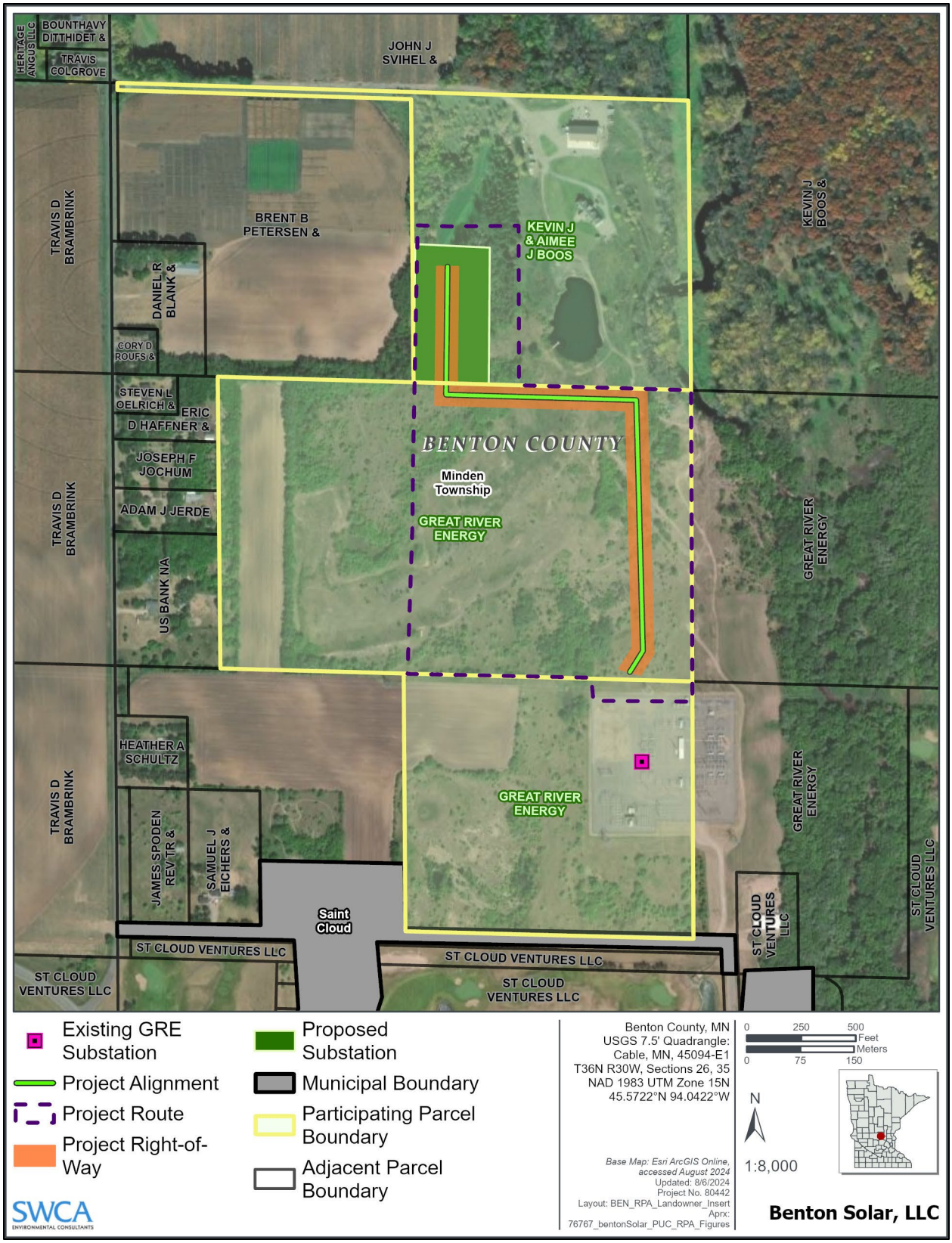

Figure 2. Participating landowners.

2.2 Project Route

Minn. Stat. Chapter 216E directs the Commission to locate transmission lines in a way that ". . . minimize[s] adverse human and environmental impact 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." A route may have a variable width of up to 1.25 miles, within which the transmission line, its right-of-way (ROW), and associated facilities can be located (Minn. Stat. § 216E.01, subd. 8 and Minn. Stat. § 216E.02, subd. 1). A route should be wide enough to provide flexibility for the permittee to work with landowners to address concerns and to address engineering issues that may arise after a Route Permit is issued. Once a route is established by the Commission, the permittee then performs more detailed engineering and survey work and obtains input from landowners to establish a final alignment and pole placement.

Benton Solar requests a Project Route with varying offset distances from the Project Alignment. These offsets are included to allow for flexibility in the final alignment routing, if needed, and for flexibility in the routing of the final alignment into the proposed Benton Solar collector substation. The Project Route exits the proposed Benton Solar collector substation and travels south for 0.11 mile; turns east for 0.16 mile; turns south for 0.22 mile; then turns southwest for 0.02 mile where it terminates at the PCO structure to be designed and installed by GRE. The Project Route varies in width, ranging from 454.7 feet to 1,308.3 feet.

The Project Route is located entirely on two privately owned parcels (see Figure 2). No existing utility, road, or other public ROWs are located within the Project Route.

The Project Route was coordinated closely with both landowners and is considered to be the preferred option because it meets the following criteria:

- No new 115-kV facilities are installed on the west side of the existing GRE Benton County Substation to allow for future GRE 345-kV improvements.
- The Project Route generally follows the eastern parcel line to the GRE PCO structure north of the existing GRE Benton County Substation, at the request of GRE to accommodate future GRE 345-kV improvements.
- The Project Route follows, as near as practical, the general paths of existing property lines to avoid subdividing GRE's parcel with a physical obstruction.
- In following existing property lines, the Project Route does not obstruct proposed future 345-kV lines that GRE is planning for 345-kV system improvements.
- No guy wires are proposed with this Project at the request of GRE. This allows the Project Route to maintain proximity to property lines and tree lines and minimizes the amount of temporary and permanent easements/disturbances required for installation of the 115-kV line.
- The Project Route aligns with GRE's Northland Reliability Project plans (see Commission Docket E-015, ET-2/TL-22-415).

2.3 Project Alignment

Given the Commission's practice of identifying an anticipated alignment in its Route Permit decisions, Benton Solar has developed a Project Alignment that minimizes the overall potential impacts of the Project based on the routing factors identified in Minn. Stat. § 216E.03, subd. 7(b), and Minn. R. § 7850.4100 (see Section 3) and that aligns with GRE's planned future land use. Benton Solar developed the Project

Alignment based on the information known at the time of the filing of this Application. The Project Alignment does not intersect any existing utility, road, or other public ROWs.

After the Commission issues a Route Permit decision, Benton Solar will develop a final alignment by reviewing the Project Alignment with individual landowners and agencies with permitting responsibilities, performing detailed survey and engineering work, conducting further Project area review, and refining the design as needed. Benton Solar will provide the final alignment to the Commission during the Plan and Profile submission and review process. As part of that submission, Benton Solar will inform the Commission about the locations of any deviations from the Project Alignment that occur in the final alignment.

2.4 Project Right-of-Way

Benton Solar proposes a 100-foot permanent Project ROW centered on the Project Alignment (50 feet either side) for the entirety of the Project Alignment (see Figure 2). No existing utility, road, or other public ROWs are located within the Project ROW. All Project-related construction activities will occur within the Project ROW, except for those temporary disturbances associated with activities such as construction ingress and egress, and wire pulling (see Section 5). Temporary access roads may be used by construction equipment as required for construction and restoration activities outlined in Section 5, as well as by equipment (e.g., cable pullers/tensioners, wideners) for wire pulling. No permanent access roads will be constructed in association with the transmission line unless otherwise agreed upon by the participating, private landowners.

2.5 Transmission Line Structures

Benton Solar will design the Project to meet applicable federal, state, and local codes, including the North American Electric Reliability Corporation (NERC) Reliability Standards, the National Electric Safety Code (NESC), and Minn. R. § 8820.9920.

Benton Solar anticipates using approximately seven 115-kV AC single-circuit monopole, steel transmission structures for the Project. Different structure types will be used as appropriate at specific locations along the Project Alignment. Primary structure types include monopole tangent structures in a single-circuit delta configuration with a single shield wire, braced post insulators, and direct embedded foundation. If it is not feasible to embed a pole into the ground, concrete piers may be used. Image 2.5-1 shows an example 161-kV weathering steel monopole tangent structure in a single-circuit delta configuration. Primary structure types at turns (corners) include monopole deadend structures with concrete drilled caisson foundations. At this time, turning structures are anticipated to be self-supporting and will not require the use of guy wires. Turning (deadend) structures will have all wires in a vertical configuration. Image 2.5-2 shows an example 161-kV weathering steel monopole tangent structure in a single-circuit vertical configuration. Primary structure types at transmission line crossings include a two-pole horizontal configuration tangent structure with two shield wires, braced post insulators, and direct embedded foundations.

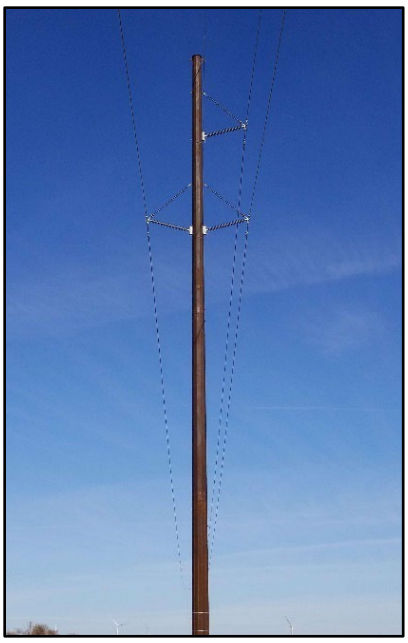

Image 2.5-1. Example 161-kV weathering steel monopole tangent structure in a single-circuit delta configuration.

Image 2.5-2. Example 161-kV weathering steel monopole deadend structure in a single-circuit vertical configuration.

Each of the single-circuit monopole structures generally will include three conductors, insulators, and a neutral overhead wire. Table 2.5-1 summarizes technical information for the family of structures that Benton Solar plans to use for the Project. More precise representations of the structures identified in Table 2.5-1 are provided in Appendix B.

Table 2.5-1. Summary of Proposed Transmission Line Pole Structures

Structure Type	Structure Material	Estimated Structure Height above Ground (feet)	Approximate Structure Base Diameter (feet)	Approximate Excavation Diameter (feet)	Approximate Span between Structures (feet)
Tangent single pole braced post delta (0°–3°)	Steel	60–110	2–4	3–5	200–700
Self-support dead-end (30°–100°)	Steel	60–100	4–6	6–10	100–600
Tangent two-pole braced post horizontal (0°–3°)	Steel	45–70	2–4	3–5	200–700

Proposed structure heights depend on terrain, span length, structure configuration, constraints, and other design factors. For example, transmission line span lengths may vary to accommodate avoidance of natural resources. Proposed span lengths for the Project are not anticipated to exceed 700 feet and the average span will be approximately 300 to 500 feet. Final pole heights will be determined during detailed design to maintain all required clearances. The proposed pole height is not expected to exceed 110 feet above ground line, and the average pole height is expected to be 45 to 95 feet above ground line.

Table 2.5-2 provides technical information for the conductor that Benton Solar proposes to use for the Project.

Table 2.5-2. Summary of Proposed Transmission Line Conductor

Conductor	Type	Size (kcmil)*	Stranding (aluminum/steel)	Diameter (inches)	Approximate Capacity (amps)
Single bittern	Aluminum conductor steel reinforced (ACSR)	1,272	45/7	1.345	1,304

*kcmil = thousands of circular mils

2.6 Substations

As part of Benton Solar's Joint Site Permit Application, pending in Commission Docket Nos. IP7115/GS-23-423 and IP7115/ESS-24-283, Benton Solar is proposing to construct a new collector substation approximately 4.0 miles east/northeast of St. Cloud. Benton Solar has an option agreement with a landowner to purchase land on which Benton Solar proposes to construct the new Benton Solar collector substation. The Benton Solar collector substation will step up the 34.5-kV Benton Solar Project collection system to 115 kV. The Benton Solar collector substation graveled footprint is anticipated to be no larger than approximately 5 acres. More detailed design engineering will confirm the size based on equipment needs. The proposed Benton Solar collector substation is described in detail in Benton Solar's Joint Site Permit Application, which can be found in Commission Docket Nos. IP7115/GS-23-423 and IP7115/ESS-24-283.

The Project will interconnect to the existing GRE Benton County Substation due to its relatively proximate location to the proposed Benton Solar collector substation and its available transmission capacity. The existing GRE Benton County Substation can accommodate the new 115-kV line and associated substation equipment. Minor modifications (e.g., network updates) to the GRE Benton County Substation may be made to accommodate the additional power to the substation. The executed Generator Interconnection Agreement provides that Benton Solar will finance any necessary minor modifications that GRE may need to perform.

2.7 Laydown Yard

Benton Solar will utilize one or more of the laydown yards described in Benton Solar's separate Joint Site Permit Application for the Benton Solar Project (Commission Docket Nos. IP7115/GS-23-423 and IP7115/ESS-24-283). The area, use, and potential impacts of the laydown yards are described in the Joint Site Permit Application.

2.8 Project Schedule

The estimated Project schedule is provided in Table 2.8-1. Transmission poles and associated equipment will need to be ordered well in advance of the in-service date. To order the correct transmission poles and associated equipment and thereafter construct the Project per the schedule below, Benton Solar is seeking a permit decision by the third quarter of 2025. This is necessary to complete pole design and order and fabricate poles. This schedule is subject to revision and is based on 1) information available as of the date of this filing; and 2) planning assumptions that balance the timing of implementation with the availability of construction crews, materials, and other practical considerations.

Table 2.8-1. Estimated Project Schedule

Activity	Estimated Date
Land acquisition	Second quarter 2023
Route Permit Application and Joint Site Permit Application review	Third quarter 2024
Route Permit and Site Permits order	Anticipated third quarter 2025
Other permits/approvals received	Third quarter–fourth quarter 2025
Environmental permits received	Third quarter–fourth quarter 2025
Commencement of construction	First quarter 2026
Duration of construction	First quarter 2026–fourth quarter 2027
End of construction	Fourth quarter 2027
In-service date	Fourth quarter 2027

2.9 Project Costs

The estimated Project cost ranges between approximately $6 million and $13 million and includes the cost of development, permitting, installation, land acquisition, procurement of equipment and services, and other miscellaneous costs. Current cost estimates may vary by ±35% due to the early stage of the Project. Final costs are dependent on a variety of factors including, but not limited to, the approved Project (e.g., structure type, line length, land cost), construction timing, and cost of materials and labor. Table 2.9-1 shows a breakdown of estimated Project costs.

Table 2.9-1. Estimated Project Costs

Project Item	Cost (millions)
Land acquisition and permitting	$2–$5
Design, procurement, and construction	$3–$7
Postconstruction close-out, permit compliance	$1
Total	**$6–$13**

Operation and maintenance (O&M) costs of the transmission line will be minimal for the first several years following construction as the line will be new. Estimated annual Project O&M costs are approximately $4,000. This estimate is based on required O&M tasks for a 115-kV transmission line, which include tower maintenance, vegetation management, and inspections. This estimate also integrates information from other recent O&M cost estimates for similar transmission lines. The primary cost associated with the O&M of a transmission line is the cost of inspections. Annual O&M costs for transmission lines in Minnesota and the surrounding states vary depending upon the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the transmission line. All costs associated with the proposed Benton Solar collector substation are addressed in Benton Solar's Joint Site Permit Application in Commission Docket Nos. IP7115/GS-23-423 and IP7115/ESS-24-283.

2.10 Other Potential Permits and Approvals

The Project may require several federal, state, and local permits prior to Project construction. All required permits, approvals, and licenses will be obtained from the applicable agency concurrently or following issuance of the Route Permit and Benton Solar Project Site Permits by the Commission. Potential permits and approvals that may apply to the Project are presented in Table 2.10-1.

Section 8 and Appendix C of this Application provide information regarding Benton Solar's outreach and coordination with federal, state, and local agencies and government.

Table 2.10-1. Potential Permits and Approvals that May Apply to the Project

Agency	Type of Permit, Approval, or Coordination	Status and Timing	Need or Description
Federal			
U.S. Army Corps of Engineers	Section 404 permit, Clean Water Act	N/A – no jurisdictional waters of the United States present in Project ROW	Required for dredging or fill in jurisdictional waters of the United States
U.S. Environmental Protection Agency (EPA)	Spill prevention, control, and countermeasures plan	To be obtained prior to Project construction, as needed	Required for facilities with aboveground oil storage of more than 1,320 gallons
State of Minnesota			
Minnesota Public Utilities Commission	Site Permits	To be obtained prior to Project construction	Required for Projects that meet the definition of a large electric power generating plant
Minnesota Pollution Control Agency	Section 401 Water Quality Certification	N/A – no jurisdictional waters of the United States present in Project ROW	Required for Section 404 individual and nationwide permits
	National Pollutant Discharge Elimination System general permit for stormwater discharges associated with construction activities	To be obtained prior to Project construction	Required for construction activities that disturb 1 or more acre of land
Minnesota Department of Health	Well construction permit	N/A – Project will not include installation of water supply well	Required for the installation of a water supply well
Minnesota Department of Labor and Industry	Electrical inspection request	To be obtained during Project construction and prior to Project operation	Required to comply with state electrical codes

Agency	Type of Permit, Approval, or Coordination	Status and Timing	Need or Description
Minnesota Department of Natural Resources (MDNR)	Water appropriation permit	To be obtained prior to dewatering activities, as needed	Required if trench dewatering (more than 10,000 gallons of water per day or 1 million gallons per year) is needed
	Work in public waters permit	N/A – no aquatic resources are present in the Project ROW	Required for activities in wetlands or waterbodies on the Public Water Inventory
MDNR, Division of Lands & Minerals	Utility crossing license	N/A – no aquatic resources or public lands are present in the Project ROW	Required for the passage of any utility crossing on public land or waters
Minnesota State Historic Preservation Office (SHPO)	Cultural and historic resources review; state and national registers of historic sites review	Obtain concurrence prior to Project construction. Complete SHPO consultation prior to construction.	Required for compliance with state permits, or affects to state-registered properties, or require National Historic Preservation Act Section 106 compliance
Minnesota Department of Transportation (MnDOT)	Application for utility accommodation on trunk highway ROW	N/A – no highway ROW located in or adjacent to the Project Alignment	Required for installing utilities along, across, or on trunk highway ROW
	Access/driveway permit	N/A – no highway ROW located in or adjacent to the Project Alignment	Required for construction or modification of a driveway/access road using the MnDOT ROW
	Oversize/overweight permit	To be obtained prior to construction, as needed	Required for oversize and/or overweight vehicles delivering equipment, materials, and supplies that exceed applicable MnDOT height, length, and weight limits
Local			
Benton County	Moving permit	To be obtained prior to construction, as needed	Required for transporting oversized and/or overweight loads on county roads
	Application for driveway/ entrance	To be obtained prior to construction, as needed	Required for modifying or creating a new driveway access to county or township roads
	Excavation and/or obstruction permit	N/A – no public road ROW located in or adjacent to the Project ROW	Required for work and placement of facilities within public road ROW
	Floodplain alteration permit	N/A – Project ROW is located in Zone X	Required for development within a floodplain
	Shoreland alteration permit	To be obtained prior to construction, as needed	May be required if an area within the shoreland is being filled, graded or vegetation altered
	Minnesota Wetland Conservation Act wetland replacement plan approval	N/A – no aquatic resources are present in the Project ROW	Required for activities affecting wetlands

Note: N/A = not applicable.

2.11 Design Options to Accommodate Future Expansion

Although no future expansion of the Project (a radial transmission line) is currently anticipated, the Project will be designed to carry up to 200 MW to accommodate any potential future expansion of the Benton Solar Project or interconnection of an adjacent separate project. Any such expansion or construction of a separate project, including any additional infrastructure that may be required, will be addressed and permitted separately in the future.

3 ROUTE SELECTION PROCESS

Benton Solar conducted a comprehensive evaluation process to determine the most appropriate route within the routing study area (i.e., parcels located between the existing GRE Benton County Substation and the proposed Benton Solar collector substation) (Figure 3). Benton Solar used publicly available geographic information system (GIS) data and information obtained from outreach efforts with Benton County and additional Project stakeholders (e.g., Minden Township) to identify potential routing constraints such as land use, sensitive environmental resources, cultural and archaeological sites, and other factors that could influence the potential location of the Project Route. Using this information, Benton Solar identified the most appropriate Project Route connecting the Project termini. Benton Solar then conducted field studies throughout the entire Project Route to verify select ground conditions and inform avoidance of sensitive environmental and cultural resources. Using this information, Benton Solar developed the Project Alignment and corresponding Project ROW to avoid and minimize impacts to sensitive resources while accommodating GRE's expansion plans for other electric infrastructure. Route selection criteria and additional detail on the process of route selection are provided below.

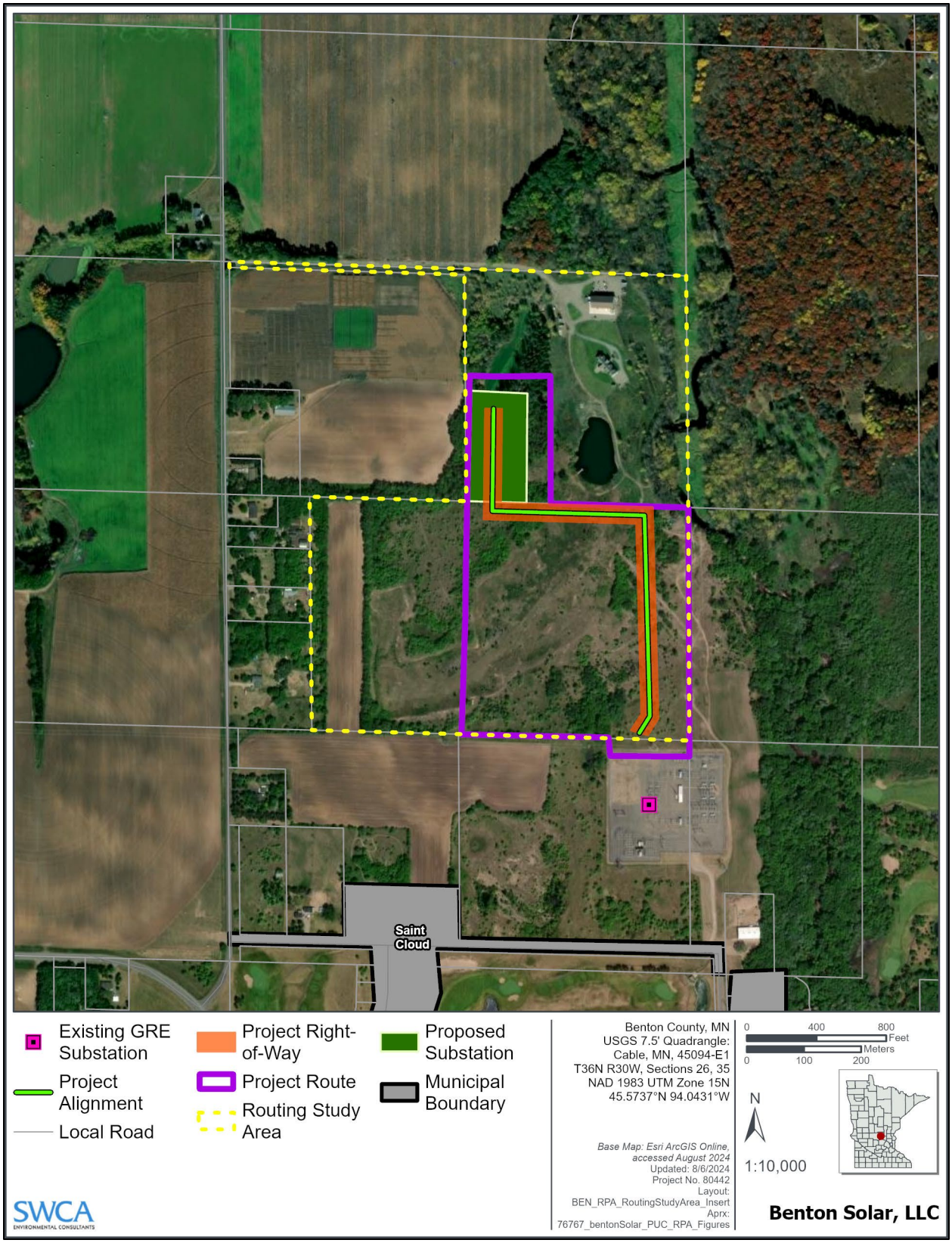

Figure 3. Routing study area.

3.1 Guiding Factors for Route Selection

Minn. Stat. § 216E.03, subd. 7(a) provides that the Commission's route permit determinations be 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. Additionally, subd. 7(e) of the same section requires the Commission to make specific findings that it has considered locating a new transmission line on an existing transmission line route or parallel with existing road ROW and, to the extent those are not used for the route, the Commission must state the reasons. The Project Alignment does not cross, and is not within, a road ROW. Approximately 80.0% of the length of the Project Alignment is located on a single parcel owned by GRE that is designated for use by electric utilities.

Further, Minn. Stat. § 216E.03 and Minn. R. § 7850.4100 direct the Commission to consider 14 factors when determining whether to issue a Route Permit for an HVTL. Each of these factors is considered in detail in this Application:

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 ROWs, 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; and

N. Irreversible and irretrievable commitments of resources.

3.2 Alternative Routes Considered and Dismissed or Rejected

Benton Solar identified four alternative routes that were reviewed and analyzed but rejected for reasons described below. These alternative routes were identified consistent with Minn. Stat. § 216E.03, subd. 7 and are depicted in Figure 4. Below is a discussion of the alternative routes that Benton Solar qualitatively reviewed and subsequently dismissed.

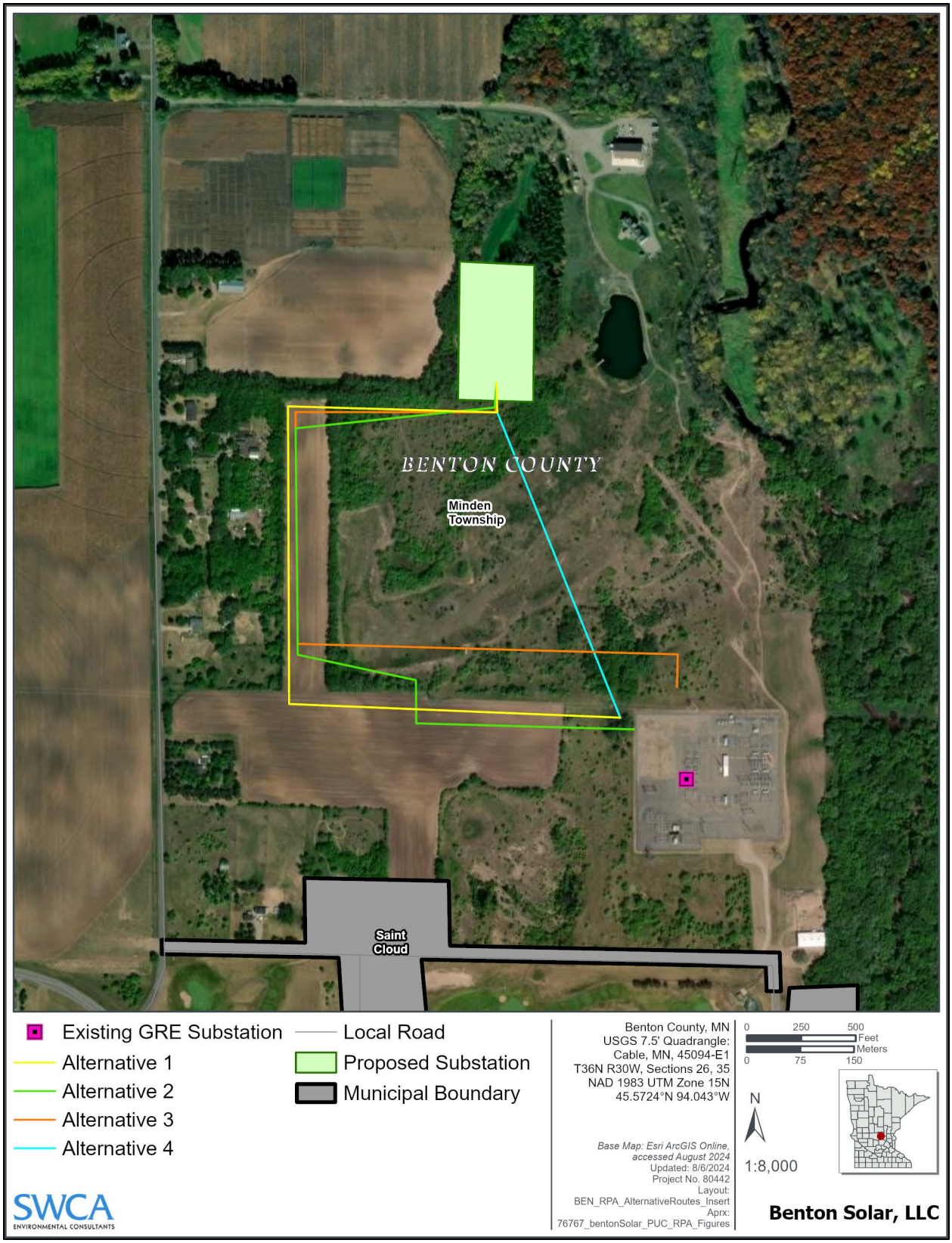

Figure 4. Alternative routes considered and dismissed.

3.2.1 Alternative Route 1

This 0.8-mile route would exit the proposed Benton Solar collector substation, turn west for approximately 0.2 mile, south for 0.3 mile, and east for 0.3 mile to the proposed GRE PCO structure located on the west side of the existing GRE Benton County Substation. This route would generally parallel existing property lines and existing easement boundaries.

The following were primary factors in Benton Solar's decision not to select this route alternative:

- Benton Solar wanted to avoid potential impacts to sensitive cultural resources that were identified during surveys and were proximate to this route.
- GRE has plans to expand its 345-kV system in the future. GRE has requested no new 115-kV facilities (structures or lines) be installed directly west of the existing Benton County Substation, and that the new 115-kV line instead should parallel the existing 115-kV Xcel Energy circuits on the north side of the substation.
- This route would require that the proposed 115-kV line cross below the existing 115-kV Xcel Energy circuits at or near the mid-span of the existing 115-kV circuits and between two existing towers. Preliminary investigation of this crossing location indicated that modifications to the existing 115-kV Xcel Energy circuits or undergrounding the proposed 115-kV line would be required to maintain adequate electrical clearances.
- Additional tree clearing would be required to maintain a 100.0-foot ROW along the north-south segment.

3.2.2 Alternative Route 2

This 0.7-mile route is similar to Alternative Route 1 with modifications to GRE's crossing location under the existing 115-kV Xcel Energy circuits and increased offsets from property boundaries to allow guying at turning structures. Upon exiting the proposed Benton Solar collector substation, this alternative would continue generally west for 0.2 mile, turn south for 0.2 mile, and continue generally east for 0.1 mile. The route would then turn south for 0.04 mile, cross below the existing 115-kV Xcel Energy circuits, and then head east for 0.2 mile to the proposed GRE PCO structure.

The following were primary factors in Benton Solar's decision not to select this route option:

- Benton Solar wanted to avoid potential impacts to sensitive cultural resources that were identified during surveys and were proximate to this route.
- GRE has plans to expand its 345-kV system in the future. GRE has requested no new 115-kV facilities (structures or lines) be installed directly west of the existing Benton County Substation, and that the new 115-kV line instead should parallel the existing 115-kV Xcel Energy circuits on the northern side of the substation.
- GRE has requested that the route be closer to tree lines, property lines, and existing easements.
- GRE's preference is that no guy wires are installed on GRE parcels.

3.2.3 Alternative Route 3

This 0.8-mile route would exit the proposed Benton Solar collector substation and turn west for 0.2 mile; turn south for 0.2 mile; then turn east approximating the general trajectory of the Xcel Energy Granite City to Benton 115-kV transmission line for 0.3 mile; and finally turn south for 0.03 mile where it would terminate at the PCO structure to be designed and installed by GRE. This route would generally parallel existing property lines and existing easement boundaries.

The primary factor in Benton Solar's decision not to select this route option was to avoid potential impacts to sensitive cultural resources that were identified during field surveys.

3.2.4 Alternative Route 4

This 0.3-mile route is the most direct option from the proposed Benton Solar collector substation to the proposed GRE PCO structure. This route would exit the proposed Benton Solar collector substation and continue 0.3 mile southeast directly to the GRE PCO structure. The direct nature of this route does not attempt to parallel existing property boundaries or existing easements.

The following were primary factors in Benton Solar's decision not to select this route option:

- This option would require the clearing of more trees as compared to other options, including the Project Route.
- GRE has plans to expand its 345-kV system in the future. GRE has requested no new 115-kV facilities (structures or lines) should be installed directly west of the existing GRE Benton County Substation.
- The proposed 115-kV route running generally north-south from the proposed Benton Solar collector substation to the PCO structure would create a physical subdivision of GRE's parcel and would be in direct conflict with proposed 345-kV circuits that GRE is planning to run north-south in this area to support system expansion.

3.3 Project Notice Area

The Project notice area developed for the Project encompasses the Project Alignment and surrounding parcels (Figure 5). The Project notice area ranges between 2.6 and 3.3 miles north to south, covers 6.3 square miles, and ranges between 0.4 and 3.0 miles east to west. The Project notice area allows for potential route alternatives should future constraints be identified in ongoing discussions with project stakeholders. As provided in Appendix A, notification letters pursuant to Minn. Stat. § 216E.03, subd. 3a were sent to local government units within the Project notice area on April 18, 2023, and again on July 17, 2024.

Benton Solar continues to work with Project stakeholders within the Project notice area to refine the Project Alignment, if applicable and within the Project ROW, with consideration given to the potential impact on routing criteria enumerated in Minn. Stat. § 216E.03, subd. 7, and Minn. R. § 7850.4100.

3.4 Selection of the Project Alignment

Ultimately, the Project Alignment presented herein is the only location known at this time that both avoids known sensitive resources and aligns with future GRE plans. The Project Alignment minimizes anticipated impacts in the routing study area while maximizing the use of land owned by an electric cooperative. Additional modifications to the Project Alignment may be made as a result of coordination with landowners or other stakeholders, or should additional sensitive resources be identified during subsequent field survey efforts. Any modifications proposed by landowners and/or stakeholders will be assessed against comparable impacts of the Project Alignment in relation to the factors listed in Minn. R. § 7850.4100. Benton Solar anticipates that the Project Alignment will continue to be within the Project Route, which ensures that the overall impacts of the final alignment will be comparable to the Project Alignment relative to the factors listed in Minn. R. § 7850.4100.

The Project Alignment does not parallel existing utility, field division, or survey lines, or transportation corridors.

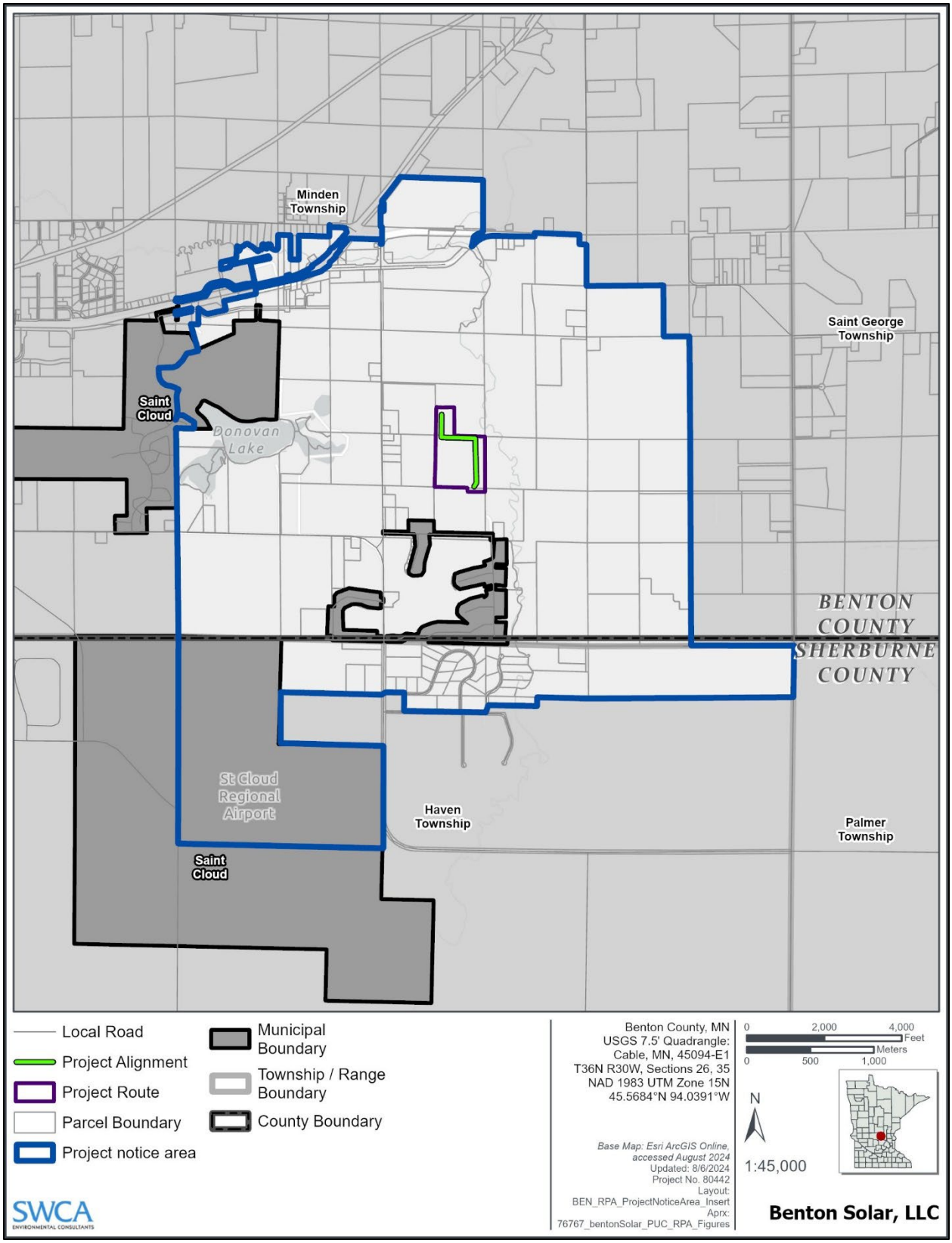

Figure 5. Project notice area.

4 RIGHT-OF-WAY ACQUISITION

Transmission easements provide consent to construct and operate on-the-ground and aboveground infrastructure including poles, and the transmission line conductor. The typical ROW evaluation process employed by Benton Solar to secure private transmission easements with landowners includes title examination, initial owner contacts, survey work, document preparation, easement negotiation, and transaction execution as follows:

- **Title and records search.** Benton Solar and its contracted title company conduct title and public records searches on targeted parcels to identify all persons and entities with recorded interests in the subject area. Benton Solar then produces a title report for each parcel to document the legal description and the owners of record, and to report information regarding easements, liens, restrictions, encumbrances, and other conditions of record.
- **Landowner meetings.** Benton Solar's land agent contacts each landowner or the landowner's representative. At an initial meeting, Benton Solar's land agent describes the Project and the proposed impact on the landowner's property. During these discussions, Benton Solar's land agent also reviews specific landowner issues or concerns regarding the construction, operation, and maintenance of the Project on their property. When negotiating easements, Benton Solar works extensively with landowners to identify the preferred location for the Project on landowners' parcels, including adjusting the location of the ROW to account for vegetation preferences, outbuildings, and the following of fence lines and crop lines, where feasible.
- **Surveys.** As a next step, Benton Solar's land agent requests landowner permission for survey crews to access the property and conduct necessary preliminary surveys and examinations. Surveys are conducted to identify preliminary ROW options, natural and artificial features, and associated elevations, which are used during detailed engineering of the transmission line. An independent geotechnical testing company may take soil borings to assess soil conditions and determine appropriate foundation design.
- **Issuance of Route Permit.** Following the Commission's issuance of the Route Permit, Benton Solar provides landowners with a copy of the Route Permit and any other materials the Commission determines are necessary. At this time, the land agent also discusses where the structure(s) may be located on the landowner's property, how many structures are likely, what the estimated span distances will be, and the specific boundaries of the easement area. If requested or allowed by the landowner, Benton Solar also stakes the proposed transmission line's location.
- **Valuation and appraisal.** The land agent collects area land value data to determine the amount of just compensation to be offered for the rights to build, operate, and maintain the transmission facilities within the easement area and retain reasonable access to the easement area. Land value data is provided in Appendix D. The land agent negotiates with the landowner regarding compensation for the transmission line. An appraisal may be obtained to resolve any complicated valuation issues. The landowner is allowed a reasonable amount of time to consider the offer and to present any information that the owner believes is relevant to determining the property's value.
- **Agreements.** The land agent prepares the documents required to complete each transaction, which may include an easement and subordination agreements.

Private landowner transmission easement agreements have been, or are being, secured throughout the entirety of the Project Alignment.

5 CONSTRUCTION, RESTORATION, AND OPERATION AND MAINTENANCE PROCEDURES

Benton Solar will begin Project construction after: 1) establishing soil conditions; 2) completing final Project design; 3) acquiring the necessary transmission easements; and 4) obtaining applicable federal, state, and local approvals. Benton Solar will work with an experienced contractor to construct the transmission line. Benton Solar and its contractor(s) will comply with all applicable federal, state, and local permit requirements.

To avoid and minimize Project impacts, Benton Solar will employ industry-specific best management practices (BMPs) and standard construction and mitigation practices developed by Benton Solar affiliates with extensive project management experience. Project BMPs are discussed in the Impacts and Mitigation subsections of Section 7 for each resource analyzed. Standard construction and mitigation practices may include, but are not limited to, safety and stormwater pollution prevention planning, agricultural mitigation planning, traffic control planning and construction access, staging, transmission line structure erection, conductor stringing, restoration, and maintenance and inspection. In some cases, Project construction activities, such as scheduling, may be modified to minimize impacts to sensitive environmental resources. In addition, any contractors or subcontractors involved in construction of the Project will be instructed on the protection of archaeological, cultural, and ecological resources, as well as all applicable permit requirements. Benton Solar construction contractors also will be informed of federal, state, and local laws regarding antiquities, fossils, plants, and wildlife (including collection and removal).

Affected landowners will be contacted and notified prior to the start of construction and provided with details regarding construction activities. If temporary removal or relocation of gates or fencing is necessary, installation of temporary or permanent gates will be coordinated with the affected landowner. Depending on the timing of Project construction, the land agent will work with the property owner for early harvest of crops, where possible, with compensation to be paid for any actual crop losses or in accordance with the landowner easement agreement. During the construction process, it may be necessary for the property owner to remove or relocate equipment from the Project ROW. Compensation related to these activities will be discussed with the landowner during easement negotiations.

Existing underground utilities will be located and staked through the call-before-you dig process with Gopher State One Call.

Benton Solar will use many types of construction equipment to complete the Project. Initially, chain saws, mowers, cranes, bucket trucks, tractors, dump trucks, pickup trucks, flatbed trucks, backhoes, and bulldozers will be used where needed to clear vegetation from the Project ROW and staging areas. After vegetation clearing, typical construction equipment used on the Project might consist of digger-derrick line trucks, track-mounted drill rigs, dump trucks, front-end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, pickup trucks, concrete trucks, and various trailers. Many types of excavation equipment are set on wheel- or track-driven vehicles, depending on terrain and soil conditions. Steel structures generally are transported on tractor trailers.

5.1 Construction in Environmentally Sensitive Areas

Benton Solar has designed the Project to avoid and minimize construction in environmentally sensitive areas. When complete avoidance of environmentally sensitive areas is not feasible, Benton Solar will comply with all applicable permit requirements and/or industry standard BMPs during construction within such areas. For example, Benton Solar may place construction mats in wet or soft soil locations to minimize

impacts such as compaction and rutting. Section 7.0 provides a detailed discussion regarding potential impacts to environmentally sensitive areas and related BMPs and/or mitigation.

5.2 Construction Sequence

Construction of the Project will follow a typical sequence of construction, including:

- Surveying and staging;
- Determining applicable construction access;
- Installing stormwater pollution prevention and erosion control measures;
- Clearing, grubbing, and grading the Project ROW;
- Delivering materials;
- Installing foundations;
- Assembling, erecting, and setting structures; and
- Installing ground rods, insulators, shield wires, and conductors.

Construction will be followed by restoration and O&M. Various phases of construction are outlined in greater detail below. The construction phases discussed in the following sections can occur at various locations throughout the construction process, and, in many cases, simultaneously at various locations throughout the Project.

5.3 Surveying and Staging

The first phase of Project construction activities involves survey staking of the Project centerline, pole locations, any environmental constraints, property boundaries, temporary construction easements, and Project ROW boundaries. Benton Solar will then install stormwater pollution prevention and erosion control measures and establish staging areas along the Project ROW.

Benton Solar will construct and use approximately seven staging areas within the Project ROW, each being approximately 100.0 feet by 100.0 feet (0.2 acre) and totaling 1.6 acres. These staging areas will be used to prepare the transmission poles, cables, and other equipment immediately prior to install. Trucks and cable reels will temporarily be housed in the staging areas during construction.

5.4 Clearing and Grading

Following surveying and staging activities, Benton Solar will install the necessary preliminary access roads and matting to support Project construction. Approximately 2.3 acres of trees within the Project ROW will require removal or trimming. Benton Solar will seek landowner agreements to remove or trim trees or limbs that are in danger of encroaching or falling into the energized transmission line (i.e., hazard trees) to ensure that vegetation meets appropriate safety standards (discussed below).

Vegetation clearing also will facilitate access to the construction site(s). Some low-growing brush or specific tree species may be allowed at the outer limits of the Project ROW depending on vegetation. Taller trees within the Project ROW that could compromise the safe and reliable operation of the Project will be removed. Existing low-growing vegetation that will not pose a risk to the Project or impede construction or maintenance may remain in the Project ROW.

Clearing of Project ROW and vegetation management will be in accordance with GRE standards and NEER transmission line vegetation management program terms. Maintenance of vegetation in the Project ROW will be completed in accordance with the NEER Vegetation Management Operations Manual. The manual outlines how Benton Solar will manage vegetation and is based on established national standards defined by the American National Standards Institute (ANSI). Operations to maintain safe and reliable distances to vegetation are defined and then calculated using ANSI A300 (Part 1) 2017 Pruning for Tree Care Operations (ANSI 2017) and ANSI Z133.1-2017 Safety Requirements Table 2 (Clearance 1) and Table 1 (Minimum Approach Distance) (ANSI 2017).

Initial clearing of the Project ROW must meet necessary clearances. In exceptional circumstances, tree trimming agreements may be used to minimize tree removal based on negotiations with the landowners. Materials resulting from vegetation clearing will be: 1) chipped on-site and spread on the Project ROW; 2) stacked outside the Project ROW when desired by, and in coordination with, the landowner; or 3) removed and disposed of as agreed with the landowners during easement negotiations. Surveyors will stake the final construction corridor within the approved Project ROW and will stake structure locations within the Project Alignment after vegetation has been removed and in preparation for the construction crew.

Benton Solar anticipates that localized grading work will be required in one location along the east-west portion of the Project Alignment and one location along the north-south portion of the Project Alignment due to the slope of the existing terrain and to accommodate access for construction equipment. Outside of these localized areas, only minimal grading is expected to be required within the Project ROW for Project construction.

5.5 Access Road Construction

To assist with the necessary access to the Project, the construction crew may install temporary culverts, matting, and access roads. Implementation of these measures may be necessary to maintain adequate access and drainage during and after construction. Access to the Project ROW typically is made directly from existing roads or paths that run parallel or perpendicular to the proposed transmission line, including private roads.

Benton Solar will obtain landowner permission prior to accessing areas, as appropriate. Where necessary to accommodate heavy equipment used in construction, including cranes, concrete trucks, and drilling equipment, existing access roads may be upgraded, or new access roads may be constructed. New access roads and driveways also may be constructed when no current access is available or when the existing access is inadequate to cross roadway ditches or safely access portions of the transmission line. Benton Solar will coordinate these activities with the affected property owner(s). Once the Project ROW is cleared and graded, the access roads or work pads will be installed as needed to support the heavy equipment necessary for foundation installation, pole framing erection, and wire stringing. These access roads and work pads generally are temporary and require minimal grading and filling for the safe movement of vehicles, equipment, and materials. Transmission line structures are designed for installation at existing grades. However, some sloped work areas may need to be graded or filled to establish a more level work surface for structure installation.

It is anticipated that localized grading will be needed for portions of the Project Alignment due to the slope of existing terrain. Within the Project ROW and with permission of the landowner, Benton Solar may prefer to leave access roads, leveled areas, and staging areas in place for future maintenance activities. If landowner permission is not granted, staging areas will be graded back as close to original condition as possible. All fill, including temporary culverts, if needed, and road approaches, will be removed and disturbed areas will be returned to preconstruction conditions.

5.6 Transmission Construction

After the structure sites are stabilized, the structure foundations will be installed. These foundations may consist of concrete caissons, or the structures may be direct buried into augured holes. Caissons will be used for heavily loaded structures, such as a self-supporting angle structure or self-supporting dead-end structure. Tangent steel pole structures are anticipated to be directly buried and would not require a caisson foundation. Foundations for direct embed steel pole structures would require excavating or auguring a hole approximately 15.0 to 30.0 feet deep and approximately 3.0 to 5.0 feet in diameter. Structures with caissons would require a hole approximately 20.0 to 50.0 feet deep and approximately 6.0 to 10.0 feet in diameter. Exact excavation dimensions will depend upon the structure geometry, investigated subsurface conditions, and required foundation loading.

Once the foundations are ready, the structures, insulators, grounding, transmission hardware, and required construction equipment will be sent from the staging areas to the appropriate staked structure location. The structures typically would be laid on the ground within the Project ROW until set. Braced posts and/or insulator assemblies would be attached directly to the structures while on the ground.

Additional hardware and pulling blocks would then be attached to the insulators. Steel structures will then be lifted, placed in the excavated hole, or placed and secured on the concrete foundation by a crane or similar heavy-lift equipment. The holes will be backfilled with select aggregate or concrete. Concrete trucks will deliver the concrete from a local batch plant. Excess soil will be offered to the landowner for disposal on the structure site or other location on the property within reasonable proximity to the construction site. If on-site disposal of excess soil is not permitted, such soil will be completely removed from the Project ROW.

At this time, guying is not proposed for any structures. Once foundations and structures are in place, conductors are installed by establishing stringing setup areas. Conductor setup areas will be located at turning structures where wire pulling is required and will provide suitable space for the required conductor reels and construction equipment. Conductor setup areas will be in-line with spans where possible but may be required to remain within Project ROW boundaries where constraints such as property boundaries limit access to pulling.

Once the steel pole structures have been erected, ground crews will drive along the Project ROW, securing the conductor pulling line through stringing blocks suspended from the insulators on the poles. The pulling line will be used to pull the conductor through each block and later to achieve the required tension. Finally, the conductor will be clipped in using bucket trucks once final sag is established. The shield wire will be installed in a comparable manner.

Following construction, soil stockpiles will be used for revegetation purposes and/or may be provided to the landowner for their use. Disturbed ground will be regraded to as close to preconstruction condition as appropriate for stabilization. Disturbed areas will then be revegetated and will be the responsibility of Benton Solar as part of the construction Stormwater Pollution Prevention Plan (SWPPP).

5.7 Restoration

Following completion of Project construction, Benton Solar will remove any temporary road improvements and temporary culverts constructed within the Project Route and restore these areas to preconstruction condition. For any section of state, county, or township road used, Benton County will restore the roadway to its preconstruction condition or as negotiated in road use agreements as agreed upon by Benton Solar, the Benton County Department of Public Works/Highway, and/or the Minnesota Department of Transportation (MnDOT), as applicable.

Benton Solar will restore areas within the Project Route temporarily disturbed during construction activities by:

- Regrading to original contours if required by the landowner;
- Backfilling and respreading, as needed, with subsoils excavated during construction;
- Topping with stored topsoil; and
- Reseeding using a regionally appropriate seed mix, as described in landowner agreements.

The Project ROW is located on land owned by GRE in a corridor that is designated to host various transmission line and substation upgrades. Therefore, the restoration objective within the Project ROW will be to install a regionally appropriate seed mix compatible with GRE's utility expansion plans. The Project ROW will be managed using standard integrated vegetation management practices, including noxious weed control, in coordination with GRE and associated stakeholders. Benton Solar will monitor reseeded areas in compliance with the Project SWPPP to confirm successful revegetation of disturbed areas. Stormwater BMPs, such as silt fence and straw wattle, will not be removed until cover by seeded species is established.

After construction is completed, Benton Solar will contact, if applicable, landowners, the Benton County Department of Public Works/Highway, or MnDOT to address any damage resulting from Project construction that has not been previously addressed. In certain situations, Benton Solar may engage an outside contractor to restore damaged property to its original condition to the extent practicable. If damage has occurred to fences or private property, Benton Solar will fairly compensate the landowner for damages sustained in accordance with landowner easement agreements.

5.8 Operation and Maintenance

NEER affiliates, such as Benton Solar, use NEER's existing transmission field operations organization that is responsible for maintaining approximately 11,359.0 miles of transmission lines and transmission voltage generation ties up to 500 kV across all NERC regions in the United States. These facilities are planned, maintained, and operated in compliance with applicable NERC Reliability Standards. The operation organization manages compliance with transmission line maintenance standards. Benton Solar will use these experts to develop and implement procedures for the maintenance of the Project. Benton Solar maintenance procedures will be informed by NEER affiliates that already have:

- Well-established O&M practices and standardized processes, which are already being used to operate high voltage transmission facilities;
- Access to over 766 power system professionals, including technicians and other staff, with expertise in all aspects of transmission and substation equipment installation, maintenance, and repair;
- Experience from O&M power delivery assets in all NERC regions at voltages up to 500 kV;
- An excellent record of transmission and substation reliability built on robust design and O&M programs that incorporate condition assessment, diagnostics, and asset management for effective and efficient investment of resources and capital;
- Experience addressing a wide variety of operating challenges including hurricanes, tornadoes, and other high wind conditions; dust contamination; avian interaction; and lightning. For example, outages are followed up by an Event Response Process in which NEER affiliates use diagnostic techniques to identify the root cause of a problem to prevent reoccurrence; and

- Solutions to transmission O&M problems that include new designs, new conditions assessment processes, and/or new products. NEER affiliates also often work directly with equipment manufacturers to develop these solutions in order to continually improve the reliability of its transmission systems.

Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99.0%. The principal O&M cost for transmission facilities is the cost of inspections.

Consistent with the applicable NERC Reliability Standards and NEER's maintenance procedures, regular maintenance of the Project will include vegetation monitoring and management, transmission line visual inspection, detailed climbing inspection, special assessments of the line, and general facilities/grounds upkeep. These and other proposed maintenance activities are discussed below in greater detail for the Project.

Regular maintenance and inspections will be performed during the life of the Project. Access to the Project ROW is required periodically to perform inspections, conduct maintenance, and make repairs. Generally, Benton Solar will inspect the transmission line annually. Inspections will be limited to the Project ROW and areas where obstructions or terrain may require off- Project ROW access. If problems are found during inspections, repairs will be performed, and the landowner will be compensated for any resulting impact.

The Project ROW will be maintained by removing vegetation that interferes with Project O&M. Native shrubs that do not interfere with safe Project operation will be allowed to reestablish in the Project ROW. Benton Solar's maintenance practices provide for the inspection of the transmission line annually to determine whether clearing is required. Clearing practices include a combination of mechanical and hand-clearing methods, along with targeted herbicide application, where allowed, to remove or control vegetation growth. Benton Solar will attempt to limit the spread of noxious and invasive weeds by cleaning construction equipment before it enters the construction work area and by using only invasive-free mulches, topsoil, and seed mixes.

Any herbicides used by Benton Solar will be approved by the U.S. Environmental Protection Agency (EPA) and the Minnesota Department of Agriculture (MDA). Herbicides will be applied only by commercial pesticide applicators that are licensed by the MDA.

6 DECOMMISSIONING

At the end of the Project's useful life, the Project will be decommissioned according to the Decommissioning Plan in Appendix E.

7 ENVIRONMENTAL INFORMATION

Chapter 7 describes 1) existing conditions; 2) an analysis of potential impacts; 3) mitigation measures; and 4) irreversible and irretrievable commitment of resources. Additional information regarding the framework for the impact analyses follows.

- **Existing Conditions** sections describe the existing conditions of environmental resources within the Project Route, and sometimes within a larger area (e.g., Benton County) where appropriate for context for a specific resource (e.g., Public Health and Safety, Section 7.2.1). The existing

conditions sections describe the conditions at the time of the submission of this Application and are based on publicly available desktop resources and data collected during field surveys.

- **Potential Impacts** sections describe, and where possible quantify (e.g., acres, square feet), the potential impacts to the existing conditions as a result of Project construction and O&M activities. Potential impact sections typically provide an impacts analysis for the Project Route and Project ROW. Where appropriate for some resources, the analysis is presented for a larger area (e.g., regional/county-wide for Public Health and Safety, Section 7.2.1).

  Potential impacts are described as either short-term or long-term. For example, Project construction activities will result in certain impacts that will be temporary as the area will be restored following construction. These impacts are considered short-term. Other impacts will exist for the life of the Project and are considered long-term. Long-term impacts would include the conversion of existing land cover to impervious surface for structure foundations.

  Potential impact calculations are based on the design and construction practices described herein.

- **Mitigation Measures** sections describe mitigation measures that will be implemented to minimize or compensate for potential impacts. In instances where impacts are not identified, will be avoided, or are unlikely to occur, no mitigation measures are recommended.

7.1 Environmental Setting

The Project Route is located approximately 4.0 miles east of St. Cloud, Minnesota, in a rural setting. No state, county, or local roads intersect the Project Route. No residences, barns, or associated constructed infrastructure are located in the Project Route. One non-residential outbuilding, associated with the existing substation, is located just inside the southern boundary of the Project Route.

The Project Route lies within the Anoka Sand Plain Subsection Ecological Classification System (ECS) 222Mc (MDNR 2024a). The ECS 222Mc is in the Minnesota and Northeast Iowa Morainal Section in the Eastern Broadleaf Forest Province. The ECS 222Mc consists of flat, sandy lake plains and terraces occurring along the Mississippi River. Low moraines are locally exposed, small dune features and ice block depressions are present, and southwest trending tunnel valleys occur on the sand plain. Bedrock is locally exposed in the St. Cloud area with surface glacial deposits usually less than 200 feet thick and underlain by Cambrian and Ordovician dolomite, sandstone, and shale. Soils derive primarily from fine sands of the sandy plain. Pre-settlement vegetation was dominated by oak barrens and openings on droughty uplands and brushlands on the sandplain. Narrow bands of upland prairie and floodplain forest were found along the Mississippi River. Current vegetation and land use in ECS 222Mc includes sod and vegetable crop production, and urban development is common (MDNR 2024a).

7.1.1 Land Cover

7.1.1.1 EXISTING CONDITIONS

Primary mapped land covers in the Project Route and Project ROW are hay/pasture (25.9 acres, 53.7%, and 3.2 acres, 51.8%, respectively) and cultivated crops (13.6 acres, 28.1% and 1.7 acres, 27.6%, respectively) (Figure 6; Table 7.1-1) (U.S. Geological Survey [USGS] 2021). During field surveys, however, SWCA biologists did not observe signs of active farming practices in the Project Route. Rather, land cover in the Project Route is described as a mosaic of mixed forest and herbaceous areas, with historic disturbances resulting from a gravel mine, agriculture, transmission line, and substation.

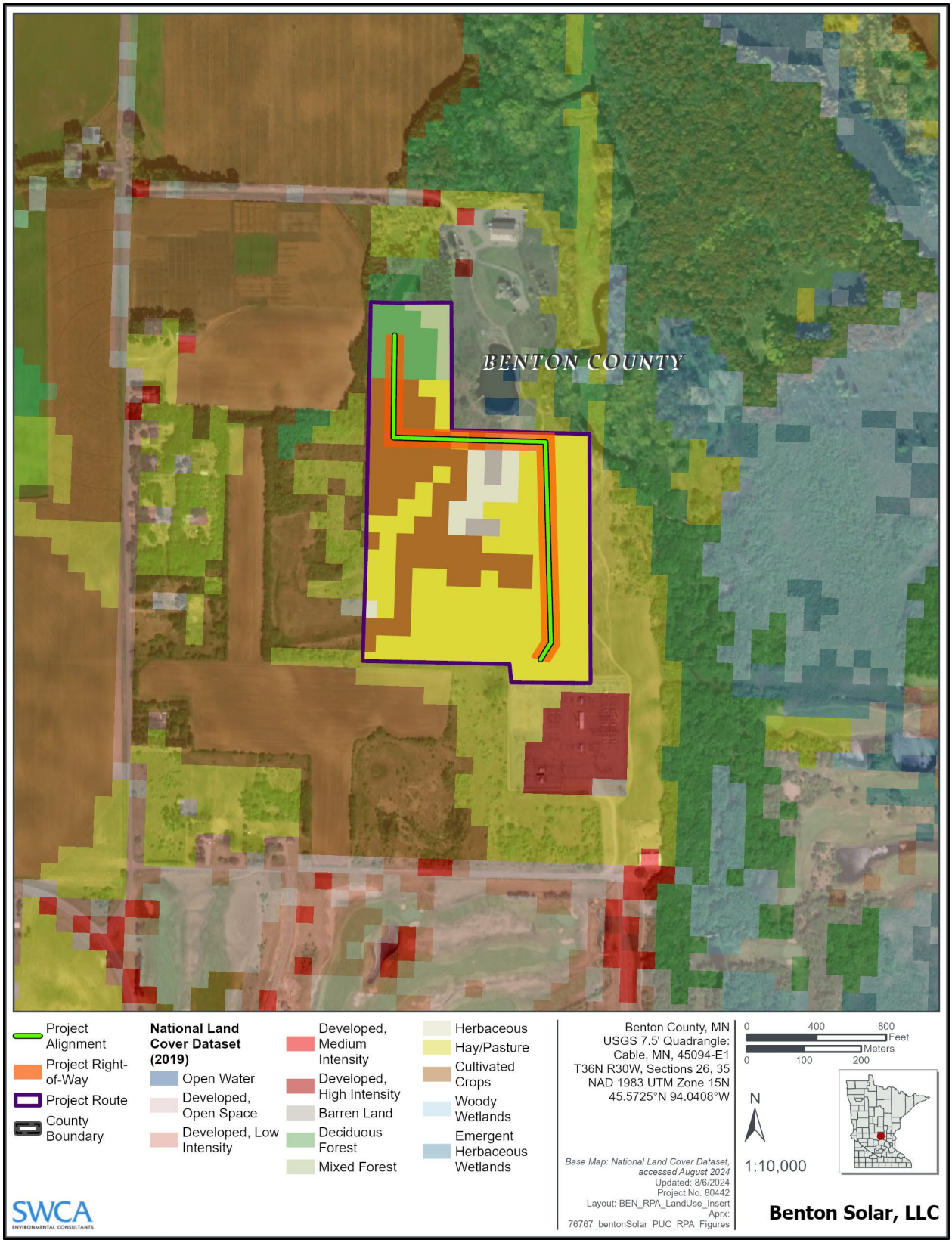

Figure 6. Land cover – National Land Cover Database.

Table 7.1-1. National Land Cover Data for the Project Route and Project Right-of-Way

Land Cover Category	Project Route		Project ROW	
	Area (acres)	Percentage of Total	Area (acres)	Percentage of Total
Hay/pasture	25.9	53.7%	3.2	51.8%
Cultivated crops	13.6	28.1%	1.7	27.6%
Herbaceous	2.9	6.0%	0.5	7.2%
Barren Land	1.2	2.5%	0.3	4.2%
Deciduous forest	3.5	7.2%	0.6	9.1%
Mixed Forest	1.3	2.6%	0.0	0.0%
Total	48.3	100.0%	6.3	100.0%

No Conservation Reserve Enhancement Program parcels are located in the Project Route. Digital data for Conservation Reserve Program lands were unavailable at the time of this writing. The U.S. Department of Agriculture (USDA) Farm Service Agency administers the Conservation Reserve Program and Conservation Reserve Enhancement Program lands.

Minnesota classifies 39 distinct agroecoregions based on a specific combination of soil type, landscape, climatic features, and land use. Agroecoregions are landscape units with relatively uniform crop productivity, climate, geologic parent material, soil drainage, and slope characteristics. According to the MDA, the Project Route is located within the Alluvium and Outwash agroecoregion, which is likely composed of sorted stream deposits and filled channels of former streams (MDA 2016; MnDOT 2001).

7.1.1.2 POTENTIAL IMPACTS

Impacts to land cover will occur in the Project ROW. Permanent impacts to existing land cover will be limited to conversion of existing cover to impervious surface on approximately 540.4 square feet (0.01 acre) where transmission structures will be sited, and removal of select woody vegetation and trees in the Project ROW (see Section 5.6). Temporary impacts will occur where staging areas and access roads temporarily convert existing cover to maintained surfaces (e.g., gravel or bare ground). These areas will be used during construction and restored to approximate preconstruction conditions following completion of construction. Restoration will include revegetation in compliance with the SWPPP and in coordination with landowners, as appropriate (see Section 5.7).

7.1.1.3 MITIGATION MEASURES

Only minimal impacts to existing land cover are anticipated. Therefore, no additional mitigation measures are proposed.

7.1.2 Land Use and Zoning

7.1.2.1 EXISTING CONDITIONS

The Project Route is located in the city of St. Cloud's Minden Township Orderly Annexation Area (Beacon 2024) (Figure 7). The current zoning for the Project Route located in the Annexation Area is Agriculture. The long-term vision for this portion of the Annexation Area is Office/Business Park and Low Density Mixed Residential land uses, per the Minden/St. Cloud Orderly Annexation Planning Board's adopted 2003 land use master plan (City of St. Cloud 2003).

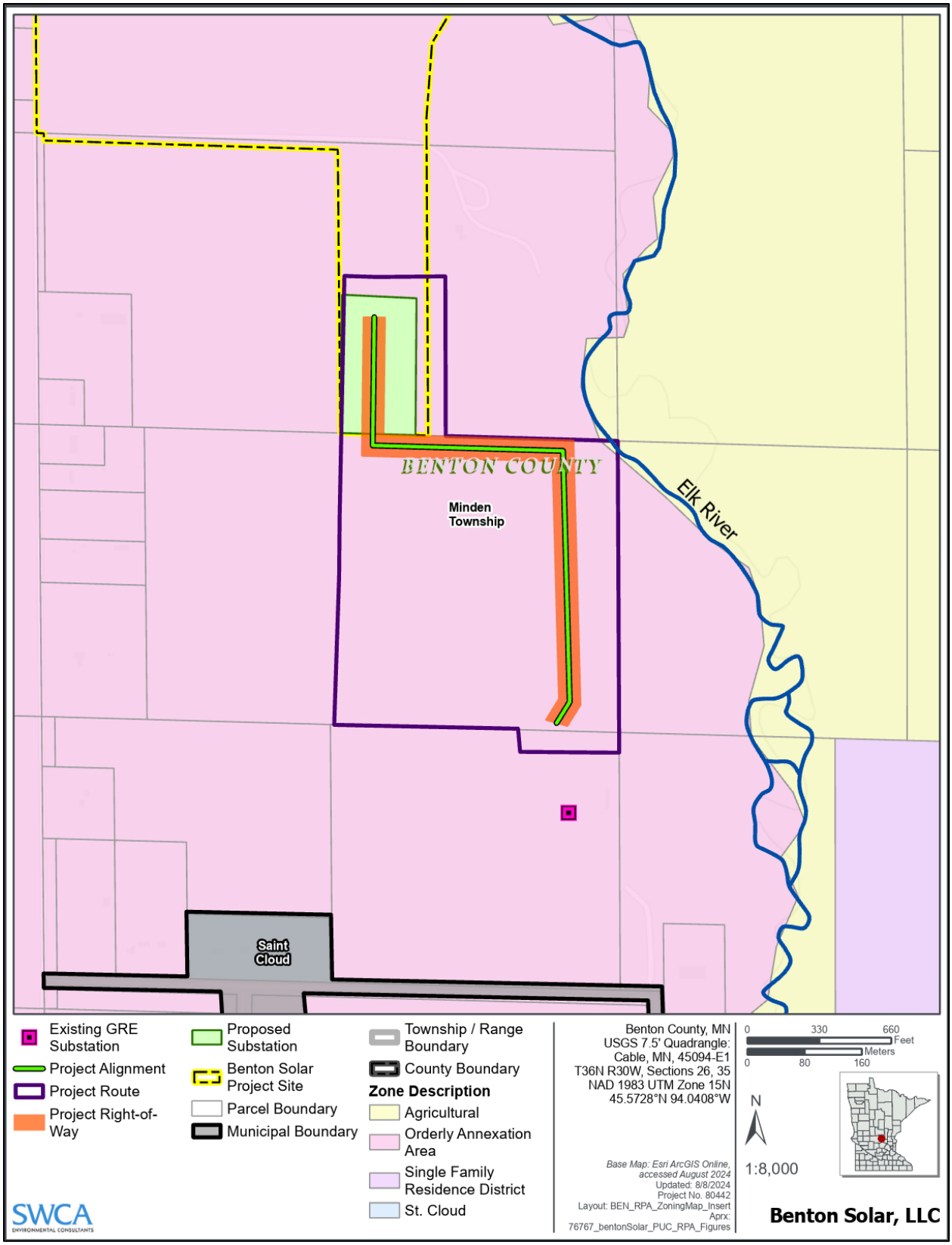

Figure 7. Zoning.

The majority (0.4 mile; 80.0%) of the Project Alignment is located on a single parcel privately owned by GRE. GRE has designated this parcel for use by electric utilities, and an existing transmission line intersects the Project Route just north of the existing substation. The Project Route has also been designed to align with GRE's Northland Reliability Project plans (see Commission Docket E-015, ET-2/TL-22-415).

7.1.2.2 POTENTIAL IMPACTS

Benton Solar coordinated with the City of St. Cloud Planning and Zoning to discuss the Minden/St. Cloud Orderly Annexation Planning Board's adopted 2003 land use master plan. The Project is anticipated to be compliant with the master plan.

7.1.2.3 MITIGATION MEASURES

No impacts to land use or zoning are anticipated. Therefore, no mitigation measures are proposed.

7.1.3 Geology and Soils

7.1.3.1 GEOLOGY

7.1.3.1.1 Existing Conditions

The surface and near-surface geologic layers of the Project Route have been most heavily influenced by numerous glaciation events during the Quaternary period's Pleistocene epoch (2.6 million–11,700 years ago). The epoch, more commonly known as the ice age, consisted of ice sheets moving across much of the Great Lakes Region, including Minnesota and the area now considered Benton County. Minnesota was at the edge of the principal glacier covering North America, the Laurentide Ice Sheet, and experienced multiple ice-free and glaciation periods as lobes of the sheet successively drifted and receded across the region. The earliest ice cover may have come as early as 1.2 mega annum (1 million years), although evidence of the event has predominantly been obscured by more recent glaciation events, including the most recent, the Wisconsin Glaciation Stage, which ended approximately 11,000 years ago. During this time, lobes of the Laurentide Ice Sheet moved across central Minnesota, leaving behind much of the glacial drift, or sediment material associated with glacial presence, which characterizes the region today (Minnesota Geological Survey 2017).

The composition and thickness of glacial drift in Benton County varies greatly across its boundaries and is a function of the numerous distinct glaciation episodes. The drift is primarily composed of unsorted sand, gravel, and rock sediments deposited out of the glaciers (till) and settled fine-grained sediment associated with glacial meltwater.

7.1.3.1.2 Potential Impacts

Impacts to geologic resources in the Project Route will be limited to the Project ROW. Because large quantities of glacial drift cover the Project ROW, near-surface excavation that could be associated with the Project would not impact bedrock. No blasting is anticipated to occur.

7.1.3.1.3 Mitigation Measures

No impacts to existing geologic features are anticipated. Therefore, no mitigation measures are proposed.

7.1.3.2 SOILS

7.1.3.2.1 Existing Conditions

Soil resources within the Project Route were evaluated using the gridded Soil Survey Geographic database (SSURGO) (Soil Survey Staff 2024). SSURGO, developed by the Natural Resources Conservation Service (NRCS) for natural resources planning and management, provides digital access to original soil survey data for streamlined use on GIS platforms. SSURGO identified four soil map units (SMUs) within the Project Route. One soil map unit is present only in the northeastern portion of the Project Route and does not coincide with the Project ROW (Fordum-Winterfield complex, 0 to 2 percent slopes) (Figure 8). The remaining SMUs are Hubbard loamy sand, 6 to 12 percent slopes (59.3% of the Project Route and 40.0% of the Project ROW); Hubbard loamy sand, 2 to 6 percent slopes (20.6% of the Project Route and 17% of the Project ROW); and Stonelake-Sanburn complex, 15 to 40 percent slopes (19.3% of the Project Route and 43.0% of the Project ROW) (see Figure 8).

Soils protected by state and federal regulation include agricultural land designated as prime or unique. Prime farmland is defined as "land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion" (NRCS 1981). These soils generate the highest yields with the least amount of expenditure. Soils currently occupying pastures and fields or otherwise undeveloped forest and open land can be classified as prime farmland soils. Lands occupied by surface water or residential, commercial, or industrial uses cannot receive this designation. Prime farmland soils generally meet the following criteria: 1) have an adequate water supply, either from precipitation or irrigation; 2) contain few or no rocks; 3) are permeable to water and air; 4) are not excessively erodible or saturated for long time periods; and 5) either do not flood frequently or are protected from flooding.

The NRCS also recognizes farmland of statewide importance, which is defined as land other than prime farmland that is used for production of specific high-value food and fiber crops (e.g., citrus, tree nuts, olives, fruits, vegetables) (NRCS 1981). Farmlands of statewide importance have the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high-quality or high yields of specific crops when treated and managed according to acceptable farming methods. Farmland of statewide importance is similar to prime farmland but with minor shortcomings such as greater slopes or less ability to store soil moisture. The methods for defining and listing farmland of statewide importance are determined by the appropriate state agencies, typically in association with local soil conservation districts or other local agencies.

There are no prime farmlands; prime farmlands, if drained; or farmlands of statewide importance within the Project Route (Figure 9).

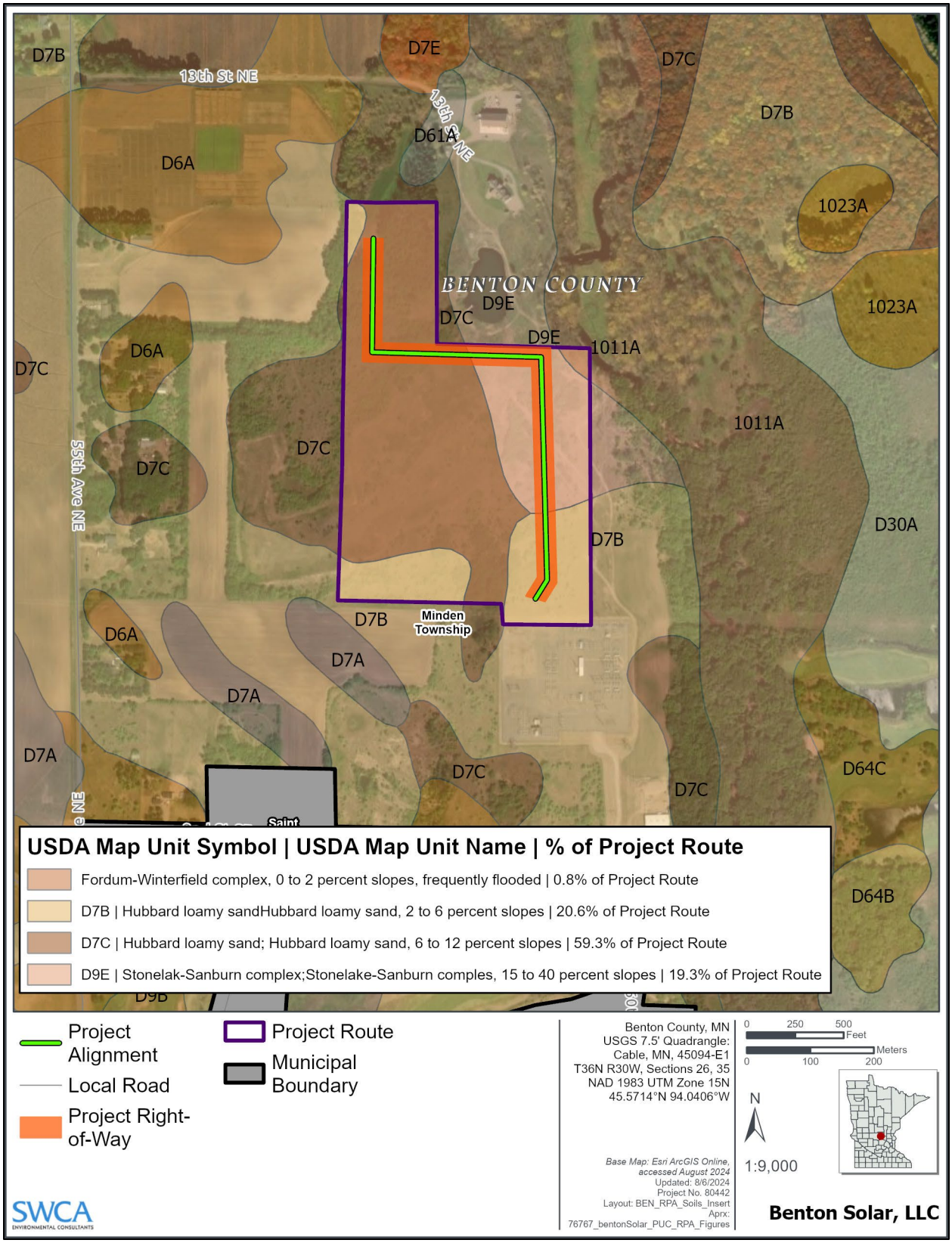

Figure 8. Soils.

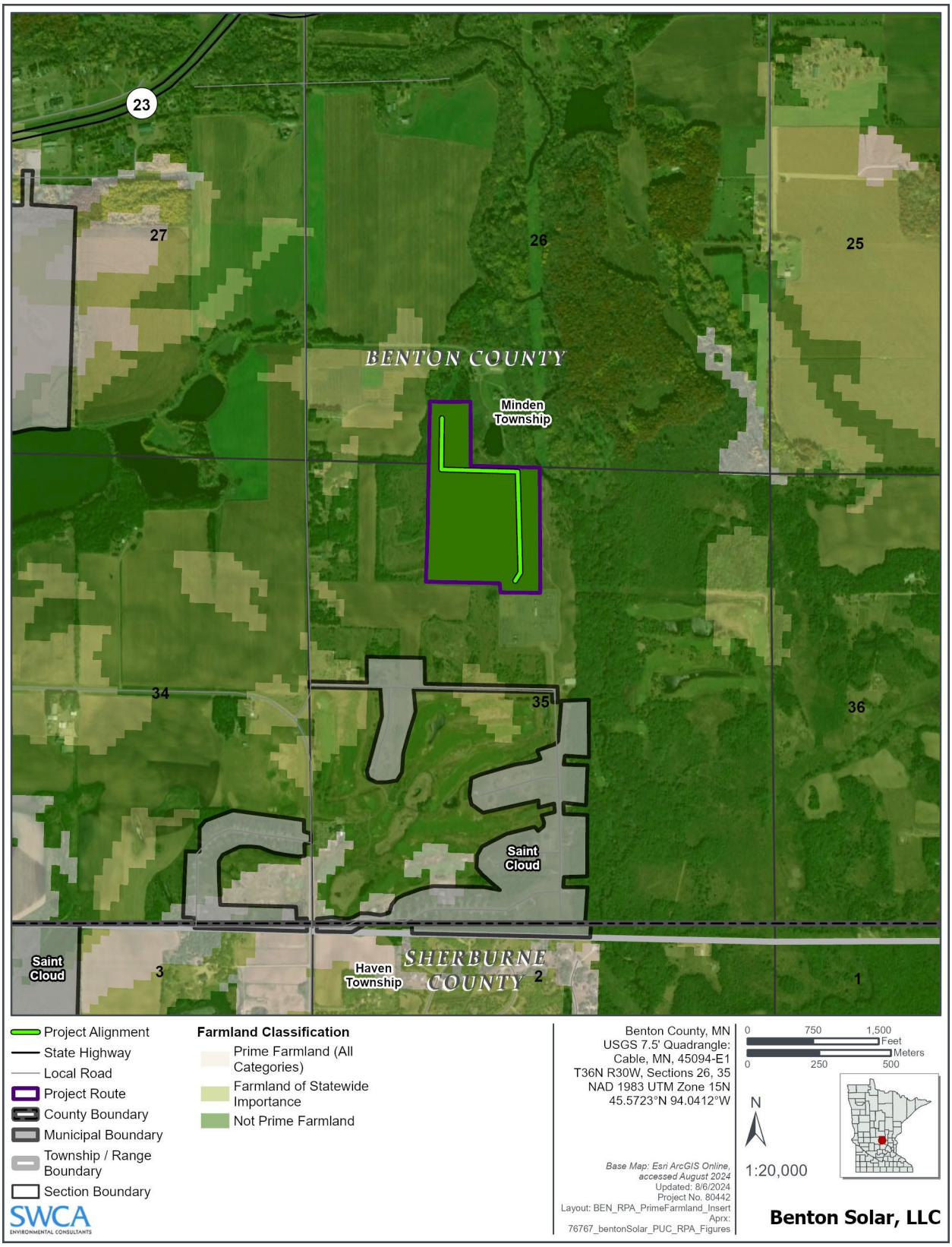

Figure 9. Prime farmland.

7.1.3.2.2 Potential Impacts

Construction activities may result in adverse impacts on soil resources within the Project ROW. Clearing removes protective vegetative cover and exposes soil to the effects of wind and precipitation, which could potentially lead to soil erosion and the loss of valuable soil resources and greater sediment yield to nearby water resources. The potential for increased erosion would be greatest in the short term following surface disturbance activities and would decline over time due to stabilization resulting from construction finalization, revegetation practices, and natural processes. Unreclaimed surface disturbances (i.e., structures and accompanying access/travel routes) could increase soil erosion during the life of the Project unless adequately stabilized. The susceptibility for increased erosion will be reduced through implementation of the Project SWPPP, proper implementation of erosion control methods, and successful, timely revegetation of disturbed areas.

Grading and equipment traffic can compact soil, impacting soil structure and reducing porosity, which leads to lower infiltration and increased runoff potential. Soil compaction from construction activities can also reduce soil productivity. Construction equipment traveling over wet or saturated soils could damage soil structure, reduce pore space, and cause rutting and topsoil-subsoil mixing. Excessive compaction can lead to 1) reduced water infiltration into the soil and reduced permeability of water through the soil; 2) reduced diffusion of oxygen, carbon dioxide (CO_2), and other gases into and out of the soil; 3) reduced plant root development and penetration; and 4) reduced plant growth and production.

Furthermore, grading may mix topsoil and subsoil, which can result in long-term reduction of agricultural productivity. Grading, excavation, and backfilling could also lead to the introduction of excavated rocks into the soil surface (from the fracturing of bedrock and excavation of rock and/or gravel), which could result in future increases in operation labor, reduced agricultural productivity, and potential damage to agricultural field equipment. Excess rock brought to the surface can also impede revegetation efforts.

Soil contamination from equipment spills and/or leakage of fluids could also impact soils.

Soil compaction or erosion may occur during the clearing and construction of the Project Alignment. Minor potential soil impacts may result from the excavation, stockpiling, and redistribution of soils.

No prime farmland types are present in the Project ROW. Therefore, no impacts to prime farmlands will occur.

7.1.3.2.3 Mitigation Measures

Certain practices and mitigation measures (e.g., implementation of the Project SWPPP and Project spill prevention, control, and countermeasures plan), will help minimize impacts on soil resources. Specifically, the following mitigation measures will protect and preserve soil resources:

- Employ a qualified third-party environmental monitor to monitor earthmoving and trenching activities, identify any construction-related issues impacting on-site or off-site areas, and recommend corrective actions, if any, to prevent/mitigate unanticipated on-site or off-site impacts.
- Ensure that personnel working on-site are familiar with and implement the standards and policies that serve to avoid, minimize, and mitigate impacts to soil resources.
- Use sound site preparation practices, such as performing disking and deep ripping activities using appropriate agronomic equipment.
- Employ a qualified soil scientist to delineate topsoil depths in construction areas requiring grading, excavation, and backfilling to properly identify topsoil depths for salvaging resources. In locations

where construction activities include grading, excavating, or removing soil, such as placement of structure foundations, segregate topsoil from subsoil. Stockpile topsoil and subsoil separately and identify with appropriate signage within designated areas of the construction workspace. Upon completion of construction activities, replace subsoil and topsoil in the reverse order removed. Avoid using topsoil resources for any purpose other than planting medium.

- Minimize clearing and grubbing activities and soil disturbances to the extent possible to avoid impacts on soil and vegetation resources (e.g., erosion, soil compaction, topsoil/subsoil mixing).
- Use designated travel corridors and low-ground-pressure tire or tracked equipment during construction activities to minimize soil compaction during wet conditions. Additional minimization measures may include, but are not limited to, use of temporary construction mats.
- Implement soil erosion measures such as temporary seeding and use of erosion control blankets, as needed and in accordance with the Project SWPPP.
- Implement the Project spill prevention, control, and countermeasures plan during construction and operation activities to minimize the potential effects of spilled fluids.
- Implement appropriate and timely restoration and revegetation practices to stabilize and protect soil resources.

These mitigation measures emphasize protection of soil resources and require that workers be informed regarding the presence of soil resources and be cognizant of potential impacts. In combination, these mitigation measures will minimize construction and operation impacts to soil resources.

7.2 Human Settlement

7.2.1 Public Health and Safety

7.2.1.1 EXISTING CONDITIONS

State, local, and NESC standards have been developed for ground clearance, crossing utilities clearance, building clearance, strength of materials, and ROW widths to control for practical safeguarding of utility workers and the public during the installation and O&M of electric supply, communication lines, and associated equipment. Further, Occupational Safety and Health Administration (OSHA) measures have been developed to prevent occupational injuries and illnesses in any workplace throughout the United States. The Project will be designed in accordance with all state, local, and NESC standards, as well as with NEER's specific standards for transmission line projects. Further, during Project construction and O&M, Benton Solar will observe and implement all such standards, measures, and practices to ensure the ongoing safety of its employees and the general public.

Regional emergency management response services that serve the Project Route are provided by the Benton County Sheriff, St. Cloud fire department, Foley fire department, Sauk Rapids police department, and the St. Cloud Hospital ambulance.

The Minnesota Statewide Communication Interoperability Plan was created to maximize interoperability between public safety/service agencies as part of Department of Homeland Security requirements. The Minnesota Statewide Communication Interoperability Plan has made considerable progress toward enhancing emergency communication with the deployment of a statewide, standards-based communication system known as the Allied Radio Matrix for Emergency Response (ARMER) (Minnesota Department of Public Safety 2015). ARMER has more than 300 tower sites scattered across Minnesota. According to the Minnesota Department of Health (MDH), three tower sites are in Benton County (MDH 2018) and are

located in Gilman, St. Cloud, and Duelm. The closest ARMER tower site is located in Duelm, approximately 5.0 miles east of the Project Route.

7.2.1.2 POTENTIAL IMPACTS

Construction activities and the temporary increase in associated workers are not expected to adversely affect public health or emergency services due to the limited number of construction workers and short duration of activities occurring in the Project ROW. Project construction will require different worker skill sets for various aspects of Project construction and installation. The specialized nature of the workers' skill sets, and the short duration of construction activities, would preclude any long-term worker relocation to the area. Construction activities may require limited additional resources for traffic control and law enforcement. Temporary traffic impacts, including lane and road closures, may be necessary during construction. Due to the establishment and implementation of safety protocols, Benton Solar does not anticipate impacts (e.g., increased demands on emergency services) to occur as a result of the Project.

7.2.1.3 MITIGATION MEASURES

Benton Solar will work with the Benton County Department of Public Works/Highway and MnDOT to develop and implement a traffic management plan during construction, if needed, to address traffic accessing the Project ROW from local roadways. The traffic management plan may include signage, flagging, physical barriers, and temporary lane closures. Benton Solar will ensure that construction crews and/or contract crews will comply with local, state, and NESC standards regarding facility installation and standard construction practices. Further, OSHA measures will be adhered to by construction and O&M crews to ensure safety. During operation, Benton Solar and its contractors will follow all applicable laws and regulations, including OSHA 1910.269, and use industry practices, such as tailboard risk assessment meetings, to protect the public and employee health and safety.

Benton Solar will comply with all applicable state, local, and NESC standards and associated protective measures to safeguard the public in the event of an accident. In the event of a structure or conductor falling to the ground, protective equipment (circuit breakers and relays located at the transmission line termini) would de-energize the transmission line. Local residents would be contacted, as necessary, if nearby structures are subject to further protective measures. Should landowners or the public identify safety concerns, Benton Solar will investigate and take appropriate corrective action. Other safety concerns not identified by Benton Solar, but raised by landowners or the public, will be investigated and addressed.

7.2.1.4 ELECTRIC AND MAGNETIC FIELDS

7.2.1.4.1 Existing Conditions

According to the EPA (2024a), "[e]lectromagnetic radiation (EMR) consists of waves of electric and magnetic energy moving together through space.… EMR associated with power lines is a type of low frequency non-ionizing radiation. Electric fields are produced by electric charges, and magnetic fields are produced by the flow of electrical current through wires or electrical devices. Because of this, low-frequency EMR is found in close proximity to electrical sources such as power lines."

Electric fields (EF) and magnetic fields (MF) are typically separated at low frequencies (in this case, 60 hertz [Hz]) and are calculated separately. The magnitude and direction of the force that is exerted on a stationary electrical charge defines the EF. The EF is determined by the voltage of the transmission line. Similarly, the same forces applied to the electrical charges determine the MF. The current on the transmission line will impact the MF.

There is no federal standard for generation-tie line or transmission line EFs. The Commission, however, has historically imposed a maximum EF limit of 8 kilovolts per meter (kV/m) measured at 1.0 meter (m) above the ground.[2] The standard was designed to prevent serious hazards from shocks when touching large objects parked under AC transmission lines of 500 kV or greater.

There is no Minnesota or federal standard on MFs. The Institute of Electrical and Electronic Engineers (IEEE) C95.6 standard provides the following guidance regarding low frequency (60 Hz) MF: The fields should not exceed 904 milliGauss (mG) within or at the edge of the ROW. The peak MF value is calculated at a height of 1.0 m above the ground.

7.2.1.4.2 Potential Impacts

The Project's EF is not anticipated to exceed 4.0 kV/m within the Project ROW. The Project's MF is not expected to exceed 600 mG within the Project ROW.

As indicated above, both the Project's EF and MF will be well below the Commission's historically imposed maximum for EFs (8.0 kV/m) and IEEE guidelines of 904 milliGauss for MFs.

7.2.1.4.3 Mitigation Measures

Because no adverse impacts from EFs and MFs are anticipated, no mitigation will be necessary.

7.2.1.4.4 Stray Voltage

Existing Conditions

Generally, stray voltage refers to a voltage found on buildings, barns, and other structures that are grounded to earth. Most occurrences of stray voltage are experienced by livestock who come into contact simultaneously with two metal objects through which a small current flows. Electrical systems, including farm systems and utility distribution systems, must be adequately grounded to ensure continuous safety and reliability and to minimize this current flow. Several factors affect whether or not an object is actually grounded. Factors include wire size and length, connection quality, the number and resistance of ground rods, and the current being grounded. Therefore, stray voltage can exist in any facility that uses electricity, independent of whether or not there is a nearby transmission line.

Stray voltage is commonly associated with small electrical distribution lines, which connect residences or farms to larger transmission lines. Data indicates that stray voltage is not linked to either 1) the distance of a farm from a substation or transmission line, or 2) to the voltage of the transmission line (Wisconsin Public Service 2011).

Potential Impacts

Because the Project will not be connected to the local distribution system, no stray voltage on the local electrical system is anticipated.

Mitigation Measures

If necessary, appropriate measures will be taken to mitigate stray voltage concerns if distribution lines are co-located with transmission. These mitigation measures tend to be site specific, but could include phase

[2] In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, Docket No. ET-2/TL-08-1471, Order Granting Route Permit (adopting Finding 194 of ALJ) (September 14, 2010).

cancellation, transmission-to-distribution separation, isolation of the end-user, and improved grounding. Any stray voltage concerns will be addressed in coordination with the distribution utilities along the Project Route.

7.2.1.4.5 Farm Operations, Vehicle Use, and Metal Buildings Near the Transmission Line

Existing Conditions

Farm equipment, passenger vehicles, and trucks may safely cross under, or operate near, transmission lines. The NESC code clearances accommodate vehicle heights of up to 14.0 feet. The Project design will meet or exceed NESC minimum clearance requirements over land that may be traversed by vehicles.

Fences can pick up an induced charge from transmission lines depending on their proximity and length and therefore may be grounded as part of the Project. Insulated electric fences cannot be grounded but may pick up charge when disconnected either during installation or maintenance, which may result in nuisance shocks.

One non-residential building associated with the existing substation is located just inside the southern boundary of the Project Route, and no buildings are located in the Project ROW. Buildings are generally not allowed within a transmission line ROW due to NESC code requirements, easement agreements, and safety concerns. Metal buildings and other metal objects adjacent to a transmission line ROW may require a study of potential induction to determine required mitigation. Benton Solar will coordinate with landowners and local utilities as necessary to address concerns regarding any new metal structures proposed adjacent to or within the Project ROW.

Potential Impacts

Grounding of metal objects under a transmission line is the best method of meeting the NESC's and Commission's standards and avoiding electrical shocks. Thus, for objects that the permittee can ensure are effectively grounded (i.e., stationary objects), no impacts due to induced voltage are anticipated from the Project. However, for metallic objects where the grounding path cannot be supplemented (e.g., machinery that is movable and operated directly under a transmission line), impacts could occur, such as a nuisance shock.

Mitigation Measures

The primary means of mitigating this potential impact is to avoid exiting, entering, or parking machinery directly under a line. Fences within the Project ROW, if any, may be grounded as a part of the Project.

7.2.2 Residential and Non-Residential Buildings

7.2.2.1 EXISTING CONDITIONS

Locations of residential and non-residential structures were considered in the design of the Project Route to minimize impacts to such structures. Consistent with this objective, the Project Route traverses a rural area, and no residences are located in the Project Route. One residence is located within 500.0 feet of the Project Route (approximately 285.0 feet northeast of the Project Route). The residence is 650.0 and 600.0 feet away from the Project Alignment and Project ROW, respectively.

No non-residential buildings, such as outbuildings, grain bins, machinery storage sheds, and livestock holding pens, are located in the Project Route with the exception of one outbuilding associated with the

existing substation. Two non-residential buildings, both associated with the existing substation, are located within 500.0 feet of the Project Alignment.

7.2.2.2 POTENTIAL IMPACTS

No impacts to residences or non-residential buildings are anticipated.

7.2.2.3 MITIGATION MEASURES

Because no impacts are anticipated, no mitigation measures are proposed.

7.2.3 Displacement

7.2.3.1 EXISTING CONDITIONS

Displacement is defined as the process by which a household is forced to move or relocate from its residence as a result of project construction. As NESC standards require specific clearances between transmission lines and buildings, displacement can be a factor in transmission line planning. The nearest residence is 650.0 and 600.0 feet away from the Project Alignment and Project ROW, respectively. Therefore, no displacement is expected to occur from the Project.

7.2.3.2 POTENTIAL IMPACTS

No displacement impacts are expected to occur as a result of Project construction and operation.

7.2.3.3 MITIGATION MEASURES

No mitigation measures are proposed as no impacts are anticipated.

7.2.4 Sound

7.2.4.1 EXISTING CONDITIONS

Minimal sound is produced from transmission lines during fair weather conditions. However, inclement weather (such as foggy, damp, or rainy conditions) may lead to a "corona effect," when a "crackling" sound is produced as a result of a small amount of electricity ionizing moist air near the wires (a corona). Other factors, such as conductor voltage, conductor shape and diameter, and surface irregularities (such as scratches, nicks, dust, or water drops) can also affect a conductor's surface voltage gradient and its corona performance. Corona noise levels are typically low until transmission line operating voltages exceed 345 kV. Given the Project voltage of 115 kV, minimal noise emissions are anticipated.

Current sound sources in the Project vicinity include vehicles on roadways, rustling vegetation, birds, insects, farm equipment, and the existing Benton substation. The Minnesota Pollution Control Agency (MPCA) regulates noise under Minn. R. Chapter 7030 and has set standards for sound levels based on land use activities. Noise Area Classifications (NAC) are set based on land use classifications of rural, industrial, and commercial land uses. Each NAC has an assigned daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) limit for noise. Limits are expressed as the range of permissible A-weighted decibels (dBA) within an hour period. L_{50} is the dBA that may be exceeded 50.0% of the time within an hour (i.e., 30 minutes), and L_{10} is the dBA that may be exceeded 10.0% of the time within an hour (i.e., 6 minutes). These limits are summarized in Table 7.2-1.

The Project ROW passes through a rural setting. No residential receptors are located within 500.0 feet of the Project Alignment (see Section 7.2.3).

Table 7.2-1. Minnesota Pollution Control Agency Sound Standards – Hourly A-Weighted Decibels

Noise Area Category	Day (7 a.m.–10 p.m.)		Night (10 p.m.–7 a.m.)	
	1-Hour L_{10} (dBA)	1-Hour L_{50} (dBA)	1-Hour L_{10} (dBA)	1-Hour L_{50} (dBA)
NAC-1 (residential)	65	60	55	50
NAC-2 (commercial)	70	65	70	65
NAC-3 (industrial)	80	75	80	75

7.2.4.2 POTENTIAL IMPACTS

Project construction and operation are associated with different potential noise impacts of significantly differing durations. These are discussed in the following sections.

7.2.4.2.1 Construction

Activities associated with Project construction may generate sound impacts in the Project vicinity that would be intermittent, temporary, and limited to times when construction activities are underway, typically during the daytime. Sounds associated with construction would occur at various locations and times as construction sequencing occurs. Noise-producing activities are primarily associated with clearing and grading, materials delivery, auguring foundation holes, setting structures, and stringing conductors.

Site preparation is anticipated to last approximately 30 days using grading equipment, bobcats, and other construction equipment. Noise associated with construction includes the following, measured at 50.0 feet from the noise source (Federal Highway Administration 2006):

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

7.2.4.2.2 Operation

High-voltage transmission line conductors are designed to prevent the creation of coronas under ideal weather conditions. During inclement weather, there may be some audible sound. Often the sound of the weather event itself may mask any sound from the transmission line.

Table 7.2-2 summarizes the maximum estimated audible sound associated with the Project during operation at 5.0 feet above the ground line at the Project Alignment centerline and at the outer edge of the Project ROW (i.e., 50.0 feet off centerline). Audible noise from Project operation will remain below the required 50 dBA nighttime sound limit regulated by the MPCA. Preliminary calculations indicate that the maximum anticipated audible noise during operation is estimated to not exceed 10 dBA.

Table 7.2-2. 115-Kilovolt Transmission Line Audible Noise

Structure Configuration	L_{50} Rain (dBA)		L_{50} Fair (dBA)	
	0 Feet	50 Feet	0 Feet	50 Feet
Single-circuit monopole delta tangent	10	7	-15	-18
Single-circuit two-pole horizontal tangent	7	5	-18	-20

7.2.4.3 MITIGATION MEASURES

7.2.4.3.1 Construction

To alleviate any increased sound levels during construction, Benton Solar and its construction contractors will adhere to the following sound control BMPs recommended to minimize construction sound levels and comply with MPCA standards:

- Limit heavy equipment activity (e.g., pile driving, drilling, and crane use) adjacent to residences or other sensitive receptors to the shortest possible period required to complete the work activity;
- Project construction will be sequenced, and different construction activities may occur simultaneously in separate sections of the footprint;
- Minimize construction equipment idling;
- Ensure that proper mufflers, intake silencers, and other noise reduction equipment are in place and in good working condition;
- Maintain construction equipment according to manufacturer's recommendations;
- Where practical, locate stationary equipment such as compressors, generators, and welding machines away from sensitive receptors or behind sound-mitigation barriers; and
- When possible, limit construction activities to daylight hours.

7.2.4.3.2 Operation

No mitigation is necessary or proposed as sound associated with the transmission line during operation is expected to be well under the regulated noise limits.

7.2.5 Radio, Television, Cellular Device, and GPS Interference

7.2.5.1 EXISTING CONDITIONS

Several AM and FM radio stations can be heard at, although no broadcast stations or towers are located within, the Project Route.

No digital or analog television towers are located within the Project Route. Several full-power television stations broadcast within the region that the Project Route is located in, including both analog and digital stations (Federal Communications Commission 2018).

No cell towers are located within the Project Route. Multiple cell towers operated by Alltel and AT&T exist within the region and likely provide cellular service near and within the Project Route.

GPS units are commonly used for a variety of purposes including vehicle navigation (personal and commercial), aviation, and surveying. GPSs rely on a connection between satellites and a receiver (e.g., cellular phone, handheld GPS) to spatially locate the end user. It is likely that a variety of GPSs are used throughout the Project Route (e.g., on farm machinery).

7.2.5.2 POTENTIAL IMPACTS

Noise created by electric transmission line coronas may impact local reception of radio and television signals. Interference with AM radio frequency is the most common type of interference from corona noise. This is most commonly observed immediately below a transmission line. Impacts to FM signals are more infrequent due to their operation outside corona noise frequencies. Television signals may be impacted when the receiver is behind a transmission structure (in a shadow) and is opposite the transmitter. Based on the Project design, Benton Solar does not anticipate radio or television interference that would exceed limits recommended by industry guidelines.

Interference associated with cellular devices is not likely as cellular transitions or packet switching occurs when a cellular link becomes unavailable. Additionally, interference with GPS systems is not anticipated from the construction or operation of the Project, as GPS signals generally are not interrupted by corona-produced noise (Silva and Olsen 2002).

7.2.5.3 MITIGATION MEASURES

Benton Solar will address any reception impacts that may arise following construction of the Project on a case-by-case basis. If impacts do occur to radio signals, additions or changes to transmitters, receivers, or amplifiers can be made to communication systems to minimize these impacts.

In the unlikely event that television interference is reported following Project construction, Benton Solar will work with affected residents to determine the cause of interference, and, when necessary, reestablish television reception and service in a timely manner. Reported television interference will be addressed by Benton Solar on a case-by-case basis. If reported, Benton Solar will do the following:

- Log the report and determine whether the interference is Project-related;
- Meet with the complainant and the local communications technician to determine the status of the affected television reception equipment;
- Discuss with the complainant the option of 1) installing a combination of high-gain antenna and/or a low-noise amplifier or 2) entering into an agreement to provide a monetary contribution (equal to the cost of installing the recommended equipment) toward comparable Direct Broadcast Satellite (DBS) service;
- At the complainant's election, Benton Solar will either install the recommended equipment or enter into an agreement to reimburse the landowner for the cost of comparable DBS service;
- If the complainant chooses DBS service, Benton Solar will consider the matter closed upon installation of the satellite dish;
- If the complainant selects antenna and/or amplifier installation and later reports continued interference issues, Benton Solar will send a technician to the property to assess the status of the equipment and provide any necessary repairs;
- If Project-related interference remains an issue, Benton Solar will propose an agreement that reimburses the complainant for the cost of comparable DBS service and will remove the antenna and/or amplifier equipment, unless it was initially installed to service multiple households; and

- If Benton Solar and the complainant are unable to reach an agreement to resolve interference-related issues, Benton Solar will report the concern as an unresolved complaint and defer to the Commission's dispute resolution process to resolve the matter.

7.2.6 Aesthetics

7.2.6.1 EXISTING CONDITIONS

The aesthetic quality and appeal of a region generally derive from the terrain, natural features (e.g., mountains, lakes, rivers, ponds), native flora, and cultural features that define the landscape. High-quality scenery, including natural-appearing landscapes, enhances people's lives and benefits society (U.S. Forest Service 1995). Individual observers will have differing opinions on the aesthetic appeal of a region and impacts that may alter its quality. Those likely to be viewing the Project include temporary observers (i.e., motorists, tourists, or recreationalists passing by the Project Route or using the general region intermittently). Residents nearer to the Project Alignment are expected to have a higher sensitivity to the potential aesthetic impacts than temporary observers as they may look at the Project more frequently than individuals passing through the area. There are no residences within the Project Route.

Regional topography is characterized by nearly level to gently rolling plains. Viewsheds in the area are generally long and open with only small, scattered areas where the view from a location would be blocked by vegetation, topography, or existing structures. Viewsheds in the vicinity of, but outside of, the Project Route include existing roads and their associated, maintained ROWs; croplands and pastures; and overhead electric transmission and distribution lines.

7.2.6.2 POTENTIAL IMPACTS

The Project would alter the visual appearance within the vicinity by adding additional vertical and horizontal human-made structures to the existing landscape. However, constructed features (e.g., existing utility lines and buildings), topography, and natural landscape features such as tree cover, in relation to a viewer's physical location, often will impede view of the Project and reduce direct impacts to viewsheds within the vicinity.

Proposed heights of Project infrastructure are not anticipated to exceed 110.0 feet (see Table 2.5-1, Section 2.5). Proposed span lengths for the transmission line support structures are not anticipated to exceed 700.0 feet, with a minimum span of 100.0 feet. The Project will not create a new feature type within the landscape as existing overhead transmission and distribution lines are present within the landscape surrounding the Project Route. Where pole structures are spaced farther apart, there will generally be less visual impact than in locations where poles are spaced closer together. The addition of approximately seven structures is not expected to result in impacts to visual resources.

7.2.6.3 MITIGATION MEASURES

Benton Solar anticipates that the Project will result in no impacts to visual resources. Therefore, no mitigation measures are proposed.

7.2.7 Socioeconomics

7.2.7.1 EXISTING CONDITIONS

Benton Solar evaluated the Project's effect on socioeconomic indicators such as population levels, community demographics, availability of housing and temporary accommodations, income, and

employment. Socioeconomic data were gathered for Minden Township and Benton County to ascertain the current estimated socioeconomic conditions for the region. State-level information and information for the city of St. Cloud, Minnesota, which is the nearest municipality, is presented to provide additional context. The socioeconomic data were gathered from the Economic Profile System (EPS) (2023).

7.2.7.1.1 Population Level and Ethnicity

Minden Township has a population of 1,404 people. There are estimated to be seven people who identify as Hispanic or Latino of any race and 16 people who identify as American Indian. Benton County has a population of 41,087, which represents approximately 0.7% of the total Minnesota state population. Approximately 2.9% of county residents self-identify as Hispanic or Latino (Table 7.2-3).

Table 7.2-3. Population Level and Ethnicity Demographics

Population Sector	Minden Township	Benton County	St. Cloud	Minnesota
Total population	1,404	41,087	68,430	5,670,472
Hispanic or Latino of any race	7	1,193	2,778	319,828
White alone not Hispanic	1,381	36,163	48,380	4,441,935
Black or African American alone	0	1,919	11,220	371,249
American Indian alone	16	59	274	46,371
Asian alone	0	422	2,384	281,572
Native Hawaiian or Pacific Islander alone	0	3	0	2,047
Some other race alone	0	18	261	17,042
Two or more races	0	1,310	3,133	190,428

Source: EPS (2023).

7.2.7.1.2 Languages Spoken

Table 7.2-4 presents language demographics as estimated in the U.S. Census Bureau's American Community Survey (ACS) 2021 5-year estimates. All but eight of Minden Township's residents over 5 years of age report speaking only English, and no residents report speaking English less than "very well." In Benton County, approximately 2.1% of individuals speak English less than "very well."

Table 7.2-4. Language Demographics

Population Sector	Minden Township	Benton County	St. Cloud	Minnesota
Total population	1,404	41,087	68,430	5,670,472
Population 5 years or older	1,338	38,453	64,094	5,322,004
Speak only English	1,330	36,261	53,469	4,683,934
Speak a language other than English	8	2,192	10,625	638,070
Spanish or Spanish Creole	3	687	1,983	207,272
Other Indo-European languages	5	473	1,466	105,092
Asian and Pacific Island languages	0	210	1,646	182,624
Other languages	0	807	5,440	136,770
Speak English less than "very well"	0	800	4,022	239,624

Source: EPS (2023).

7.2.7.1.3 Housing and Temporary Accommodations

According to the U.S. Census Bureau's ACS 2021 5-year estimates, there are 42 vacant housing units in Minden Township. Benton County has approximately 845 vacant housing units, which represents approximately 0.4% of the total vacant housing in Minnesota (241,383) (EPS 2023).

The largest nearby population center is the city of St. Cloud (see Figure 1). St. Cloud has approximately 1,586 vacant housing units (EPS 2023). In addition, according to Visit St. Cloud, there are 22 hotels and motels, three bed and breakfasts, and seven campgrounds in the greater St. Cloud area (Visit St. Cloud 2023).

7.2.7.1.4 Income and Employment

Table 7.2-5 presents per capita income level, persons in poverty, and the unemployment rate as estimated in the U.S. Census Bureau ACS 2021 5-year estimates and the Bureau of Labor Statistics Local Area Unemployment Statistics.

Table 7.2-5. Per Capita Income Level, Persons in Poverty, and Unemployment Rate

State/County/City	Per Capita Income Level (U.S. dollars)	Persons in Poverty	Estimated Unemployment Rate
Minnesota	41,204	9.2%	3.4%
St. Cloud	28,896	22.0%	N/A
Benton County	32,884	9.5%	4.3%
Minden Township	44,382	1.4%	N/A

Source: EPS (2023).
Note: N/A = not available.

The per capita income of Minden Township is $44,382, which is $3,178 higher than the Minnesota state average of $41,204 and $11,498 higher than the Benton County average of $32,884 (EPS 2023). The unemployment rate in Minden Township is not reported by the Bureau of Labor Statistics. The percentage of individuals living at or below the poverty level (1.4%) is less than the state average (9.2%) (EPS 2023). The unemployment rate in Benton County (4.3%) is higher than the state average of (3.4%), and the proportion of individuals living at or below the poverty level (9.5%) is marginally higher than the state average at (9.2%) (EPS 2023).

Educational services, health care, and social assistance make up 23.5% of the civilian employed population 16 years or older in Minden Township, followed by transportation, warehousing, and utilities (12.9%), manufacturing (11.2%), and construction (10.9%) (EPS 2023). Educational services, health care, and social assistance make up 27.8% of the civilian employed population 16 years or older in Benton County, followed by manufacturing (15.2%) and retail trade (12.0%) (EPS 2023).

7.2.7.2 POTENTIAL IMPACTS

Construction of the Project will not significantly impact the permanent population size or demographics of the county or township traversed by the Project Route because the Project will not create any permanent jobs. During construction, approximately 5 to 10 temporary construction personnel will be required and will remain in Benton County over the duration of Project construction. This short-term increase in population is likely to result in a small financial gain for the local economy, as Project personnel will use products and services from a variety of local businesses, including infrastructure maintenance services,

industrial supplies, and hospitality services. Local workers (workers who live within commuting distance of the Project) will be used to the extent possible. When local labor is unavailable, employees from outside local areas will be brought in. Project O&M will require two to three employees to be dedicated full time to the Project.

Based on the results of market impact analyses conducted for the Project, it is anticipated that the Project will have a negligible effect on property values along the Project Route. Further, as stated in the analysis conducted for the Project, "there is no market data indicating the project will have a negative impact on either rural residential or agricultural property values in the surrounding area" (see Appendix D). No additional socioeconomic impacts are anticipated as a result of Project development.

7.2.7.3 MITIGATION MEASURES

No negative socioeconomic impacts are anticipated to occur from construction and operation of the Project. As previously mentioned, a small, temporary increase in population size is likely to result in a small financial gain for the local economy. Therefore, no mitigation measures are proposed.

7.2.8 Cultural Values

7.2.8.1 EXISTING CONDITIONS

Cultural values in the general area of the Project Route are closely related to an agriculturally dominated landscape. Protection of land to allow for the continuation of farming is of the utmost importance in Benton County and is supported by the County's comprehensive plan.

The Benton County *2040 Comprehensive Plan* focuses on maintaining the county's rural value and character and protecting prime agricultural land while supporting growth and economy of the cities and rural areas (Benton County 2019). The comprehensive plan identifies goals and policies centered on a commitment to quality of life, land development, and economic development. The plan outlines policies to ensure high-quality housing and to support the practices, character, and lifestyle central to agriculture in Benton County.

7.2.8.2 POTENTIAL IMPACTS

Cultural values are not expected to be impacted by the Project. The Project will not alter the rural character of the area, nor will it substantially alter the continuation of existing land use. The Project complies with the overall goals of Benton County to conserve farmland and natural resources and to support economic and sustainable development. The Project is compatible with the rural, agricultural character of Benton County and with the economic and development goals set forth in the county's comprehensive plan. Further, the Project follows the ideal that development occur where infrastructure (e.g., substation and existing transmission) already exists.

A detailed analysis of potential impacts on agriculture can be found in Section 7.3.1.

7.2.8.3 MITIGATION MEASURES

The Project is not anticipated to impact cultural values in the Project Route, and no mitigation measures are proposed.

7.2.9 Recreation

7.2.9.1 EXISTING CONDITIONS

Benton County provides a variety of recreational opportunities including hiking, fishing, hunting, camping, nature viewing, and snowmobiling. Benton County offers several camping locations, several parks, and many miles of trails. However, no parks, campsites, hiking trails, or snowmobile trails are located within the Project Route (Figure 10). Further, no U.S. Fish and Wildlife Service (USFWS) Waterfowl Production Areas, Minnesota Scientific and Natural Areas, Wetland Reserve Program conservation easements, or Wildlife Management Areas (WMAs) are located in or within 1.0 mile of the Project Route. Such public resources can provide recreational and tourism opportunities, including biking, camping, wildlife watching, hunting, fishing, and snowmobiling (MDNR 2021). The Sherburne Sands Conservation Opportunity Area overlaps a portion of the Project Alignment (see Figure 10). Conservation Opportunity Areas are areas identified by the MDNR, through software and consideration of various criteria, as areas with potential for high conservation opportunity. They do not have regulatory implications, and privately owned areas within Conservation Opportunity Areas are not open to the public.

The Elk River and its tributaries, located approximately 0.03 mile east of the Project ROW, intersect the Project Route at the northeast. The Elk River and its tributaries likely provide areas of access for water-based recreation (see Figure 10).

7.2.9.2 POTENTIAL IMPACTS

The Project will introduce additional transmission structures to the landscape that may be visible to recreational users such as those on the Elk River. However, between the existing transmission lines present just outside of the Project Route that span the Elk River north-to-south (approximately 250.0 feet east of the Project Alignment), a second existing transmission line intersecting the Project Route just north of the existing substation, and existing vegetative buffers, the addition of seven structures is not expected to result in visual impacts to recreational users (see Section 7.2.6).

7.2.9.3 MITIGATION MEASURES

Because Benton Solar does not expect the Project to adversely impact recreational resources, no mitigation measures are proposed.

7.2.10 Public Services

7.2.10.1 EXISTING CONDITIONS

Public services and associated facilities are discussed below and were previously discussed in Section 7.2.1.

7.2.10.1.1 Emergency Services

Providers likely to serve the Project Route region include, but are not limited to, the Benton County Sheriff, St. Cloud fire department, Foley fire department, St. Cloud police department, Sauk Rapids police department, and the St. Cloud Hospital ambulance (see Section 7.2.1).

7.2.10.1.2 Hospitals

No hospitals or other medical facilities are located within the Project Route. The nearest hospital is located in St. Cloud, approximately 6.2 miles west of the Project Route.

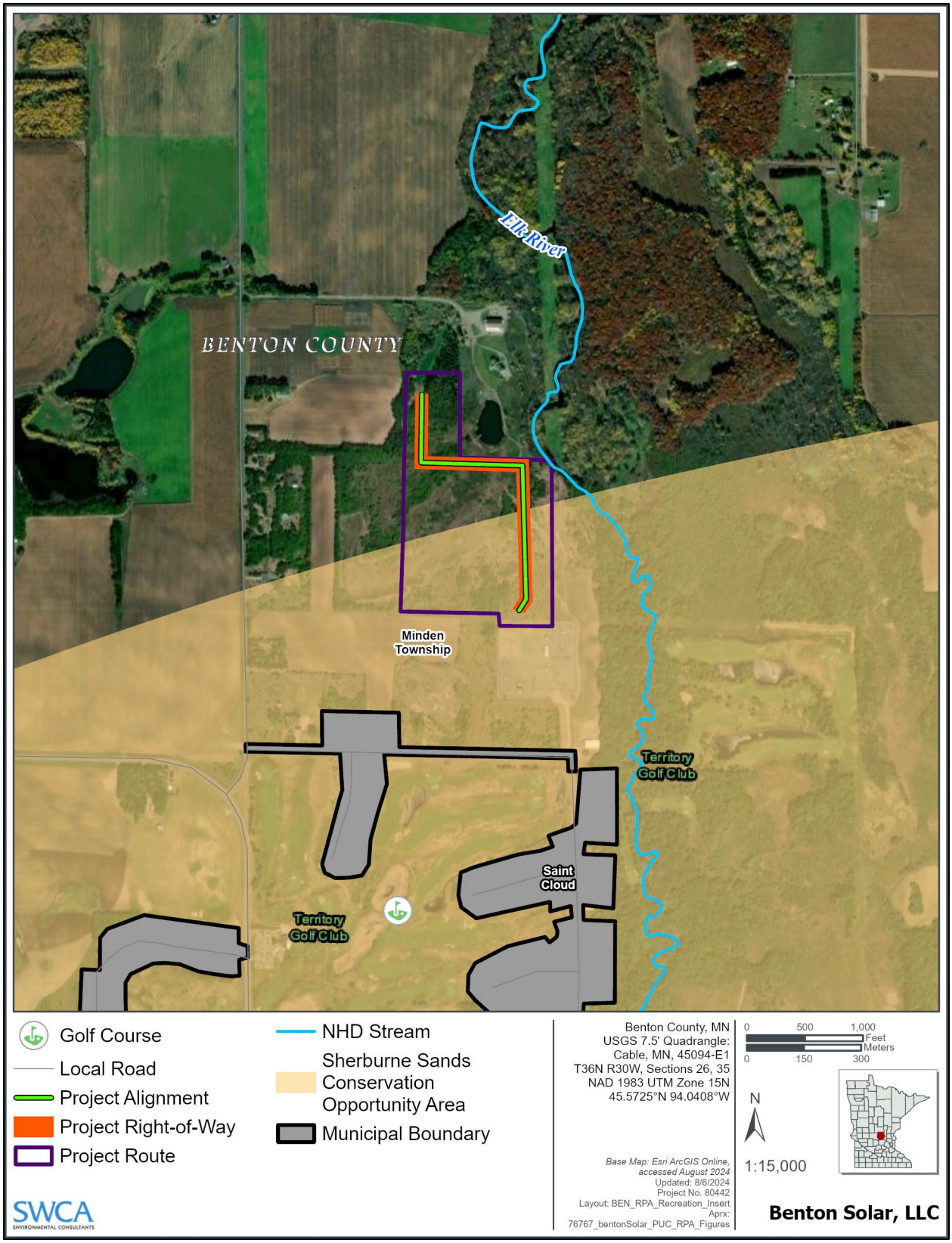

Figure 10. Public landownership and recreation.

7.2.10.1.3 Water and Wastewater Services

Within the Project Route, water and wastewater services are expected to be provided mainly through privately owned water wells and septic systems.

7.2.10.1.4 School Districts

The Project Route crosses the Sauk Rapids-Rice School District in Benton County. No school buildings are located within the Project Route.

7.2.10.1.5 Electric and Natural Gas Utilities

Utility providers within Benton County include East Central Energy, Minnesota Power, and Xcel Energy (Benton County 2024a). The utility provider in the general area where the Project Route is located is East Central Energy. No pipelines are located within the Project Route.

One existing transmission line intersects the Project Route just north of the existing substation. Several existing transmission lines are present in the vicinity of the Project Route and include volt classes of 345, 220 to 287, 110 to 161, and less than 100 (U.S. Department of Homeland Security 2023; U.S. Energy Atlas 2021).

7.2.10.1.6 Other Public Services

A variety of other public services in the area are provided by Benton County. These include environmental, administrative, planning and zoning, economic development, and communications services, among others. Townships throughout the Project Route assist with snow removal, road maintenance, stormwater management, building maintenance, and sidewalks.

7.2.10.2 POTENTIAL IMPACTS

Public services within the Project Route are not anticipated to be permanently or substantially impacted by the construction and operation of the Project.

7.2.10.3 MITIGATION MEASURES

Benton Solar will coordinate with applicable public service providers, as necessary. The Applicant will work with public service providers to determine the location of public service infrastructure, to ensure proper coordination, and to ensure that impacts to public services are avoided. The Applicant will coordinate with individual landowners to ensure that the Project does not impact privately owned septic systems and water wells.

The Applicant will also work with other electric utility providers, as appropriate, to ensure that the Project will not impact the existing utilities in the area, specifically other transmission or distribution lines, or those under current permitting and/or construction. The Applicant will use the Gopher State One Call system to locate and mark existing underground utilities prior to construction to avoid impacts to pipelines or other buried infrastructure.

7.2.11 Transportation

7.2.11.1 ROADWAYS

7.2.11.1.1 Existing Conditions

Existing road infrastructure in the general area of the Project Route is comprised primarily of paved and unpaved county and township roads that typically follow section lines. Unpaved two-track roads, likely used for farming access and private access, are also present. The Project Alignment does not intersect any roadways, and no roadways are present in the Project Route. Following completion of Project construction, Benton Solar anticipates there will be an access point for operations and maintenance personnel at the proposed substation located off 13th Street NE and another access point at the Benton County Substation located off 2nd Street SE.

The MnDOT Average Annual Daily Traffic data can be used to determine traffic volumes within and around the Project Route. Based on 2019 data for Benton County, State Highway 95 had an average vehicle count of 5,500 vehicles per day (MnDOT 2022). Traffic data were not available for 55th Avenue NE and 2nd Street SE. Due to the rural setting of the Project, roads lacking Average Annual Daily Traffic data likely also carry low traffic levels.

7.2.11.1.2 Potential Impacts

Project-related impacts to transportation resources may include increased traffic load on roadways during construction. Construction traffic will primarily use the highway and local and county roadway systems to access and deliver materials to the Project ROW. These impacts will be temporary and minor, as a relatively small number of workers and equipment will be accessing any one location within the Project ROW at any time during construction.

As discussed in Section 7.2.1.3, Benton Solar will coordinate construction activities with the Benton County Department of Public Works/Highway and MnDOT, as necessary. Benton Solar will also obtain any necessary permits from the Benton County Department of Public Works/Highway and MnDOT prior to construction. Benton Solar will follow all conditions of road use agreements and haul road permits, as applicable. Section 7.2.1.3 discusses development and implementation of a traffic management plan, if needed.

Upon completion of the Project and throughout the life of the Project, a maintenance crew of up to three people will travel regularly through the Project ROW to monitor and maintain the Project. This represents a very minor, temporary, and intermittent increase in traffic. Traffic functions on local roadways will not be impacted as a result of operations and maintenance activities.

Construction and operation of the Project are not anticipated to have permanent impacts on area roadways or traffic and are not anticipated to impact the safety of the traveling public.

7.2.11.1.3 Mitigation Measures

Benton Solar anticipates that the Project will not impact roadways. Therefore, no mitigation measures are necessary or proposed. For any section of state, county, or township road used, Benton County will restore the roadway to its preconstruction condition or as negotiated in road use agreements as agreed upon by Benton Solar, the Benton County Department of Public Works/Highway, and/or MnDOT, as applicable.

7.2.11.2 RAILROADS

7.2.11.2.1 Existing Conditions

The closest active railroad track to the Project Route, owned by the BNSF Railway, is located approximately 3.9 miles southwest where it runs northwest-southeast through St. Cloud (MnDOT 2024).

7.2.11.2.2 Potential Impacts

Construction and operation of the Project will have no impact on railroads.

7.2.11.2.3 Mitigation Measures

Because no impacts to railroads are anticipated, no mitigation is proposed.

7.2.11.3 AIRPORTS AND AIRSTRIPS

7.2.11.3.1 Existing Conditions

The Project Route is north of St. Cloud Regional Airport. At its nearest point, the Project ROW is approximately 1.5 nautical miles northeast of the closest runway end. Benton Solar will identify and file (for all applicable Project structures) a Federal Aviation Administration (FAA) Form 7460-1, Notice of Proposed Construction or Alteration (notice) prior to construction. This process allows the FAA to determine the effect a structure could have on the safe and efficient use of navigable airspace. The FAA applies different sloping and horizontal obstacle identification surfaces to all public use airports as part of their aeronautical study. When a structure penetrates an obstacle identification surface, the FAA conducts further study to determine the level of adverse effect from the structure and whether a determination of hazard would be warranted. The FAA would issue a determination of no hazard if the structure has little or no effect on the navigable airspace.

7.2.11.3.2 Potential Impacts

Benton Solar does not anticipate that any impact to airports and airstrips will occur as a result of the Project.

7.2.11.3.3 Mitigation Measures

No mitigation measures are proposed as no impacts to airports or airstrips are anticipated.

7.3 Land-Based Economies

7.3.1 Agriculture

7.3.1.1 EXISTING CONDITIONS

Primary mapped land covers in the Project Route and Project ROW are hay/pasture (25.9 acres, 53.7%, and 3.2 acres, 51.8%, respectively) and cultivated crops (13.6 acres, 28.1%, and 1.7 acres, 27.6%, respectively) (see Figure 6) (Table 7.1-1). However, during field surveys, SWCA biologists did not observe signs of active farming practices in the Project Route. The existing land cover in the Project Route is described as a mosaic of mixed forest and herbaceous areas, with historic disturbances resulting from a gravel mine, agriculture, transmission line, and substation. As discussed in Section 7.1.3.2, the Project Route does not

cross soil classified as prime farmlands; prime farmlands, if drained; or farmlands of statewide importance (see Figure 9).

According to the USDA 2017 Census of Agriculture, Benton County encompasses 264,320.0 acres. Farmland, which is land used either for crop or livestock production, composes 194,832.0 of those acres. There are 816 farms averaging 239.0 acres each in Benton County (USDA 2017). Major harvested crops include corn, soybeans, vegetables harvested for sale, and forage (e.g., hay and haylage, grass silage, and greenchop). Major livestock inventories include poultry, cattle and calves (beef and milk), and hogs and pigs (USDA 2017).

Benton County's market value of agricultural products sold in 2017 was approximately $207 million (USDA 2017). Crop sales, including nursery and greenhouse crops, accounted for approximately 31.0% of the total value of sales by commodity or commodity group within Benton County (USDA 2017). Livestock and poultry product sales accounted for the remaining approximately 69.0% (USDA 2017).

The MPCA's What's in My Neighborhood database provides public access to a variety of environmental data, including properties previously contaminated or being investigated for contamination (MPCA 2024). This database shows that no feedlots are located within the Project Route (MPCA 2024).

7.3.1.2 POTENTIAL IMPACTS

Project construction and O&M activities are not expected to result in the loss of agricultural-related jobs or in an appreciable net loss of income resulting from agricultural practices because no active agricultural practices currently occur in the Project ROW.

The NESC regulates the aboveground clearance for electric lines adjacent to, crossing, or overhanging roads to ensure that conductors are maintained at a minimum safe clearance from vehicles on roadways. The NESC requires that a 115-kV electric line maintain a minimum safety clearance of 20.3 feet above a roadway designed to accommodate vehicles up to 14.0 feet tall. This minimum clearance is applicable in all temperature and wind ranges including those that would cause temporary "blowout conditions." Although no roadways are present within the Project Route, Benton Solar will exceed the NESC requirement using a minimum clearance threshold of 27.8 feet over areas that may be utilized for agriculture practices in the future. This larger clearance threshold is designed to accommodate oversized vehicles, such as large farm equipment (e.g., combines) up to 19.0 feet with a 2.5-foot buffer. Typical clearances to ground and roads, outside of cultivated fields, is NESC minimum clearance with a 2.5-foot buffer.

7.3.1.3 MITIGATION MEASURES

Because Benton Solar does not expect the Project to adversely impact agriculture, no mitigation measures are proposed.

7.3.2 Forestry and Mining

7.3.2.1 EXISTING CONDITIONS

No economically important forestry resources are found within the Project Route. There are 3.5 acres of deciduous forest and 1.3 acres of mixed forest present in the Project Route. The Project ROW encompasses 0.6 acre of deciduous forest (see Section 7.1-1).

Based on review of MnDOT County Pit Maps and the MnDOT Aggregate Source Information System, no economically significant mining resources are located within the Project Route (MnDOT 2002, 2023).

7.3.2.2 POTENTIAL IMPACTS

No economically important forestry or mining resources are found within the Project Route. Therefore, no impacts would occur to these resources.

7.3.2.3 MITIGATION MEASURES

The Project is not expected to impact economically important forestry or mining resources. Therefore, no mitigation measures are proposed.

7.3.3 Tourism

7.3.3.1 EXISTING CONDITIONS

Benton County offers residents and visitors tourism and recreational opportunities throughout the year. In 2021, annual spending on culture and recreation in Benton County was approximately $570,706 (Benton County 2024b). Generally, tourism in Benton County focuses on promoting the area's culture (including museums and art) and recreational (including parks and events) activities. Local community events include the Benton County Fair in Sauk Rapids, Granite City Days Festival in St. Cloud, Mississippi Music Fest in St. Cloud, Rapids River Food Fest in Sauk Rapids, Sartell Summer Fest, Rice Days, Foley Fun Days, and Gilman Days (Benton County 2024b). Unincorporated Benton County includes seven parks totaling 354.0 acres with frontage on the Mississippi River and access onto Little Rock Lake (City of St. Cloud 2024).

As described in Section 7.2.9.1, no USFWS Waterfowl Production Areas, Minnesota Scientific and Natural Areas, Wetland Reserve Program conservation easements, or WMAs are located in or within 1.0 mile of the Project Route. These public resources can provide recreational and tourism opportunities including biking, camping, wildlife watching, hunting, fishing, and snowmobiling (MDNR 2021).

The Sherburne Sands Conservation Opportunity Area overlaps a portion of the Project Alignment (see Figure 10). Conservation Opportunity Areas are areas identified by the MDNR, through software and consideration of various criteria, as areas with potential for high conservation opportunity. They do not have regulatory implications and privately owned areas within Conservation Opportunity Areas are not open to the public.

7.3.3.2 POTENTIAL IMPACTS

The Project will introduce additional transmission structures to the landscape. However, an existing transmission line is present just outside of the Project Route (approximately 250.0 feet east of the Project Alignment), and a second existing transmission line intersects the Project Route just north of the existing substation. The addition of approximately seven structures is not expected to result in any measurable impact on any existing recreational facilities or tourism activities in Benton County.

7.3.3.3 MITIGATION MEASURES

No impacts on tourism are anticipated. Therefore, no mitigation is proposed.

7.4 Archaeological and Historic Resources

7.4.1 Existing Conditions

The Project Route is located in the Central Lakes Deciduous Archaeological Region. The Central Lakes Deciduous Archaeological Region includes all of Anoka, Benton, Cass, Chisago, Crow Wing, Hennepin, Isanti, Mille Lacs, Morrison, Ramsey, Sherburne, Stearns, Todd, Wadena, Washington and Wright Counties, and portions of Becker, Dakota, Douglas, Kandiyohi, Kanabec, Meeker, Otter Tail, Pipe, Pope, and Swift Counties in Minnesota and extends into west-central Wisconsin (Gibbon et al. 2002). The region was intermittently glaciated during the Wisconsin Ice Age (Gibbon et al. 2002). Archaeological resources are predominantly associated with permanent water sources such as major lakes and rivers. Relatedly, they can also be associated with wild rice beds.

The Minnesota State Historic Preservation Office (SHPO) and Minnesota Office of the State Archaeologist (OSA) were contacted in October 2022 to gather cultural resources records related to the Project Route. Cultural resources data maintained by the SHPO and OSA include National Register of Historic Places (NRHP) records, Minnesota State Historic Sites Network records, Minnesota State Monument records, Minnesota State Register of Historic Places records, "state site" or "state archaeological site" records, records related to previous professional architectural and archaeological surveys, and records related to reported architectural inventory resources and archaeological sites.

No cultural resources listed on the Minnesota State Historic Sites Network records, Minnesota State Monument records, Minnesota State Register of Historic Places, or NRHP are located within the Project Route. The literature review indicated that 95 NRHP listings (sites, structures, properties, or districts) are located in Benton County (National Park Service 2023). None of these NRHP listings are located within the Project Route. The closest NRHP listings to the Project Route include the Minnesota State Reformatory for Men Historic District, also known as the Minnesota Correctional Facility (located approximately 3.8 miles southwest of the Project Alignment), and the Cota Round Barns (located approximately 4.4 miles east-northeast of the Project Alignment).

The records search indicated that the Project Route contains no previously documented architectural inventory resources or archaeological sites (see Appendix F1 and F2).

In 2022, Benton Solar conducted outreach to 47 tribes to provide an overview of the Project and to invite tribes to participate in Project coordination. A list of the tribes contacted, and a copy of the outreach letter is provided in Appendix F3. The outreach letter provided an opportunity to receive additional information about the Project and opportunities to participate in fieldwork to identify and avoid sensitive tribal resources. The Mille Lacs Band of Ojibwe and the Rosebud Sioux Tribe responded, indicating interest in the Project. The Crow Creek Sioux Tribe responded indicating no interest in the Project, and the Shakopee Mdewakanton Sioux Community responded that they would defer to tribes closer to the Project. Benton Solar requested that SWCA conduct additional outreach with five tribes (the Mille Lacs Band of Ojibwe, the Rosebud Sioux Tribe, the Sisseton Wahpeton Oyate, the Standing Rock Sioux Tribe, and the Upper Sioux Community) regarding participation in future fieldwork. All tribes except the Upper Sioux Community provided tribal specialists to participate in fieldwork. Coordination with tribes is ongoing.

Three archaeological and tribal resource sites were identified within the Project Route during archaeological and tribal resource surveys. The sites were identified by archaeologists and tribal cultural specialists and have not yet been evaluated regarding their NRHP eligibility. Tribal cultural specialists present for the survey identified them as areas of tribal importance. Details of the archaeological and tribal resource surveys are included in the Phase I report for the Project (see Appendix F2). The SHPO has reviewed the Phase I report and is in agreement with its recommendations (Appendix F2-1).

7.4.2 Potential Impacts

Benton Solar recognizes the importance of cultural resources to local and scientific communities. Benton Solar's previously considered route (Section 3.2) traversed two archaeological and tribal resource sites. Upon site discovery and following close coordination with the tribes and GRE, Benton Solar relocated the Project ROW to avoid direct impacts to all known sites. The Project Alignment avoids sites by approximately 100 feet as coordinated with the tribes. An existing transmission line is present just outside of the Project Route, approximately 250.0 feet east of the Project Alignment, and a second existing transmission line intersects the Project Route just north of the existing substation. Therefore, indirect (i.e., visual) impacts to the archaeological and tribal resource sites would not increase compared to baseline impacts created by the existing, proximate transmission lines. Benton Solar therefore does not anticipate that there will be an increase in indirect impacts.

Project construction activities have the potential to encounter unidentified archaeological sites. Therefore, prior to construction, Benton Solar will prepare an Unanticipated Discovery Plan (UADP) for the Project. Should Project construction or operation inadvertently encounter previously undocumented archaeological resources or human remains, the discoveries will be reported to the SHPO or OSA, as applicable. The UADP will include a section addressing Minnesota's Damages; Illegal Molestation of Human Remains; Burials; Cemeteries; Penalty; and Authentication Statute (Minn. Stat. § 307.08), which protects known or suspected human burials and burial grounds regardless of landownership status. This section of the UADP will apply if human remains are inadvertently discovered.

7.4.3 Mitigation Measures

Benton Solar has designed the Project to avoid impacts to all known sites. If impacts to cultural resources become unavoidable, Benton Solar, and its cultural resources consultant, would coordinate with the SHPO and OSA, as applicable, on whether the resource is eligible for the NRHP.

7.5 Natural Environment

7.5.1 Air

7.5.1.1 EXISTING CONDITIONS

The Clean Air Act of 1970, 42 United States Code 7401 et seq., amended in 1977 and 1990, is the primary federal statute governing ambient air pollution (EPA 2020). The Clean Air Act designates standards for the following criteria pollutants that have been determined to affect human health and the environment: particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), and ozone (O_3). Volatile organic compounds and NO_2 are precursors to O_3, which is not an emitted source but is formed by these pollutants in the atmosphere (40 Code of Federal Regulations [CFR] 50). The Clean Air Act requires the EPA to set National Ambient Air Quality Standards (NAAQS) for these criteria pollutants, in order to protect health, the environment, and property (40 CFR 50; EPA 1990). The State of Minnesota follows ambient air quality goals and standards as defined under Minn. R. § 7009.0080. To ensure compliance with the NAAQS, the MPCA tracks air quality using Ambient Air Quality Monitoring Sites located throughout the state (MPCA 2022a). The state of Minnesota met NAAQS for all criteria pollutants in 2022 (MPCA 2022b). The MPCA has also established state standards (Minnesota Ambient Air Quality Standards) for hydrogen sulfide (H_2S) and particulate matter (Minn. R. § 7009.0080; Revisor of Statutes, State of Minnesota 2017). The MPCA is responsible for compliance with state and federal standards for air quality in Minnesota.

The EPA developed the Air Quality Index (AQI) to provide a simple, uniform way to report daily air quality conditions (AirNow 2021). Minnesota AQI numbers are determined by hourly measurements of five pollutants (MPCA 2020a). The pollutant with the highest AQI value determines the overall AQI for that hour (MPCA 2020a). These five pollutants include:

- Fine particulate matter ($PM_{2.5}$);
- Ground-level ozone (O_3);
- Sulfur dioxide (SO_2);
- Nitrogen dioxide (NO_2); and
- Carbon monoxide (CO).

Many factors can lead to poor air quality days. Air pollution levels in Minnesota come from local pollutant emissions from sources such as industries, cars, and homes and from pollution that is blown into Minnesota from surrounding areas (MPCA 2020a). The MPCA monitors outdoor air quality at over 50 air quality monitoring stations that are dispersed across the state. Collected data are used to determine whether Minnesota meets the federal and state air quality standards and health benchmarks (MPCA 2020b). The MPCA ranks air quality breakpoints based on the reported levels of indicators and places them into one of five narrative categories: good, moderate, unhealthy for sensitive groups, unhealthy, and very unhealthy (MPCA 2020a).

The nearest Ambient Air Quality Monitoring Site is in St. Cloud, Minnesota, approximately 4.7 miles southwest of the Project ROW (MPCA 2022a). This site monitors O_3 and $PM_{2.5}$. Table 7.5-1 provides the AQI in St. Cloud for the past 6 years reported (MPCA 2022b). The air quality was considered good for the majority (88.4%) of time from 2016 to 2021, based on the EPA's standards (MPCA 2022b).

There are limited air pollutant emissions within the Project Route. The primary emission sources within the Project Route, including the Project ROW, currently include vehicles traveling along nearby roadways.

Table 7.5-1. Days in Each Air Quality Index Category, St. Cloud, Minnesota

Air Quality Index	Good		Moderate		Unhealthy for Sensitive Groups		Unhealthy or Very Unhealthy		Total Days
Year	Number of Days	Percent of Days	Number of Days	Percent of Days	Number of Days	Percent of Days	Number of Days	Percent of Days	
2016*	338	92.4%	28	7.7%	0	0.0%	0	0.0%	366
2017	329	90.1%	36	9.9%	0	0.0%	0	0.0%	365
2018	310	84.9%	54	14.8%	1	0.3%	0	0.0%	365
2019	313	91.0%	31	9.0%	0	0.0%	0	0.0%	344
2020*	336	91.8%	30	8.2%	0	0.3%	0	0.0%	366
2021	290	80.3%	66	18.3%	3	0.8%	2	0.6%	361
Total/ average	**1,916**	**88.4%**	**245**	**11.3%**	**4**	**0.2%**	**2**	**0.1%**	**2,167**

Categories are as defined by the MPCA (2022b).
Note: Total days may not equal 365 and rather reflect all days for which data were available.
*Leap year

7.5.1.2 POTENTIAL IMPACTS

Project construction activities (e.g., clearing, grading, and hauling) may result in the temporary increase of 1) airborne dust/particulate matter and 2) emissions related to operation of construction equipment and vehicles. No long-term impacts to air quality are anticipated to result from Project construction activities. Temporary impacts during construction are expected to be localized and would not impact the surrounding area. Airborne mobilization of dust particles constitutes wind erosion. Measures to minimize and mitigate potential wind erosion, such as dust suppression/control and reclamation during and after construction, will be addressed in the Applicant's Project-specific SWPPP that will be implemented during Project construction. Applicable BMPs also may be included in Benton County Haul Road permits, if applicable. The Applicant will maintain equipment and vehicles in good working condition through routine maintenance checks to minimize emissions.

Project O&M activities may result in intermittent and short-term increases in airborne dust/particulate matter due to the use of equipment or vehicles in graveled or unprotected soil areas. The increase in emissions from vehicles and construction equipment is expected to be negligible as there are several well-traveled roadways, such as State Highway 95, in the area. No adverse impacts to air quality related to Project O&M are anticipated.

As transmission lines themselves do not appreciably affect air quality, there will be no permanent impacts to air quality from the operation of the transmission line. According to the Electric Power Research Institute (EPRI), a small amount of ozone is created during the operation of a transmission line (EPRI 1982) due to corona discharge. Typically, ozone production during fair conditions is not detectable, and ozone production during rain events is only detectable using specialized methods (EPRI 1982). Transmission line design also can affect ozone production. As the diameter of the conductor increases relative to the voltage, the corona discharge and associated ozone creation decreases. Additionally, ozone creation is greatly reduced when using bundled conductors instead of single conductors. The use of conductors proposed for use by the Applicant for the 115-kV transmission lines complies with industry BMPs regarding ozone production and corona discharge. This use complies with the recommended BMPs for reducing corona discharge of a 115-kV transmission line. Therefore, due to the design and operating voltage, the Project is not anticipated to have a substantial impact on the environment through ozone creation.

In summary, no substantial or long-term impacts to air quality are anticipated from Project construction and operation.

7.5.1.3 MITIGATION MEASURES

Although the Project is not expected to result in substantial or long-term impacts to air quality, Benton Solar will implement BMPs, as necessary, to minimize the amount of fugitive dust and emissions created by the Project. BMPs may include the following:

- Implement dust suppression/control measures;
- Minimize idling of construction vehicles; and
- Ensure that construction equipment and vehicles are properly tuned and maintained prior to and during operation within the Project ROW.

Measures to minimize and mitigate potential impacts to air quality will be addressed in the Applicant's Project-specific SWPPP that will be implemented during Project construction. Applicable BMPs also may be included in Benton County Haul Road permits, if applicable.

7.5.2 Greenhouse Gas Emissions

Greenhouse gases (GHGs) include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several fluorinated species of gas. CO_2 is emitted primarily from the combustion of fossil fuels; CH_4 is emitted from the production and transport of coal, natural gas, and oil; and N_2O is emitted during agricultural and industrial activities. Fluorinated gases, which are synthetic, are emitted from a variety of industrial processes. Other GHGs, including CO_2, are naturally occurring gases in the atmosphere. Their status as pollutants is not related to their toxicity but to the added long-term impacts on climate because of their increasing levels in the Earth's atmosphere (EPA 2022a).

The global warming potential (GWP) of gases allows comparison of global warming impacts among different gases. The GWP of a gas depends on how well the gas absorbs energy and how long the gas stays in the atmosphere. GWP is a measure of the total energy that a gas absorbs over a particular period (usually 100 years) compared with CO_2, which has a GWP of 1. The larger the GWP, the more warming the gas causes. For example, CH_4 has a 100-year GWP estimated to be 29.8, meaning that CH_4 would cause 29.8 times as much warming as an equivalent mass of CO_2 over a 100-year period (Intergovernmental Panel on Climate Change [IPCC] 2021). The GWP for N_2O is estimated to be 273. The term "carbon dioxide equivalent" (CO_2e) is used to describe different GHGs in a common unit. CO_2e is calculated with CO_2, CH_4, and N_2O multiplied by the 100-year GWP values from the IPCC's *Sixth Assessment Report* (IPCC 2021).

7.5.2.1 EXISTING CONDITIONS

The EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks provides data regarding annual GHG emissions (EPA 2022b). Table 7.5-2 provides the economic sector and total GHG emissions for the United States for 2020, the most recent available reporting year (EPA 2022b). These data are useful in understanding sources of anthropogenic emissions and how they contribute to GHG emissions nationally and within Minnesota.

Table 7.5-2. Greenhouse Gas Emissions by Sector

Sector	2020 U.S. GHG Emissions (million metric tons CO_2e)	2020 Minnesota GHG Emissions (million metric tons CO_2e)
Transportation	1,627.6	27.4
Electric power industry	1,482.2	20.2
Industry	1,426.2	28.8
Agricultural	635.1	26.9
Commercial	425.3	8.8
Residential	362.0	9.9
Total	**5,958.4**	**122.0**

Source: EPA (2022b).
Note: Does not include U.S. territories.

Nationally, transportation is the top contributor to GHG emissions, followed by the electric power industry and general industry. However, in Minnesota, the top contributor to GHG emissions is transportation, followed by electric power industry, general industry, and agricultural (see Table 7.5-2). The fossil fuel combustion sectors (CO_2 and other GHGs) contributed over 96.0% of the GHG emissions from the electric power industry sector in Minnesota in 2020. Other electricity generation categories contributed 1.0% (Table 7.5-3).

Table 7.5-3. Greenhouse Gas Emissions by Electric Power Industry Sector

Sector	2020 U.S. GHG Emissions (million metric tons CO_2e)	2020 Minnesota GHG Emissions (million metric tons CO_2e)
Fossil fuel combustion: carbon dioxide	1,439.0	19.2
Fossil fuel combustion: other greenhouse gases	21.0	0.3
Incineration of waste	13.5	0.5
Other electricity generation categories	8.7	0.2
Total	**1,482.2**	**20.2**

Source: EPA (2022b).
Note: Does not include U.S. territories.

7.5.2.2 POTENTIAL IMPACTS

In an effort to address climate change, Minnesota enacted The Next Generation Energy Act (2007) which requires the state to reduce greenhouse gas emissions by 80% between 2005 and 2050. Provisional goals of a 15% reduction by 2015 and 30% by 2025 were also established. As a result of Minnesota not meeting the 2015 goal, the state has bolstered its efforts by supporting energy efficiency, clean energy, and supplementation of other renewable energy standards (MPCA 2023). In 2022, Minnesota's Climate Action Framework set targets to reduce emissions 50% by 2030 (from 2005 levels) and achieve net-zero emissions by 2050 (State of Minnesota 2022). These targets were adopted into statute in 2023. The 2023-2027 One Minnesota Greenhouse Gas Emissions Goal aligns with these more ambitious targets for emissions reductions.

Project activities resulting in GHG emissions are construction activities and vehicular traffic during Project O&M. Exact amounts of fuel consumption during Project construction are not known at this time. As a preliminary estimate, fuel use on an average construction day is estimated to be approximately 100 gallons but depends on the equipment used and the size and model of the equipment. A combination of gasoline, number 1 diesel and number 2 diesel fuel is planned. Because Project construction is planned to occur over a duration of 4 months, fuel consumption would be approximately 3,000 gallons of gasoline, 3,000 gallons of number 1 diesel and 6,000 gallons of number 2 diesel. This estimate likely overestimates fuel consumption. Table 7.5-4 shows a preliminary estimate of the construction emission calculations for GHG emissions of CO_2, CH_4, and N_2O using EPA emissions factors (40 CFR 98, Tables C-1, and C-2). GHG construction emissions are expected to be 118.53 metric tons of CO_2e and GHG emissions for Project O&M are estimated to be approximately 5% of annual construction emissions, or 5.9 metric tons (6.5 tons) of CO_2e annually.

Project-related GHG emissions are anticipated to be temporary, minor, and/or intermittent and are not expected to result in impacts beyond those that are likely to occur in the absence of Project development (e.g., from nearby agriculture and traffic). Minnesota has not established specific GHG emission thresholds, but Minn. R. § 4410.4300, subp. 15(B) requires the preparation of an Environmental Assessment Worksheet for stationary sources generating 100,000 tons of GHGs per year. Because the Project is well below the 100,000-ton threshold at approximately 6.5 tons per year, GHG emissions are anticipated to be negligible, and an Environmental Assessment Worksheet is not required.

Table 7.5-4. Preliminary Estimate of the Emission Calculations for Greenhouse Gas Emissions of CO_2, CH_4, and N_2O

Fuel Type	Estimated Total Fuel Use (gallons)	Heating Value (mmBtu/ gallon)*	CO_2 Emission Factor (kg CO_2/ mmBtu)†	Total CO_2 Emissions (kg)	CH_4 Emission Factor (kg CH_4/ mmBtu)	Total CH_4 Emissions (kg)	N_2O Emission Factor (kg N_2O/ mmBtu)	Total N_2O Emissions (kg)
Gasoline	3,000	0.125	70.22	26,332.50	0.003	1.13	0.0006	0.23
Distillate No. 1	3,000	0.139	73.25	30,545.25	0.003	1.25	0.0006	0.25
Distillate No. 2	6,000	0.138	73.96	61,238.88	0.003	2.48	0.0006	0.50
Total (kg)	–	–	–	118,116.63	–	4.86	–	0.98
Global warming potential‡	–	–	–	1	–	29.8	–	273.00
Total as CO_2e (kg)	–	–	–	118,116.63	–	144.83	–	267.54
Total as CO_2e (metric tons)	–	–	–	118.12	–	0.14	–	0.27

Source: 40 CFR 98, Tables C-1, and C-2.

* mmBtu = 1 million British thermal units

† kg = kilogram

‡ Typically, greenhouse gas emissions are reported in units of carbon dioxide equivalent (CO_2e). Gases are converted to CO_2e by multiplying the emission amount by the emission's Global Warming Potential. Global Warming Potential source: EPA 2022a.

7.5.2.3 MITIGATION MEASURES

Benton Solar will minimize GHG emissions by 1) limiting vehicle and equipment idling to only those times when necessary, 2) using vehicles and equipment that meet air emissions standards, and 3) performing routine maintenance to ensure vehicles and equipment remain in good, working order and operate at performance standards.

7.5.3 Surface Water

7.5.3.1 EXISTING CONDITIONS

The Project Route is located in County Ditch No. 13-Headwaters Elk River Subwatershed (HUC 070102030304) (USGS 2020).

According to the USGS National Hydrography Dataset, there are no streams or ditches within the Project Route (USGS 2020). Approximately 0.01 mile of the Elk River overlaps the northeast corner of the Project Route. Benton Solar completed an aquatic resources survey of the Project Route and verified that no additional surface waters are present (Figure 11) (USGS 2020).

7.5.3.2 POTENTIAL IMPACTS

Benton Solar will implement its Project SWPPP to ensure avoidance and minimization of impacts to surface waters. The SWPPP will include BMPs (e.g., erosion control and soil exposure/stabilization measures) to prevent sediment from entering waterbodies. Therefore, no impacts to surface waters will occur within the Project Route.

7.5.3.3 MITIGATION MEASURES

The Project is not expected to impact surface waters. As such, no specific mitigation is proposed.

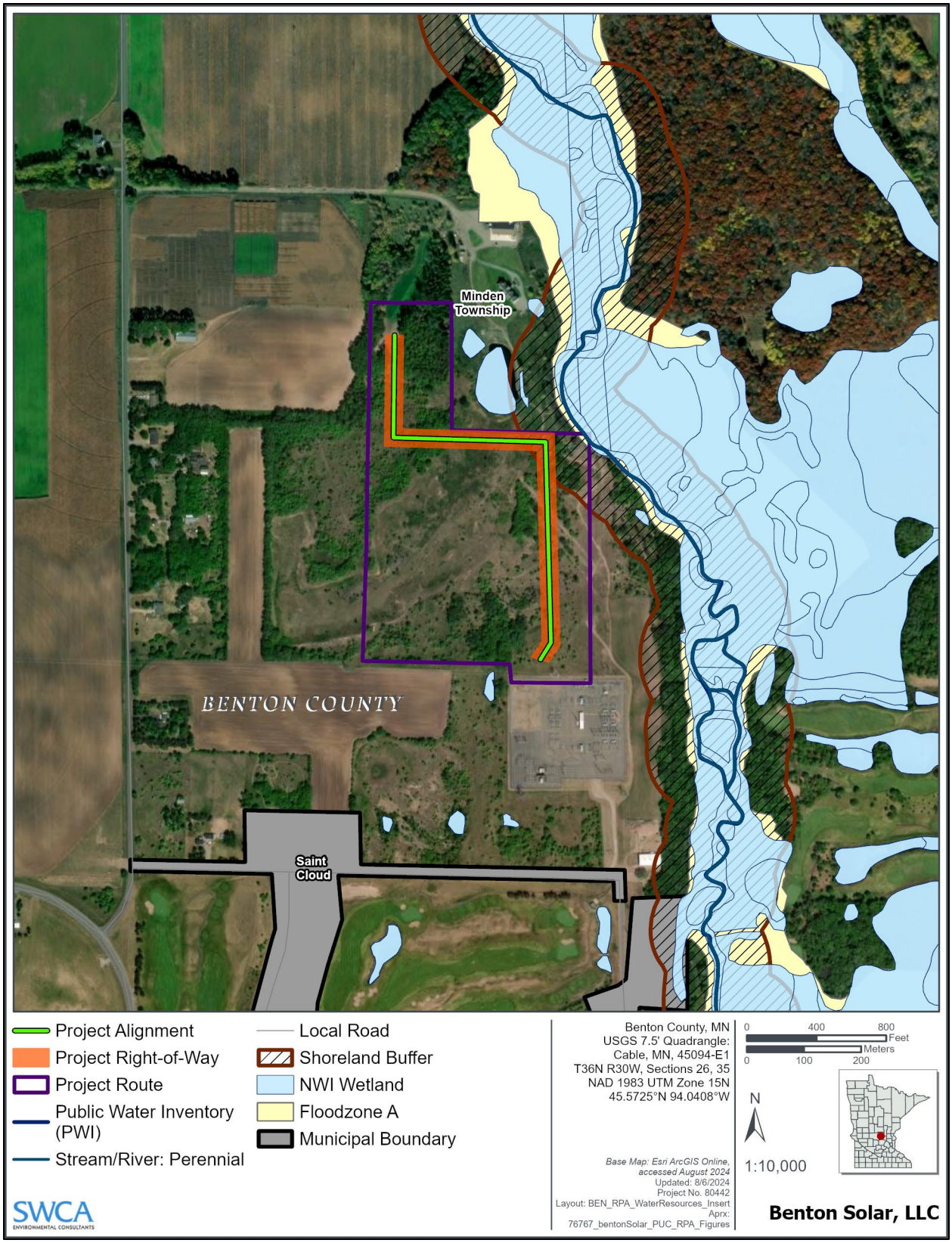

Figure 11. Surface waters and floodplains.

7.5.4 Groundwater

7.5.4.1 EXISTING CONDITIONS

Hydrogeography data from MDNR indicates that the Anoka Sand Plain Aquifer System lies beneath the Project Route and varies between a few feet to over 75.0 feet in thickness. The aquifer sits at a depth between 970.0 and 1,030.0 feet, which is on the shallower end of those found in Benton County (MDNR 2012). Enough water to sustain personal-use wells can be found at significantly shallower depths in the region (MDH 2021).

Benton Solar reviewed known information regarding groundwater under the Project Route for EPA-designated sole source aquifers (SSAs). An SSA is defined by the EPA as an aquifer that "supplies at least 50 percent of the drinking water for its service area" and where "there are no reasonably available alternative drinking water sources should the aquifer become contaminated" (EPA 2024b). In areas supplied by SSAs, contamination can create a significant public health hazard. Benton Solar identified no SSAs under the Project Route (EPA 2024c). The Applicant also reviewed the Minnesota County Well Index to assess if the Project would impact any wells in the Project Route. The Minnesota County Well Index is maintained by the Minnesota Geological Survey and MDH and provides up-to-date records of the existence and exact locations of wells across the state. The database indicated that no wells are located within the Project Route (MDH 2021).

Under the Safe Drinking Water Act, every state is required to have a wellhead protection program that prevents drinking water contamination through the identification of surface-based recharge zones for public supply wells. In 1986, the scope of the Safe Drinking Water Act was revised and broadened to include a source water assessment program that directs a watershed and aquifer-level approach to identifying potential contamination zones. The MDH administers the state's wellhead protection program and is responsible for the delineation of wellhead protection areas (WHPA). These are defined as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield" (EPA 2024d). WHPAs are delineated based on 10-year groundwater time-of-travel to wells and are maintained in an up-to-date publicly available database. Benton Solar queried the database and determined that there are no WHPAs within the Project Route. The nearest WHPA, Foley West, is located approximately 6.9 miles northeast of the Project Route near the town of Foley (MDH 2019).

7.5.4.2 POTENTIAL IMPACTS

No impact to wells will occur as none are located in the Project Route.

The Project's minimal water-related needs for construction and operation are expected to be fulfilled with area wells (through landowner agreements) or rural water services. The Project therefore has no need for groundwater use, nor will it result in intrusion into groundwater systems.

7.5.4.3 MITIGATION MEASURES

Because Project construction and operation are not expected to impact groundwater resources, no mitigation is proposed.

7.5.5 Floodplains

7.5.5.1 EXISTING CONDITIONS

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps and data, the majority of the Project Route, and the entirety of the Project ROW, is located in an area of minimal flood hazard (Zone X) (FEMA 2018) (see Figure 11).

7.5.5.2 POTENTIAL IMPACTS

Due to the lack of floodplains within the Project Route and Project ROW, impacts to floodplains are not expected.

7.5.5.3 MITIGATION MEASURES

Project construction and operation are not expected to impact floodplain resources. Therefore, no mitigation is necessary or proposed.

7.5.6 Wetlands

7.5.6.1 EXISTING CONDITIONS

The USFWS National Wetlands Inventory indicates 0.02 acre of riverine wetland is present in the Project Route. No other wetlands, including calcareous fens, are present within the Project Route, nor are any located in the Project ROW (USFWS 2024a) (see Figure 11). Benton Solar verified the absence of additional wetlands during its aquatic resources field surveys in spring 2023.

7.5.6.2 POTENTIAL IMPACTS

The Project will not result in impacts to wetlands as the Project ROW and Project Alignment will avoid the 0.02 acre of riverine wetland in the Project Route. The SWPPP will include BMPs (e.g., erosion control and soil exposure/stabilization measures) to help prevent sediment from entering nearby wetlands.

7.5.6.3 MITIGATION MEASURES

Benton Solar does not anticipate that the Project will impact wetlands. Therefore, no mitigation measures are proposed.

7.5.7 Flora

As described in Section 7.1, the Project Route lies within the Anoka Sand Plain Subsection Ecological Classification System (ECS) 222Mc in the Minnesota and Northeast Iowa Morainal Section in the Eastern Broadleaf Forest Province (MDNR 2024a). Pre-settlement vegetation was dominated by oak barrens and openings on droughty uplands and brushlands on the sandplain. Narrow bands of upland prairie and floodplain forest were found along the Mississippi River. Current vegetation and land use in ECS 222Mc includes sod and vegetable crop production, and residential and urban development is common (MDNR 2024a).

7.5.7.1 EXISTING CONDITIONS

The MDNR specifically defines recognizable native plant community units. Oak savanna is an example of one such designated natural community. The Project ROW does not intersect any defined native plant community units. Primary land cover types within the Project Route and Project ROW are hay/pasture (26.0 acres, 56.5%, and 3.3 acres, 62.3%, respectively) and cultivated crops (13.6 acres, 29.6%, and 1.2 acres, 22.6%, respectively) (see Table 7.1-1). However, during field surveys, SWCA biologists did not observe signs of active farming practices in the Project Route. The existing land cover in the Project Route is described as a mosaic of mixed forest and herbaceous areas, with historic disturbances resulting from a gravel mine, agriculture, transmission line, and substation.

7.5.7.2 POTENTIAL IMPACTS

Benton Solar has minimized permanent impacts to existing vegetation through optimizing use of currently disturbed areas (e.g., hay/pasture) for siting of the Project. Construction and O&M activities within the Project ROW will not impact any recognized areas of high-quality biodiversity or specifically designated native plant communities. Project construction will result in the removal of approximately 2.3 acres of trees in the Project ROW, and in the conversion of approximately 540.4 square feet (0.01 acre) of existing land cover to impervious surface for structure foundations.

7.5.7.3 MITIGATION MEASURES

Temporarily disturbed areas will be revegetated as outlined in the SWPPP. Temporary construction areas will be reseeded. For non-agricultural areas, a regionally appropriate seed mix will be used as coordinated with landowners and applicable agencies. Benton Solar will monitor reseeded areas to confirm successful revegetation in compliance with the SWPPP. Stormwater BMPs, such as silt fence and straw wattle, will not be removed until cover by seeded species is established.

Benton Solar will implement BMPs during construction in order to control and prevent the introduction of invasive species to the Project Route. These BMPs include limiting invasive species spread via maintenance equipment and vehicles through early detection of invasive species, cleaning mowers and bladed equipment, minimizing disturbance, limiting traffic through weed-infested areas, and frequently inspecting equipment storage areas for weeds.

7.5.8 Fauna

7.5.8.1 EXISTING CONDITIONS

Within the Project Route, wildlife associated with a mix of disturbed herbaceous and wooded areas are expected to be present. These wildlife species include various terrestrial bird, mammal, herptile, and insect species.

The Project Route occurs in the Mississippi Flyway, an important north-south migration corridor between avian wintering habitat and breeding areas, and in the Prairie Hardwood Transition Bird Conservation Region (The National Audubon Society 2023; U.S. North American Bird Conservation Initiative 2021). The USFWS Information for Planning and Consultation (IPaC) report identified 16 species of Birds of Conservation Concern (species given the USFWS's highest conservation priority) (USFWS 2021) with potential to occur in the Project Route (Appendix G). These species included chimney swift (*Chaetura pelagica*), eastern whip-poor-will (*Antrostomus vociferus*), and red-headed woodpecker (*Melanerpes erythrocephalus*) (see Appendix G).

The Migratory Bird Treaty Act of 1918 (16 United States Code 703–712) prohibits the taking, selling, transporting, and importing of migratory birds or their nests, eggs, parts, or products, and protects more than 800 bird species occurring in the United States. Most birds in the Project Route would be afforded protection under the Migratory Bird Treaty Act. Migratory birds that may occur in the Project Route include the northern cardinal (*Cardinalis cardinalis*) and chipping sparrow (*Spizella passerina*) (Cornell Lab of Ornithology 2024).

Non-migratory birds that may occur in the Project Route include wild turkey (*Meleagris gallopavo*) and ring-necked pheasant (*Phasianus colchicus*) (MDNR 2024b).

Common mammal species that may occur in the Project Route include opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), common raccoon (*Procyon lotor*), coyote (*Canis latrans*), and eastern cottontail (*Sylvilagus floridanus*) (MDNR 2024c).

Common reptile and amphibian species that may occur in the Project Route include northern leopard frog (*Lithobates pipiens*), eastern tiger salamander (*Ambystoma tigrinum*), painted turtle (*Chrysemys picta*), and American toad (*Anaxyrus americanus*) (MDNR 2024d).

Insects found in the Project Route, including the Project ROW, would include pollinators such as bees and butterflies.

7.5.8.2 POTENTIAL IMPACTS

Project construction would result in temporary impacts (e.g., disturbance) to wildlife and wildlife habitats (e.g., temporary alteration of vegetation) within and adjacent to the Project ROW. During construction, mobile wildlife individuals may be displaced as a result of habitat removal and human disturbance (e.g., activity, noise). Mobile individuals are expected to move to adjacent, available habitat. Less mobile species or immobile individuals, ground nests, and eggs occupying an area at the same time and space as construction activities may be impacted through collision with, or crushing by, construction equipment.

Approximately 540.4 square feet (0.01 acre) of the Project ROW will be converted to impervious surface (i.e., for structure foundations). This represents 0.2% of the Project ROW, and 0.02% of the Project Route. Additionally, approximately 2.3 acres of tree removal will be required in the Project ROW. These areas may provide habitat for common wildlife species adapted to areas comprised of a mosaic of land cover types.

Overall, due to the minor amount of potential wildlife habitat removal relative to the amount of remaining habitat, Project construction is expected to have minimal impacts on individuals of common wildlife species and no impact on their populations.

Project O&M activities in the Project ROW may disturb wildlife using the Project ROW or adjacent areas in the Project Route. Modes of impact would be similar to those resulting from Project construction. However, O&M activities are expected to be intermittent and temporary.

The Project Alignment is unlikely to pose a hard barrier to the movement or migration of most terrestrial wildlife species expected to occur in this region. The Project Alignment does not span any officially notable wildlife habitat corridors (e.g., Important Bird Areas [The National Audubon Society 2021] or WMAs [MDNR 2024e]). Vegetation within the Project ROW will be maintained in accordance with Section 5.8. Wildlife species likely to be found in the area are likely adapted to a mosaic of land cover types. Mammals, insects, and herptile species are expected to travel through and across the Project ROW.

Of the animal species that may utilize the Project ROW, birds are most likely to experience direct impacts during Project operation. Transmission lines and distribution lines have been documented to pose hazards to birds through collision mortality and electrocution (Bevanger 1994; Erickson et al. 2005). During operation of the proposed 115-kV transmission line, no electrocution risk to perching birds is expected, given the size and clearances associated with this voltage (Avian Power Line Interaction Committee [APLIC] 2006). However, collisions could still occur.

7.5.8.3 MITIGATION MEASURES

Benton Solar will design the Project to follow the appropriate, suggested practices outlined by the APLIC collision manual to avoid and minimize impacts to avian species (APLIC 2012). Benton Solar may modify APLIC's suggested practices as appropriate and due to the minimal length of the Project. Where tree-clearing cannot be avoided, Benton Solar will implement seasonal clearing restrictions during the summer season (May 15–August 31) as recommended by USFWS to minimize direct effects to avian and bat species that may be present.

7.6 Rare and Unique Natural Resources

7.6.1 Existing Conditions

7.6.1.1 FEDERALLY LISTED AND PROTECTED SPECIES

Benton Solar reviewed the USFWS IPaC report in 2023 to identify federally endangered and threatened species, proposed species, candidate species, and designated critical habitat under the Endangered Species Act that may occur in the Project Route. In 2024, Benton Solar conducted a second IPaC review to ensure it had the most recent data for the current Project Route. A copy of both reviews are included in Appendix G. The IPaC reviews indicated four federally listed, proposed listed, or candidate animal species with potential to occur in the Project Route due to overlapping ranges. Each of these species, and its potential to occur in or adjacent to the Project Route, is discussed below.

- **Northern long-eared bat** (*Myotis septentrionalis*) (endangered). The northern long-eared bat occurs throughout Minnesota, hibernating in mines and caves during winter months (November–March). During the warm season, northern long-eared bat habitat consists of woodland and forested areas where they roost, travel, and forage on insects. Northern long-eared bats are a forest interior species, showing a preference for roosting and foraging away from edge habitat in larger contiguous blocks of forest (USFWS 2024b). Potential roost sites consist of trees with cracks, hollows, and crevices (USFWS 2024b). Individual trees may be used by northern long-eared bats as a roost when they are located within 1,000.0 feet of forested habitat. Human-made structures such as barns, houses, and bridges also are used as roosts by northern long-eared bats and are considered potential active season habitat (USFWS 2024b).

  Documented hibernacula and roost tree records are maintained in the MDNR's Natural Heritage Information System (NHIS). NHIS reviews did not indicate hibernacula or roost trees as being present within the Project Route (see Appendix G). While no roost trees are located in Benton County, hibernacula are known to occur (MDNR 2022).

  Woody vegetation in the Project Route is primarily associated with forested remnants, woodlot patches, and individual trees. These areas have potential to provide habitat for roosting, traveling, and foraging bats during the spring, summer, and fall. Therefore, the northern long-eared bat has potential to occur in the Project Route, including the Project ROW.

- **Tricolored bat** (*Perimyotis subflavus*) (proposed endangered). Tricolored bats winter in mines and caves or in road-associated culverts where caves are scarce. During the spring, summer, and fall months, these bats can occur in forested habitats where they primarily roost among leaves. Females may roost alone or in small colonies. Although research on tricolored bat foraging is limited and conflicting results have been observed, it appears that the species forages in more open areas such as forest openings and early successional areas (Loeb and O'Keefe 2006). Tricolored bats have been found regularly in southeastern Minnesota, although never in large numbers in Minnesota (MDNR 2022).

  During the summer, tricolored bats can be found roosting in trees (MDNR 2022). Woody vegetation in the Project Route is primarily associated with forested remnants, woodlot patches, and individual trees. These wooded areas have potential to provide habitat for roosting, traveling, and foraging bats during non-hibernating months (April–October) (MDNR 2022). Therefore, the tricolored bat has potential to occur in the Project Route, including in the Project ROW.

- **Monarch butterfly** (*Danaus plexippus*) (candidate). Monarch butterflies occur throughout Minnesota during the summer in open habitats, including fields, meadows, weedy areas, marshes, and roadsides (Environmental Conservation Online System [ECOS] 2023). Adult monarch butterflies lay their eggs on milkweed (primarily *Asclepias* spp.). Once eggs hatch, the larvae are dependent on milkweed before emerging as adults (ECOS 2023). Typically, three to four generations overlap mid-May through late October before individuals migrate south to wintering grounds in Mexico (ECOS 2023; Minnesota Seasons 2023).

  The Project Route contains open habitats that may provide suitable summer habitat for monarch butterflies, including areas where milkweed, asters (*Symphyotrichum* spp.), goldenrod, and other flowering plants are found. Because the Project Route contains suitable habitat for the species, and the species is widespread, monarch butterflies are likely to occur in the Project Route, including the Project ROW, during the summer months.

- **Whooping crane** (*Grus americana*) (experimental population, non-essential)**.** Two whooping crane populations occur in the United States: the experimental, non-essential Eastern Migratory population and the wild Aransas-Wood Buffalo population. Only the Eastern Migratory population range overlaps with Minnesota. The population's summer range is located in central Wisconsin, 200.0 miles southeast of the Project Route, and individuals migrate to Florida for wintering habitat. Whooping cranes rarely have been documented in Minnesota (Minnesota Conservation Volunteer 2021). The likelihood of this species occurring in the Project Route, including the Project ROW, is considered low.

There is no designated critical habitat within the Project Route (see Appendix G).

The Bald and Golden Eagle Protection Act protects bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) from intentional take and prohibits disturbance that may lead to biologically significant impacts. The range of both bald and golden eagles overlaps the Project Route (The Raptor Center 2023) (see Appendix G). Bald eagles may be present within the Project Route, including in the Project ROW, which contains potentially suitable habitat for bald eagles in the form of trees and wooded patches that may be used for roosting, nesting, and perching. No known bald eagle nests are located within 1.0 mile of the area of interest. Nonbreeding golden eagles may occur in the Project Route, including the Project ROW, sporadically or during migration (Cornell Lab of Ornithology 2024).

7.6.1.2 STATE-LISTED SPECIES

Benton Solar requested a MDNR NHIS review in 2023 to determine if significant and rare species, native plant communities, and/or other natural features, may be impacted by activities occurring within a designated area that included the Project Route. In 2024, Benton Solar requested a second review to ensure it had the most recent data for the current Project Route. A copy of both reviews are included in Appendix G. The 2023 review indicated that the following four state-listed species may have potential to be impacted by the Project based on the area submitted to the MDNR with Benton Solar's request: Blanding's turtle (*Emydoidea blandingii*) (state threatened), creek heelsplitter (*Lasmigona compressa*) (state species of special concern), loggerhead shrike (*Lanius ludovicianus*) (state endangered), and tubercled rein orchid (*Platanthera flava var. herbiola*) (state threatened). The 2024 review indicated that only the Blanding's turtle and creek heelsplitter were of concern, based on the area submitted with the request.

Benton Solar also reviewed Minnesota's List of Endangered, Threatened, and Species of Special Concern (MDNR 2013), *Minnesota's Wildlife Action Plan 2015–2025* (MDNR 2016), and the MDNR Rare Species Guide (MDNR 2022) to identify the potential for state-listed species to occur in the Project Route based on known range, habitat requirements, and documented occurrences in Benton County.

Each of these species is summarized in Table 7.6-1. Their potential to occur within the Project Route and Project ROW is further discussed below.

Table 7.6-1. State-Listed Species Potentially Occurring within the Project Route and Project Right-of-Way

Common Name	Scientific Name	State Status	Potential to Occur in the Project Route and Project ROW
Birds			
Cerulean warbler	*Setophaga cerulea*	Special concern	May occur
Lark sparrow	*Chondestes grammacus*	Special concern	May occur
Loggerhead shrike*	*Lanius ludovicianus*	Endangered	May occur
Peregrine falcon	*Falco peregrinus*	Special concern	Unlikely to occur
Purple martin	*Progne subis*	Special concern	May occur
Red-shouldered hawk	*Buteo lineatus*	Special concern	May occur
Yellow rail	*Coturnicops noveboracensis*	Special concern	Unlikely to occur
Mammal			
Plains pocket mouse	*Perognathus flavescens*	Special concern	May occur
Reptiles and Amphibians			
Blanding's turtle*,†	*Emydoidea blandingii*	Threatened	May occur
Gopher snake	*Pituophis catenifer*	Special concern	Unlikely to occur
Insects			
Regal fritillary	*Argynnis idalia*	Special concern	Unlikely to occur
Whitney's underwing	*Catocala whitneyi*	Special concern	Unlikely to occur
Fish			
American eel	*Anguilla rostrata*	Special concern	Project Route – Unlikely to occur Project ROW – Does not occur

Common Name	Scientific Name	State Status	Potential to Occur in the Project Route and Project ROW
Mussels			
Creek heelsplitter*,†	*Lasmigona compressa*	Special concern	Project Route – Unlikely to occur Project ROW – Does not occur
Black sandshell	*Ligumia recta*	Special concern	Project Route – Unlikely to occur Project ROW – Does not occur
Plants			
Blunt sedge	*Carex obtusata*	Special concern	Unlikely to occur
Bog bluegrass	*Poa paludigena*	Threatened	Unlikely to occur
Butternut	*Juglans cinerea*	Endangered	Unlikely to occur
Clinton's bulrush	*Trichophorum clintonii*	Threatened	May occur
Drummond's campion	*Silene drummondii* ssp. *Drummondii*	Special concern	Unlikely to occur
Hill's thistle	*Cirsium pumilum* var. *hillii*	Special concern	Unlikely to occur
Kinnikinnick dewberry	*Rubus multifer*	Special concern	Unlikely to occur
Old field toadflax	*Nuttallanthus canadensis*	Special concern	Unlikely to occur
Tubercled rein orchid*	*Platanthera flava* var. *herbiola*	Threatened	Project Route – May occur Project ROW – Unlikely to occur
Vermont bristle-berry	*Rubus vermontanus*	Special concern	Project Route – May occur Project ROW – Unlikely to occur

Source: MDNR 2022; Appendix G.

* Species indicated by NHIS 2023 review.

† Species indicated by NHIS 2024 review.

7.6.1.2.1 Birds

- **Cerulean warbler** (*Setophaga cerulea*). This species prefers mature forests associated with floodplains or wetlands (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. A limited amount of suitable habitat is present in the Project Route in the form of deciduous and mixed forest. No forested land cover types are identified in the Project ROW. The species may occur in the Project Route or sporadically in the Project ROW.
- **Lark sparrow** (*Chondestes grammacus*). Lark sparrows typically occur in short or sparse grasses (usually native) in areas of sand or gravel soils, with at least some bare ground and widely scattered or patchy trees (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Suitable habitat may be present in the limited areas of herbaceous and barren land cover types within the Project ROW and Project Route. Therefore, the species may occur there.
- **Loggerhead shrike**. This species prefers open grasslands or pastures with short vegetation and scattered shrubs or trees (MDNR 2022). The NHIS reviews indicated that the loggerhead shrike has been documented in the vicinity of the area of interest. Due to the presence of potentially suitable habitat (e.g., hay/pasture), and the known occurrence of this species in the vicinity, this species may occur in the Project Route or Project ROW.
- **Peregrine falcon** (*Falco peregrinus*). Peregrine falcons nest primarily on buildings and bridges in urban settings and prefer open, non-forested areas for hunting (MDNR 2022). The NHIS reviews

did not indicate a documented record for the species in the vicinity of the area of interest. Suitable nesting habitat is not present in the Project Route, including the Project ROW. While open areas potentially suitable for hunting may be present, the overall likelihood of the species occurring in the Project Route or Project ROW is considered relatively low.

- **Purple martin** (*Progne subis*). This species typically nests within human-made structures around human settlements and forages for insects over cities, towns, parks, open fields, streams and rivers, and open water habitats including wetlands, marshes, and lakes (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Suitable nesting habitat is not present in the Project Route, including the Project ROW. However, open areas potentially suitable for hunting may be present in the Project Route, including the Project ROW, and the species has potential to occur there.
- **Red-shouldered hawk** (*Buteo lineatus*). These hawks prefer mature forests associated with floodplains or wetlands (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. However, suitable habitat (e.g., deciduous, and mixed forest land cover types) is present in the Project Route. The species has potential to occur in the Project Route, including the Project ROW.
- **Yellow rail** (*Coturnicops noveboracensis*). The yellow rail prefers inundated wetlands with sedges, rushes, and prairie cordgrass (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Due to the lack of suitable habitat in the Project Route, this species is unlikely to occur there.

7.6.1.2.2 Mammal

- **Plains pocket mouse** (*Coturnicops noveboracensis*). This species is restricted to open, well-drained areas, typically on sandy soils with sparse, grassy, or brushy vegetation (MDNR 2022). The NHIS review did not indicate a documented record for the species in the vicinity of the area of interest. Limited suitable habitat within the Project Route and Project ROW, in the form of hay/pasture, herbaceous, and barren land cover types, may be present. This species may occur within the Project Route, including the Project ROW.

7.6.1.2.3 Reptiles and Amphibians

- **Blanding's turtle.** Both NHIS reviews indicated that Blanding's turtle has been documented in the vicinity of the Project Route. This species occurs in sandy uplands adjacent to wetland complexes. Calm, shallow waters, including wetlands adjacent to streams and rivers, are especially preferred (MDNR 2022). Wetlands are not present in the Project ROW. However, due to the presence of wetlands proximate to the Project ROW (i.e., 0.02 acre of riverine wetland in the northeastern corner of the Project Route), and the known occurrence of this species in the vicinity of the area of interest, this species is considered to have potential to occur in the Project Route and Project ROW.
- **Gopher snake** (*Pituophis catenifer*). The species occurs in well-drained, loose sandy and gravel soils with dry sand prairies and bluff prairies habitats preferred (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Prairies are not present in the Project Route, including the Project ROW, and this species is unlikely to occur there.

7.6.1.2.4 Insects

- **Regal fritillary** (*Argynnis idalia*). This species is associated with native prairie habitat (MDNR 2022). Because the NHIS responses did not indicate presence of native plant communities in the

vicinity of the area of interest, and suitable habitat is lacking within the Project Route, this species is unlikely to occur there.

- **Whitney's underwing** (*Catocala whitneyi*). The Whitney's underwing occurs in dry to mesic prairies and savanna where leadplant (*Amorpha canescens*) occurs (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Suitable habitat is not present in the Project Route and the species is unlikely to occur there.

7.6.1.2.5 Fish

- **American eel** (*Anguilla rostrata*). This species prefers moderate- or large-sized rivers that have continuous flow and a mud or rock bottom (MDNR 2022). This species primarily is found in the lower Mississippi River and its larger tributaries, such as the St. Croix and Minnesota Rivers (University of Minnesota 2002). Approximately 0.01 mile of the Elk River is present in the northeast corner of the Project Route. However, the NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest and the American eel is unlikely to occur in the Project Route. Because no aquatic resources are present in the Project ROW, the American eel does not occur there.

7.6.1.2.6 Mussels

- **Creek heelsplitter**. The 2023 NHIS review indicated that creek heelsplitter has been documented in the Redeye River. The Redeye River, at its closest point, is located 74.9 miles northwest of the Project ROW. The 2024 review indicated the species has been documented in the Elk River in the vicinity of the Project Route. This species typically occurs in creeks, small rivers, and the upstream portions of large rivers (MDNR 2022). Approximately 0.01 mile of the Elk River is present in the northeast corner of the Project Route. Because no aquatic resources are present in the Project ROW, the species does not occur there.

- **Black sandshell** (*Ligumia recta)*. This species is typically found in the riffle and run areas of medium to large rivers (MDNR 2022). Approximately 0.01 mile of the Elk River is present in the northeastern corner of the Project Route. However, the NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest and the black sandshell is unlikely to occur in the Project Route. Because no aquatic resources are present in the Project ROW, the black sandshell does not occur there.

7.6.1.2.7 Plants

- **Blunt sedge** (*Carex obtusata*). This species occurs in native grasslands that have developed on dry, sandy, or gravelly soil (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Suitable habitat is not present in the Project Route, including the Project ROW, and the species is unlikely to occur there.

- **Bog bluegrass** (*Poa paludigena*). Bog bluegrass occurs only in forested wetland habitats that are maintained by groundwater seeps (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Suitable habitat is not present in the Project Route, including the Project ROW, and the species is unlikely to occur there.

- **Butternut** (*Juglans cinerea*). Butternut most commonly occurs on river terraces elevated several feet or more above active floodplains where it is protected from siltation and flood scouring (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Suitable habitat is not present in the Project Route, including the Project ROW, and the species is unlikely to occur there.

- **Clinton's bulrush** (*Trichophorum clintonii*). This species occurs in a variety of habitats. In southeastern Minnesota, the species occurs in prairie or savannah communities and sometimes in openings or edges of fire-dependent forests. In northwestern Minnesota, this species occurs in aspen parkland communities, which are also fire dependent (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. However, because potentially suitable habitat may be present in the Project Route, including the Project ROW, this species may occur there.
- **Drummond's campion** (*Silene drummondii* ssp. *Drummondii*). This species occurs in relatively high-quality native plant communities with dune, savanna, barren, or pine woodland habitats. This species does not occur on roadsides, agricultural land, gravel pits, or other disturbed habitats (MDNR 2022). The NHIS responses did not indicate presence of native plant communities in the vicinity of the area of interest. Suitable habitat is not present in the Project Route, including the Project ROW, and the species is unlikely to occur there.
- **Hill's thistle** (*Cirsium pumilum* var. *hillii*). Hill's thistle typically occurs on level outwash plains, river terraces, and rolling terrain formed of glacial till (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Suitable habitat is not present in the Project Route, including the Project ROW, and the species is unlikely to occur there.
- **Kinnikinnick dewberry** (*Rubus multifer*). This species occurs in high-quality savanna remnants on the Anoka Sandplain Subsection and elsewhere on a few bedrock exposures in prairie habitats (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Suitable habitat is not present in the Project Route, including the Project ROW, and the species is unlikely to occur there.
- **Old field toadflax** (*Nuttallanthus canadensis*). Old field toadflax occurs in dry and sandy soil in prairies, barrens, dunes, and savannas (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the area of interest. Suitable habitat is not present in the Project Route, including the Project ROW, and the species is unlikely to occur there.
- **Tubercled rein orchid.** The 2023 NHIS review indicated that tubercled rein orchid has been documented in the vicinity of the Project Route; the 2024 review did not. This species occurs in moist or wet meadows or sunny swales in savannas and prefers sandy or peaty habitats along marshes, lakeshores, swamps, and wet prairies and meadows (MDNR 2022). Potentially suitable habitat may be associated with the 0.02 acre of riverine wetland in the northeastern corner of the Project Route, and the species has potential to occur there. Suitable habitat is not present within the Project ROW, and the species is unlikely to occur there.
- **Vermont bristle-berry** (*Rubus vermontanus*) occurs in partially wooded habitats and woodland edges, particularly where edges constitute ecotones between uplands and lowlands (MDNR 2022). The NHIS reviews did not indicate a documented record for the species in the vicinity of the Project ROW. Suitable habitat is present in the Project Route, in the form of forested land cover types and their edges, and the species may occur within the Project Route. Suitable habitat is lacking in the Project ROW, and the species is unlikely to occur there.

7.6.1.3 NATURAL RESOURCES SITES

The Project Route does not overlap any mapped MDNR native communities or other managed areas that could contain higher-quality natural resources, including USFWS Waterfowl Production Areas or easements, Minnesota Scientific and Natural Areas, Wetland Reserve Program conservation easements, WMAs, or Minnesota Biological Survey Site of Biodiversity Significance. Additionally, none of these areas is present within 1.0 mile of the Project Route.

7.6.2 Potential Impacts

7.6.2.1 FEDERALLY LISTED AND PROTECTED SPECIES

Migrating, foraging, and roosting individual northern long-eared and tricolored bats have potential to occur during spring, summer, or fall in the Project Route and Project ROW. Relatively minimal (2.3 acres) tree clearing will be required for Project construction and O&M. If occurring in the Project ROW during the same time and space as tree-clearing, bats could be impacted through injury or mortality. If occurring in the Project ROW during the same time and space as other construction activities, individual bats may be temporarily disturbed by human presence or noise. However, such disturbance would be insignificant and similar to current human presence and noise associated with agricultural activities.

The monarch butterfly may use suitable habitat in the Project Route, including the Project ROW, for foraging, rearing, and flight. Habitat removal and modification in the Project ROW during Project construction would result in temporary impacts where habitat is removed for construction only or permanent impacts where habitat is replaced by Project components (i.e., transmission structures). Monarch butterflies often inhabit disturbed areas exposed to human activity. Benton Solar anticipates that monarch butterflies would continue to use habitat exposed to temporary disturbances related to Project construction and operation or would use adjacent available habitat. Monarch butterflies could be injured or killed through collisions with or crushing by construction or personal vehicles or workers. Construction and O&M personnel would observe a reduced speed limit of 10.0 miles per hour (16.1 kilometers per hour) while driving in the Project ROW. Due to reduced speeds in the Project ROW, adult monarch butterflies are expected to be able to avoid collisions with vehicles in most instances. Butterfly eggs, larvae, and pupae have potential to be crushed by vehicles or personnel operating in the Project ROW.

The range of both bald and golden eagles overlaps the Project ROW, and bald eagles may be present as the Project ROW contains suitable habitat for bald eagles in the form of remnant forests and smaller wooded patches that may be used for roosting, nesting, and perching. Golden eagles may occur in the Project ROW sporadically during migration. Avian (including raptor) collision and electrocution risk is not anticipated from the proposed transmission line with implementation of APLIC practices. However, collisions could still occur, depending on location and surrounding habitat features.

7.6.2.2 STATE-LISTED SPECIES

Direct fatalities and habitat disturbance from construction and Project-related activities could impact state-listed species, if present, via the relative pathways described in Sections 7.5.7.2 and 7.5.8.2. Benton Solar expects that, due to implementation of mitigation measures described in Sections 7.5.7.3 and 7.5.8.3, impacts to state-listed species will not occur. Additionally, Benton Solar will implement specific measures to further reduce the likelihood of impacts to two state-listed species (see Section 7.6.3.2).

7.6.2.3 NATURAL RESOURCES SITES

Benton Solar does not expect that the Project will impact any areas managed for high-quality natural resources as no such areas occur within the Project Route.

7.6.3 Mitigation Measures

7.6.3.1 FEDERALLY LISTED AND PROTECTED SPECIES

Benton Solar will implement the following measures to avoid, minimize, and mitigate impacts to federally listed or protected species.

- Where tree-clearing cannot be avoided, Benton Solar will implement seasonal clearing restrictions during the summer season (May 15–August 31) as recommended by USFWS to minimize direct effects to bats.
- Construction and O&M personnel will observe a reduced speed limit of 10.0 miles per hour (16.0 kilometers per hour) while driving in the Project ROW. Due to reduced speeds in the Project ROW, adult monarch butterflies are expected to be able to avoid collisions with vehicles in most instances.
- To reduce the risk of avian collision, including with eagles, Benton Solar will mark the Project in accordance with suggested APLIC practices (APLIC 2012). Line marking frequency may be adapted as needed to Project specifics.

7.6.3.2 STATE-LISTED SPECIES

The NHIS reviews provided the following required avoidance measures for Blanding's turtle, which Benton Solar will implement:

- Limit erosion control blanket use to "bio-netting" or "natural netting" types, and specifically do not use products containing plastic mesh netting or other plastic components.
    - Benton Solar is aware that other hydro-mulch products may contain small synthetic (plastic) fibers to aid in their matrix strength. The loose fibers could potentially resuspend and make their way to public waters. Benton Solar will avoid using such products in areas of potentially suitable Blanding's turtle habitat.
- Benton Solar will investigate potentially suitable habitat areas prior to the use of heavy equipment or any ground disturbance in these areas.
    - Benton Solar will distribute the Blanding's turtle flyer (MDNR 2008) to all contractors working in such areas.
    - Benton Solar will monitor for Blanding's turtles during construction in such areas and will report any sightings to the MDNR nongame specialist.
    - Benton Solar will avoid further activity and first coordinate with the MDNR nongame specialist to move individual turtles if they are observed and in imminent danger.

To avoid impacts to nesting loggerhead shrikes, if present, Benton Solar will avoid tree and shrub removal in suitable nesting habitat during the breeding season (April–July).

7.6.3.3 NATURAL RESOURCES SITES

The Project will not impact natural resources sites. Therefore, no mitigation measures are necessary or proposed.

7.7 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources refers to resources that cannot be replaced within a reasonable timeframe after use. Irretrievable commitments of resources means resources that cannot be restored to their original value after use. Potential impacts are summarized in Table 7.7-1. No irreversible or irretrievable commitments of these resources are expected from construction or operation of the Project.

Irreversible and irretrievable commitments of other nonrenewable resources are important to address when their use can influence the availability of resources to future generations.

Construction of the Project Alignment will result in minimal irreversible and irretrievable commitments of some types of resources. Resources used during construction include nonrenewable resources such as aggregate resources, concrete, steel, and hydrocarbon fuel. During construction of the Project Alignment, construction vehicles will be deployed on-site and would need to travel along the Project Alignment and to and from the area, consuming fuel. Further, resources will be used during pole construction, pole placement, and associated activities.

7.7.1 Impacts and Mitigation

The Project Alignment and the construction process will be designed to minimize the potential for irreversible and irretrievable commitments of resources. Due to the relatively short, approximately 4-month construction timeframe for the Project, potential impacts to nonrenewable resources from use are expected to be negligible. Because no significant or long-term impacts to nonrenewable resources are anticipated from the operation of the Project, no mitigation measures are proposed during operation.

Table 7.7-1. Summary of Impacts

Type of Resource	Specific Resource	Summary of Impacts
Environmental setting	Land cover	A very minimal amount of land cover (up to a maximum total of 540.4 square feet [0.01 acre]) will be permanently altered to structure foundations in the Project ROW. Approximately 2.3 acres of trees and other vegetation will be removed and maintained as non-woody vegetation within the Project ROW. Temporary impacts will occur where access roads, laydown yard(s), and staging areas are used during construction and restored to approximate preconstruction conditions in coordination with landowners following completion of construction.
	Geology	Impacts to geologic resources in the Project ROW are likely to be limited. Because large quantities of glacial drift cover the Project ROW, near-surface excavation that could be associated with the Project would not impact bedrock.
	Soils	No permanent impacts to soils are expected to occur due to implementation of appropriate minimization and avoidance measures and BMPs established herein and in the SWPPP.
Human settlement	Public health and safety	No impacts to this resource are expected to occur.
	Residential and non-residential buildings	No impacts to this resource are expected to occur.
	Displacement	No displacement is expected to occur.
	Sound	Activities associated with the construction of the Project may generate temporary sound. Sound generated from the operation of the Project would be in accordance with MPCA standards.
	Radio, televisions, cellular device, and GPS interference	No impacts to these resources are expected to occur.
	Aesthetics	The viewshed in the vicinity of the Project Route will be altered by construction of the Project Alignment. However, it will not create a new feature type within the landscape as overhead electric transmission and distribution lines and an existing substation are already present.
	Socioeconomics	While permanent impacts to socioeconomics are not anticipated, the population size and demographics may temporarily increase and change with the addition of construction personnel, likely resulting in a small financial gain for the local economy.
	Cultural values	No impacts to this resource are expected to occur.
	Recreation	No impacts to this resource are expected to occur.

Type of Resource	Specific Resource	Summary of Impacts
	Public services	No impacts to this resource are expected to occur.
	Transportation	Project-related impacts to transportation resources may include increased traffic load on roadways during construction. These impacts will be temporary and minor, as a relatively small number of workers and equipment will be accessing any one location within the Project ROW at any time during construction.
Land-based economies	Agriculture	No impacts to this resource are expected to occur.
	Forestry and mining	No impacts to these resources are expected to occur.
	Tourism	No impacts to this resource are expected to occur.
Archaeological and historic resources	–	Impacts to known sites have been avoided. Project construction activities have the potential to encounter unidentified archaeological sites. Therefore, prior to construction, Benton Solar will prepare a UADP for the Project. Should Project construction and/or operation inadvertently encounter previously undocumented archaeological resources or human remains, the discoveries will be reported to the SHPO and/or OSA, as applicable.
Natural environment	Air	Project construction activities have potential to result in temporary impacts to air quality associated with exhaust emissions and/or fugitive dust. Impacts are expected to be negligible due to the relatively short construction timeframe. Negligible amounts of ozone and only intermittent, temporary impacts to air quality (e.g., fugitive dust, vehicle emissions) will be created during O&M activities.
	Greenhouse gas emissions	Project construction activities have potential to result in temporary increases of greenhouse emissions associated with exhaust emissions. Impacts are expected to be negligible due to the relatively short construction timeframe. Negligible emissions will be created during O&M activities.
	Surface water	No impacts to this resource are expected to occur.
	Groundwater	No impacts to this resource are expected to occur.
	Floodplains	No impacts to this resource are expected to occur.
	Wetlands	No impacts to this resource are expected to occur.
	Flora	A very minimal amount of land cover (up to a maximum total of 540.4 square feet [0.01 acre]) will be permanently altered to structure foundations in the Project ROW. Approximately 2.3 acres of trees and other vegetation will be removed and maintained as non-woody vegetation within the Project ROW. Temporary impacts will occur where access roads, laydown yard(s), and staging areas are used during construction and restored to approximate preconstruction conditions in coordination with landowners following completion of construction.
	Fauna	Project construction is expected to have minimal impacts on individuals of common wildlife species and no impact on their populations.
Rare and unique natural resources	Federally listed and protected species	No impacts to this resource are expected to occur.
	State-listed species	No impacts to this resource are expected to occur.
	Natural resources sites	No impacts to these resources are expected to occur.
Adverse human and natural environmental effects that cannot be avoided	–	Unavoidable impacts include the conversion of nominal areas of agricultural land cover or natural vegetation, and negligible impacts to agricultural land use.

Type of Resource	Specific Resource	Summary of Impacts
Irreversible and irretrievable commitments of resources	–	No irreversible or irretrievable commitments of resources related to human settlement, land-based economics, archaeology/history, or the natural environment are expected to result from Project construction or operation. A commitment of people and resources would be required to successfully construct and operate the Project. Some resources (e.g., concrete and steel) may be recycled or salvaged upon Project decommissioning. Other resources (e.g., fuels and lubricants used by equipment) would be irretrievable.

8 AGENCY, TRIBAL, AND PUBLIC OUTREACH

This section describes the Applicant's outreach efforts as well as federal, state, and local agency involvement in the pre-application process. The Applicant also made efforts to solicit stakeholder and landowner opinions, concerns, and feedback regarding the Project.

On April 18, 2023, Benton Solar provided written notice to local government units regarding the Project and invited a discussion regarding agency questions, comments, and concerns, per the requirements of Minn. Stat. § 216E.03, subd. 3a and 3b. Given the passage of time, Benton Solar provided a refreshed notice containing updated Route and contact information as a courtesy on July 17, 2024. Representative letters and responses, including substantive comments received as of the date of submission of this Application, are included in Appendix C. Table 8-1 provides a summary of significant communication with federal, state, and local agencies and the public in chronological order.

Benton Solar also conducted outreach to 47 Native American Tribes for the Benton Solar Project. Tribal outreach efforts are provided in Appendix F3, Table F3-1. Initial outreach consisted of a letter sent to each tribe's Tribal Historic Preservation Officer or similar representative on October 22, 2022, by Benton Solar's Tribal and Indigenous Relations group, providing information on the project and surrounding area (Appendix F3-1). The outreach letter provided an opportunity to receive additional information on the Project and opportunities to participate in fieldwork to identify and avoid sensitive tribal resources. The Mille Lacs Band of Ojibwe and the Rosebud Sioux Tribe responded, indicating interest in the Project. The Crow Creek Sioux Tribe responded indicating no interest in the Project, and the Shakopee Mdewakanton Sioux Community responded that they would defer to tribes closer to the Project. Benton Solar requested that SWCA conduct additional outreach with five tribes (the Mille Lacs Band of Ojibwe, the Rosebud Sioux Tribe, the Sisseton Wahpeton Oyate, the Standing Rock Sioux Tribe, and the Upper Sioux Community) for potential fieldwork. All but the Upper Sioux Community provided tribal specialists to participate in fieldwork. A second outreach letter was sent on August 10, 2023, to the 11 federally recognized tribes in Minnesota and those tribes outside Minnesota that requested continued involvement in the Project. This letter provided a Project update and included sensitive and confidential cultural resources information. Due to the sensitive nature of that content, the letter is not included in Appendix F3-1. Coordination with tribes is ongoing to ensure acceptable avoidance of cultural resources.

The Applicant will continue the collaborative process with agencies, stakeholders, and landowners throughout the development, construction, and operation phases of the Project.

Table 8-1. Agency and Public Coordination Dates and Correspondence

Date	Entity	Event and Participants
September 6, 2022	Benton County Commission	Meeting to discuss the Project overview and updates. Participants were Jared J. Gapinski, Steve Heinen, Scott Johnson, Ed Popp, and Beth Schlangen, Benton County Commission; Brittney Paxson, Benton Solar, LLC (Benton Solar).
Summer 2022	Benton County Planning and Zoning	Meeting to discuss the Project overview and updates. Participants were Roxanne Achman, Chris Byrd, and Sierra Cotter, Benton County Planning and Zoning; Brittney Paxson, Danell Herzig, and Tom Vonbische, Benton Solar.
November 30, 2022	Benton County Planning and Zoning	Meeting to discuss the Project overview, updates, and how to get involved with the community. Participants were Roxanne Achman, Benton County Planning and Zoning; Brittney Paxson and Danell Herzig, Benton Solar.
November 30, 2022	Participating and signed landowners; Benton County Commission	Dinner meeting to discuss the Project overview, updates, and next steps. Participants included the participating and signed landowners; Scott Johnson and Ed Popp, Benton County Commissioners; Brittney Paxson, Danell Herzig, Tom Vonbische, Greg Martinez, Kim Duursma, Derek Hood, Todd Cummins, and Steven Davidson, Benton Solar.
December 1, 2022	St. Cloud Planning and Zoning	Meeting to discuss the Project overview and where the Project boundary is located in relation to city expansion plans. Participants were Matt Glaseman, St. Cloud Planning and Zoning; Brittney Paxson and Danell Herzig, Benton Solar.
December 2, 2022	Benton Economic Partnership	Meeting to discuss the Project overview, updates, and how to get involved with the community. Participants were Amanda Othoudt, Benton Economic Partnership; Brittney Paxson and Danell Herzig, Benton Solar.
December 3, 2022	Benton County Sheriff	Meeting to discuss the Project overview, updates, and how to get involved with the community. Participants were Troy Heck, Benton County Sheriff; Brittney Paxson and Danell Herzig, Benton Solar.
February 7, 2023	Benton County Commission	Meeting to discuss the Project overview and updates. Participants were Scott Johnson, Ed Popp, Steve Heinen, Jared J. Gabinski, and Beth Schlangen, Benton County Commission; Brittney Paxson and Danell Herzig, Benton Solar.
February 7, 2023	Gabriel Media	Meeting to discuss marketing and sponsorship opportunities that the City of St. Cloud Chamber of Commerce offers. Participants were Dustin Guggenberger, Gabriel Media; Brittney Paxson and Danell Herzig, Benton Solar.
February 7, 2023	Townsquare Media	Meeting to discuss marketing and sponsorship opportunities that Townsquare Media offers. Participants were John Schroeder, Townsquare Media; Brittney Paxson and Danell Herzig, Benton Solar.
February 7, 2023	Benton Economic Partnership	Meeting to discuss the Project overview, updates, and how to get involved with the community. Participants were Amanda Othoudt, Benton Economic Partnership, Inc; Brittney Paxson and Danell Herzig, Benton Solar.
February 14, 2023	Minden Township Board	Meeting to discuss the Project overview, updates, and how to get involved with the community. Participants were Pam Benoit, Mark Ebnet, Steve Simones, Cynthia Abraham, Minden Township Board; Brittney Paxson, Danell Herzig, and Greg Martinez, Benton Solar.
February 15, 2023	Benton County Planning and Zoning	Meeting to review status of the Project and to go through Application details. Participants were Roxanne Achman, Benton County Planning and Zoning; Brittney Paxson and Danell Herzig, Benton Solar.

Date	Entity	Event and Participants
March 14, 2023	St. George Township Board	Meeting to discuss the Project overview, updates, and how to get involved with the community. Participants were Patrick Herbst, Bradley Chmielewski, Donald Martin, Nicole Leabch, and Jeremy Johnson, St. George Township Board; Brittney Paxson, Danell Herzig, and Greg Martinez, Benton Solar.
April 13, 2023	U.S. Army Corps of Engineers	Letter from Brittney Paxson, Benton Solar, describing Project and requesting comments. This letter specifically described the Benton Solar Project and included a spatial area of interest that encompassed the Project Route.
	U.S. Fish and Wildlife Service	
	Minnesota State Historic Preservation Office (SHPO)	
	Minnesota Department of Natural Resources (MDNR)	
	Minnesota Department of Health	
	Minnesota Department of Agriculture	
	Minnesota Department of Transportation (MnDOT)	
	Minnesota Department of Employment & Economic Development	
	Minnesota Pollution Control Agency	
	Minnesota Department of Public Safety	
	Minnesota Board of Water and Soil Resources (BWSR)	
	Benton County Planning and Zoning Department	
	St. Cloud Planning and Zoning Department	
	Benton County Sheriff	
	Benton County Commissioners	
	Benton Economic Partnership	
	Benton County Highway Department	
	Minden Township	
April 13, 2023	MDNR, Ecological and Water Resources	Email from Melissa Collins, MDNR to Brittney Paxson, Benton Solar in response to April 13, 2023, request for comments.
April 13, 2023	MDNR, Lands and Minerals Division	Email from Martha Vickery, MDNR to Brittney Paxson, Benton Solar in response to April 13, 2023, request for comments.
April 14, 2023	SHPO	Email from Kelly Gragg-Johnson, SHPO to Brittney Paxson, Benton Solar in response to April 13, 2023, request for comments.
April 17, 2023	BWSR	Emails from Cade Steffenson and Sierra Cotter, BWSR to Brittney Paxson, Benton Solar in response to April 13, 2023, request for comments.
April 18, 2023	MnDOT	Email from Stacy Kotch Egstad, MnDOT to Brittney Paxson, Benton Solar in response to April 13, 2023, request for comments.
April 18, 2023	Benton County Commissioners	Meeting to discuss the Project overview, updates, and how to get involved with the community. Participants were Benton County Commissioners and Brittney Paxson, Benton Solar.

Date	Entity	Event and Participants
April 20, 2023	Landowners within the Project	Dinner meeting to discuss the Project overview, updates, and how to get involved with signed landowner community. Participants were landowners and Brittney Paxson, Benton Solar.
April 20, 2023	Foley Area Chamber of Commerce	Event meeting to discuss the Project overview, updates, and how to get involved with the community. Participants were Foley Area Chamber of Commerce and Brittney Paxson, Benton Solar.
May 3, 2023	Big Brothers Big Sisters of Central Minnesota	Follow up meeting from the Foley Chamber event meeting to discuss and create sponsorship opportunities. Participants were Emmitt Edwards, Big Brothers Big Sisters; and Brittney Paxson and Adam Gracia, Benton Solar.
August 3, 2023	Recipients of the April 13, 2023, letter	Email from Brittney Paxson, Benton Solar, providing a KMZ of the Project Route, Project ROW, and Project Alignment and inviting comments.
August 9, 2023	MDNR	Email from Melissa Collins, MDNR to Brittney Paxson, Benton Solar in response to August 3, 2023, request for comments.
January 25, 2024	Benton Economic Partnership Inc.	Meeting to discuss Project overview, timeline, and community engagement. Participants were Amanda Othoudt, Benton Economic Partnership Inc.; and Adam Gracia, Benton Solar.
April 8, 2024	Big Brothers Big Sisters of Central Minnesota	Meeting to discuss and renew sponsorship opportunities. Participants were Emmitt Edwards, Big Brothers Big Sisters of Central Minnesota; and Adam Gracia and Matt Johnson, Benton Solar.
April 24, 2024	Foley Quality of Life Task Force	Email from Adam Gracia, Benton Solar to Melissa Kloss-Lezer, Foley Quality of Life Task Force to discuss renewed sponsorship opportunities for the Foley Quality of Life Task Force.
April 26, 2024	City of St. Cloud Planning and Zoning	Email from Adam Gracia, Benton Solar to David Broxmeyer, Matt Glaesman and Isabella Margl, City of St. Cloud Planning and Zoning to communicate the intended 911 address for the Project.
April 30, 2024	Benton County Board	Meeting to discuss proposed road use, Project timeline, and battery energy storage system. Participants were Benton County Commissioners; and Adam Gracia, Benton Solar.
May 17, 2024	City of St. Cloud Planning and Zoning Emails	Email from Adam Gracia, Benton Solar to Matt Glaesman and Isabella Margl, City of St. Cloud Planning and Zoning to communicate Project plans in the St. Cloud/Minden Township Orderly Annexation Area and ensure the Project complies with the City's land use and zoning plans.
May 28, 2024	Landowners	Meeting to discuss Project updates and timeline. Participants were Site landowners; Jonas van Stappen, Kimberly Duursma, Sophia Donovan, John Lewis, Alec Mazzuco; and Adam Gracia, Benton Solar.
June 6, 2024	City of St. Cloud Planning and Zoning	Meeting to discuss how the Project aligns with the City of St. Cloud/Minden Township Orderly Annexation Area land use and zoning plans. Participants were Matt Glaesman, City of St. Cloud Planning and Zoning; and Adam Gracia and Cody MacDonald, Benton Solar.
July 16, 2024	Benton County Commissioners	Meeting to discuss Project update and overview of battery energy storage site. Participants were Benton County Commissioners; and John Farley, Adam Gracia, and Cody MacDonald, Benton Solar.
August 14, 2024	Landowner Open House	Open house to provide Project updates. Participants were landowners in and adjacent to the Project Site; and Adam Gracia, Benton Solar.
August 14, 2024	Benton County Emergency Management	Meeting to discuss Project. Participants were Kristen Tschida, Benton County Emergency Management Director; and Josh Adams, Sophia Donovan, John Farley, Adam Gracia, and Evan Shea, Benton Solar.

9 LITERATURE CITED

AirNow. 2021. Air Quality Index (AQI) Basics. Available at: https://www.airnow.gov/aqi/aqi-basics/. Accessed May 2024.

American National Standards Institute (ANSI). 2017. Tree, shrub, and other woody plant management - standard practices (Pruning). ANSI A300 (Part 1) - 2017 Pruning.

Avian Powerline Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Edison Electric Institute, Avian Powerline Interaction Committee, and the California Energy Commission.

———. 2012. *Reducing Avian Collisions with Power Lines: The State of the Art in 2012*. Washington, D.C.: Edison Electric Institute and Avian Powerline Interaction Committee. Available at: http://www.aplic.org/uploads/files/11218/Reducing_Avian_Collisions_2012watermarkLR.pdf. Accessed May 2024.

Beacon. 2024. Benton County, MN. Layers used: Parcels, Highways, County Roads, Roads, Aerial, Zoning, 2023. Scale: 1 in:6 mi. Available at: https://beacon.schneidercorp.com/Application.aspx?AppID=386&LayerID=5759&PageTypeID=1&PageID=0. Accessed April 2024.

Benton County. 2019. *2040 Comprehensive Plan: A Shared Vision for the Future*. Available at: https://www.co.benton.mn.us/560/Comprehensive-Plan. Accessed May 2024.

———. 2024a. Utilities & Communication. Available at: https://www.co.benton.mn.us/474/Utilities-Communication. Accessed April 2024.

———. 2024b. Annual Financial Reports. Available at: https://www.co.benton.mn.us/Archive.aspx?AMID=37. Accessed April 2024.

Bevanger, K. 1994. Bird interactions with utility structures: collision and electrocution, causes and mitigating measures. *Ibis* 136(4):412–425.

City of St. Cloud. 2003. Saint Cloud 2003 Comprehensive Plan Update. Minden Township Orderly Annexation Area Master Plan.

———. 2024. City of St. Cloud Minnesota. Available at: https://www.ci.stcloud.mn.us/. Accessed April 2024.

Cornell Lab of Ornithology. 2024. All About Birds. Ithaca, New York: Cornell Lab of Ornithology. Available at: https://www.allaboutbirds.org. Accessed April 2024.

Economic Profile System (EPS). 2023. Comprehensive Reports: Demographics and Key Indicators. Available at: https://headwaterseconomics.org/apps/economic-profile-system/. Accessed July 2023.

Erickson W.P., G.D. Johnson, and D.P. Young Jr. 2005. *A summary and comparison of bird mortality from anthropogenic causes with an emphasis on collisions*. U.S. Department of Agriculture Forest Service Report No. PSW-GTR-191. Available at: https://www.fs.usda.gov/research/treesearch/32103. Accessed May 2024.

Electric Power Research Institute (EPRI). 1982. *Transmission Line Reference Book - 345 kV and Above*. Second Edition. Palo Alto, California: Electric Power Research Institute.

Environmental Conservation Online System (ECOS). 2023. Monarch butterfly (*Danaus plexippus*). Available at: https://ecos.fws.gov/ecp/species/9743. Accessed May 2024.

Federal Communications Commission. 2018. Homeland Infrastructure Foundation-Level Data. TV Broadcast Contours. Available at: https://hifld-geoplatform.opendata.arcgis.com. Accessed April 2024.

Federal Emergency Management Agency (FEMA). 2018. FEMA Flood Map Service Center. Available at: http://msc.fema.gov/portal/. Accessed April 2024.

Federal Highway Administration. 2006. *Construction Noise Handbook*. Available at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/. Accessed April 2024.

Gibbon G.E., C.M. Johnson, and E. Hobbs. 2002. Chapter 3: Minnesota's Environment and Native American Culture History. In *Mn/Model Final Report Phases 1–3, 2002: A Predictive Model of Precontact Archaeological Site Location for the State of Minnesota*. Available at: https://www.dot.state.mn.us/mnmodel/P3FinalReport/chapter3.html. Accessed May 2024.

Intergovernmental Panel on Climate Change (IPCC). 2021. *Sixth Assessment Report*. Available at: https://www.ipcc.ch/assessment-report/ar6/. Accessed August 2024.

Loeb, S.C., and J.M. O'Keefe. 2006. Habitat use by forest bats in South Carolina in relation to local, stand, and landscape characteristics. Journal of Wildlife Management 70(5):1210–1218.

Marous & Company. 2023. Market Impact Analysis. Benton Solar Project. Benton County, Minnesota.

Minnesota Conservation Volunteer. 2021. Young Naturalists Standing Tall. Available at: https://www.dnr.state.mn.us/mcvmagazine/issues/2021/mar-apr/yn.html. Accessed May 2024.

Minnesota Department of Agriculture (MDA). 2016. AgroEcoregions, Minnesota. Minnesota Geospatial Commons. Available at: https://gisdata.mn.gov/dataset/agri-agroecoregions. Accessed April 2024.

Minnesota Department of Health (MDH). 2018. ARMER Radio System. Available at: https://www.health.state.mn.us/communities/ep/taccomm/armerradio.html. Accessed April 2024.

———. 2019. Wellhead Protection Areas. Available at: https://gisdata.mn.gov/dataset/water-wellhead-protection-areas#:~:text=Wellhead%20Protection%20Area%20(WHPA)%20is,the%20well%20or%20well%20field. Accessed April 2024.

———. 2021. Minnesota Well Index (MWI). Available at: https://www.health.state.mn.us/communities/environment/water/mwi/index.html. Accessed April 2024.

Minnesota Department of Natural Resources (MDNR). 2008. Blanding's Turtle Flyer. Available at https://files.dnr.state.mn.us/natural_resources/animals/reptiles_amphibians/turtles/blandings_turtle/flyer.pdf. Accessed May 2024.

———. 2012. *Hydrogeology of the Surficial Sand Aquifer*. Available at: https://files.dnr.state.mn.us/waters/groundwater_section/mapping/cga/c23_benton/pdf_files/plate06.pdf. Accessed April 2024.

———. 2013. Minnesota's List of Endangered, Threatened, and Special Concern Species. Available at: https://www.dnr.state.mn.us/rsg/filter_search.html?action=doFilterSearch&allspecies=Y&county_query=5&stateendangered=Y&statespecial_concern=Y&statethreatened=Y&5=Benton. Accessed March 2023.

———. 2016. *Minnesota's Wildlife Action Plan 2015–2025*. Division of Ecological and Water Resources, Minnesota Department of Natural Resources. Available at: https://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/mnwap/wildlife-action-plan-2015-2025.pdf. Accessed May 2024.

———. 2021. Minnesota Scientific and Natural Areas Find by Map. Available at: https://www.dnr.state.mn.us/snas/map.html. Accessed April 2024.

———. 2022. Rare Species Guide. Available at: https://www.dnr.state.mn.us/rsg/index.html. Accessed March 2023.

———. 2024a. Ecological Classification System. Available at: https://www.dnr.state.mn.us/ecs/index.html. Accessed May 2024.

———. 2023b. Birds of Minnesota. Available at: https://www.dnr.state.mn.us/birds/index.html. Accessed April 2024.

———. 2024c. Mammals of Minnesota. Available at: https://www.dnr.state.mn.us/mammals/index.html. Accessed April 2024.

———. 2024d. Reptiles / Amphibians of Minnesota. Available at: https://www.dnr.state.mn.us/reptiles_amphibians/index.html. Accessed April 2024.

———. 2024e. Wildlife management areas. Available at: http://www.dnr.state.mn.us/wmas/index.html. Accessed April 2024.

Minnesota Department of Public Safety. 2015. *Minnesota 2014-2015 Minnesota Statewide Communication Interoperability Plan (SCIP)*. Available at: https://dps.mn.gov/divisions/ecn/programs/armer/Documents/MN%20SCIP%202014-2015%20for%20Publication.pdf. Accessed April 2024.

Minnesota Department of Transportation (MnDOT). 2001. Geologic map of Minnesota. Available at: https://www.dot.state.mn.us/materials/geologydocs/quaterweb.pdf. Accessed April 2024.

———. 2002. Aggregate Sources: Gravel Pit and Rock Quarry Aggregate Source Information. County Pit Maps. Available at: https://www.dot.state.mn.us/materials/aggcopitmaps.html. Accessed August 2023.

———. 2022. Traffic Mapping Application. Available at: https://dot.state.mn.us/traffic/data/tma.html. Accessed May 2023.

———. 2023. Aggregate Source Information System Map. Minnesota Department of Transportation ASIS Map - Google Earth. Available at: https://www.dot.state.mn.us/materials/asis_GE.html. Accessed April 2024.

———. 2024. Minnesota Rail Viewer Application. Available at: https://www.arcgis.com/apps/webappviewer/index.html?id=5640f575a86148039704660c29126f24&extent=-11690507.5359%2C5234420.4958%2C-9081864.6346%2C6507555.6389%2C102100. Accessed April 2024.

Minnesota Geological Survey. 2017. *Minnesota at a Glance. Quaternary Glacial Geology*. Available at: https://conservancy.umn.edu/bitstream/handle/11299/59427/mn%20glance%20quat.pdf?sequence=9&isAllowed=y. Accessed April 2024.

Minnesota Pollution Control Agency (MPCA). 2020a. Understanding the air quality index (AQI). Available at: https://www.pca.state.mn.us/air/about-air-quality-data. Accessed July 2023.

———. 2020b. Minnesota's air monitoring network. Available at: https://www.pca.state.mn.us/air-water-land-climate/air-quality-monitoring. Accessed August 2023.

———. 2022a. Air Quality Monitoring. Available at: https://www.pca.state.mn.us/air-water-land-climate/air-quality-monitoring. Accessed May 2023.

———. 2022b. Annual Air Quality Index Summary Reports. Available at: https://www.pca.state.mn.us/air-water-land-climate/condition-details-and-past-aqi-data. Accessed May 2022.

———. 2023. Climate Change Initiatives, The Next Generation Energy Act. Available at: https://www.pca.state.mn.us/air-water-land-climate/climate-change-initiatives. Accessed January 2024.

———. 2024. What's in My Neighborhood? Available at: https://www.pca.state.mn.us/about-mpca/whats-in-my-neighborhood. Accessed April 2024.

Minnesota Seasons. 2023. Monarch (*Danaus plexippus*). Available at: http://www.minnesotaseasons.com/Insects/monarch.html. Accessed March 2023.

National Audubon Society, The. 2021. Important Bird Areas. Audubon. Available at: http://www.audubon.org/important-bird-areas. Accessed April 2024.

———. 2023. The Flyways: Mississippi Flyway. Available at: https://www.audubon.org/mississippi-flyway. Accessed April 2024.

National Park Service. 2023. National Register of Historic Places Digital Archive on NPGallery. Available at: https://npgallery.nps.gov/nrhp. Accessed July 2023.

Natural Resources Conservation Service (NRCS). 1981. *Farmland Protection Policy Act*. Environmental Compliance Library. Available at: http://www.in.gov/ifa/srf/files/Farmland_Protection_Policy_Act.pdf. Accessed May 2024.

Raptor Center, The. 2023. Bald Eagle. Available at: https://raptor.umn.edu/about-raptors/raptors-north-america/bald-eagle. Accessed February 2023.

Revisor of Statutes, State of Minnesota. 2017. *7009.0080 Minnesota Ambient Air Quality Standards*. Available at: https://www.revisor.mn.gov/rules/pdf/7009.0080/2017-01-27%2015:41:50+00:00. Accessed August 2023.

Silva J.M., and R.G. Olsen. 2002. Use of Global Positioning System (GPS) receivers under power-line conductors. *IEEE Transactions on Power Delivery* 17(4):938–944. Available at: https://ieeexplore.ieee.org/document/1046866. Accessed April 2024.

Soil Survey Staff. 2024. Web Soil Survey. Available at: http://websoilsurvey.sc.egov.usda.gov/. Accessed April 2024.

State of Minnesota. 2022. Climate Action Framework. Available at: https://climate.state.mn.us/sites/climate-action/files/Climate%20Action%20Framework.pdf. Accessed August 2024.

University of Minnesota. 2002. Fishes of Minnesota, American Eel. Available at: https://academics.cehd.umn.edu/hatch/research/fish/fishes/american_eel.html. Accessed August 2024.

U.S. Department of Agriculture (USDA). 2017. 2017 Census of Agriculture, County Profile. Available at: https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/index.php. Accessed July 2023.

U.S. Department of Homeland Security. 2023. Homeland Infrastructure Foundation Level Data 2023. Available at: https://hifld-geoplatform.opendata.arcgis.com/datasets/transmission-lines. Accessed July 2023.

U.S. Energy Atlas. 2021. All Energy Infrastructure and Resources, Interactive Map. Available at: https://atlas.eia.gov/apps/5039a1a01ec34b6bbf0ab4fd57da5eb4/explore/. Accessed July 2023

U.S. Environmental Protection Agency (EPA). 1990. NAAQS Table. Available at: https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed August 2023.

———. 2020. Summary of the Clean Air Act. Laws & Regulations. Available at: https://www.epa.gov/laws-regulations/summary-clean-air-act. Accessed July 2023.

———. 2022a. Greenhouse Gas Emissions, Overview of Greenhouse Gasses. Available at: https://www.epa.gov/ghgemissions/overview-greenhouse-gases. Accessed March 2023.

———. 2022b. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2020. EPA. Available at: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2020. Accessed December 2022.

———. 2024a. Electric and Magnetic Fields from Power Lines. Available at: https://www.epa.gov/radtown/electric-and-magnetic-fields-power-lines. Accessed August 7, 2024.

———. 2024b. Overview of the Drinking Water Sole Source Aquifer Program. Available at: https://www.epa.gov/dwssa/overview-drinking-water-sole-source-aquifer-program#What_Is_SSA. Accessed April 2024.

———. 2024c. Map of Sole Source Aquifer Locations. Available at: https://www.epa.gov/dwssa/map-sole-source-aquifer-locations. Accessed April 2024.

———. 2024d. What is a wellhead protection area and how can a facility determine if it is located in one? Available at: https://www.epa.gov/oil-spills-prevention-and-preparedness-regulations/what-wellhead-protection-area-and-how-can. Accessed April 2024.

U.S. Fish and Wildlife Service (USFWS). 2021. *Birds of Conservation Concern 2021, Migratory Bird Program*. Available at: https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf. Accessed February 2023.

———. 2024a. National Wetlands Inventory. Available at: https://www.fws.gov/program/national-wetlands-inventory. Accessed April 2024.

———. 2024b. Northern Long-eared Bat. Available at: https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis. Accessed April 2024.

U.S. Forest Service. 1995. *Landscape Aesthetics, A Handbook for Scenery Management*. Available at: https://www.nrc.gov/docs/ML1224/ML12241A377.pdf. Accessed April 2024.

U.S. Geological Survey (USGS). 2020. National Hydrography Dataset. Available at: https://www.usgs.gov/national-hydrography/national-hydrography-dataset. Accessed April 2024.

———. 2021. National Land Cover Database (NLCD) 2019 Products (ver. 2.0, June 2021): U.S. Geological Survey data release. Available at: https://www.sciencebase.gov/catalog/item/5f21cef582cef313ed940043. Accessed April 2024.

U.S. North American Bird Conservation Initiative. 2021. Bird Conservation Regions Map. Available at: https://nabci-us.org/resources/bird-conservation-regions-map/. Accessed April 2024.

Visit St. Cloud. 2023. Things To Do. Available at: www.visitstcloud.com. Accessed February 2023.

Wisconsin Public Service. 2011. *Answers to Your Stray Voltage Questions: Backed by Research*. Available at: https://www.wisconsinpublicservice.com/partners/agriculture/stray-voltage/pdf/stray-voltage.pdf. Accessed August 2023.