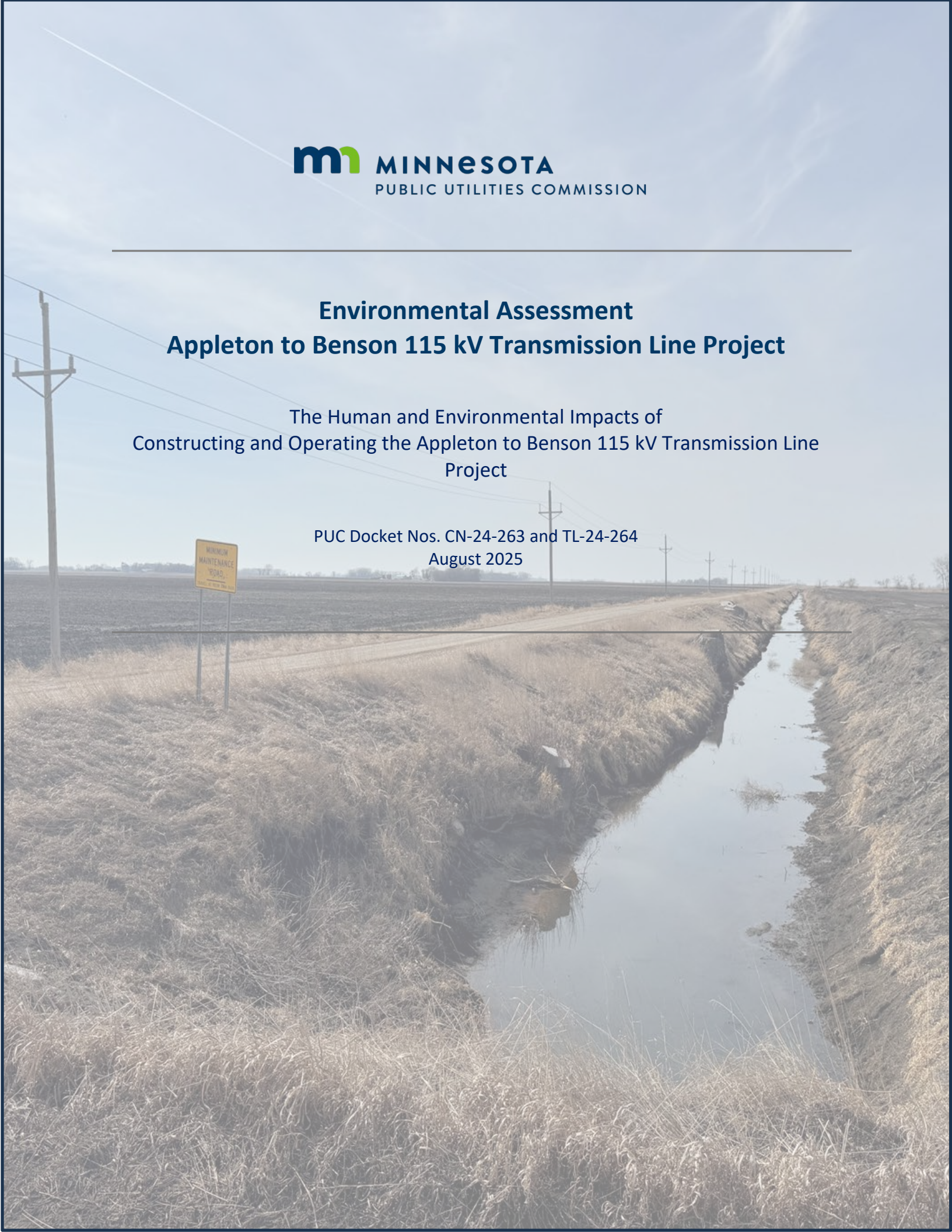
MINNESOTA
PUBLIC UTILITIES COMMISSION

Environmental Assessment
Appleton to Benson 115 kV Transmission Line Project

The Human and Environmental Impacts of
Constructing and Operating the Appleton to Benson 115 kV Transmission Line Project

PUC Docket Nos. CN-24-263 and TL-24-264
August 2025



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Sources

Much of the information used to prepare this environmental assessment comes from the route permit application. Additional sources include additional information provided by the Applicants, information from relevant environmental review documents for similar projects, site visits, and publicly available data.

Project Mailing List

To place your name on the project mailing list contact docketing.puc@state.mn.us or 651-201-2254 and provide the docket number (24-263 or 24-264), your name, email address, and mailing address. Please indicate how you would like to receive notices—by email or US mail.

Alternative Formats

This document can be made available in alternative formats, that is, large print or audio, by calling 651-296-0406 (local) or 1-800-657-3782 (toll-free).

[1] Prior to July 1, 2025, Sam Weaver was a staff member within the Department of Commerce, Energy Environmental Review and Analysis unit, which was tasked with developing this environmental assessment. As the result of legislation, and as of July 1, 2025, Sam Weaver is a staff member with the Public Utilities Commission.

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Acronyms and Abbreviations	
AEO2025	Energy Information Administration Annual Energy Outlook 2025
ALJ	Administrative Law Judge
APLIC	Avian Power Line Interaction Committee
Applicants	Great River Energy, Otter Tail Power Company, Western Minnesota Municipal Power Agency, Agralite Electric Cooperative, and the city of Benson
BLM	Bureau of Land Management
BWSR	Board of Water and Soil Resources
CH4	Methane
CO	Carbon monoxide
CO2	Carbon dioxide
CO2e	Carbon dioxide equivalents
Commerce	Minnesota Department of Commerce
Commission	Minnesota Public Utilities Commission
CN	Certificate of Need
dB	Decibels
dBA	Decibels on the A-weighted scale
DSM	Demand-side Management
EA	Environmental Assessment
EERA	Energy Environmental Review and Analysis
EIP	Energy Infrastructure Permitting
EMF	Electric and magnetic fields
FAA	Federal Aviation Administration
GHG	Greenhouse gas
GLO	BLM General Land Office
GWP	Global warming potential
GRE	Great River Energy
HVTL	High-voltage transmission line
IPaC	Information for Planning and Consultation
kV	Kilovolt
kV/m	Kilovolts per meter
mA	Milliamps
MBS	Minnesota Biological Survey
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
mG	Milligauss
MIAC	Minnesota Indian Affairs Council
MISO	Midcontinent Independent System Operator
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency

Acronyms and Abbreviations	
MRES	Missouri River Energy Services
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards NAAQS
NAC	Noise Area Classification
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NLEB	Northern long-eared bat
NPDES	National Pollutant Discharge Elimination System
NRHP	National Registry of Historic Places
Otter Tail Power	Otter Tail Power Company
Project	Appleton to Benson 115 kilovolt Transission Line Project
PM2.5	Particulate matter less than 2.5 microns
ROI	Region of influence
ROW	Right-of-way
SDS	State Disposal System
SF6	Sulfur hexafluoride
SHPO	State Historic Preservation Office
SOBS	Site of Biodiversity Significance
THPO	Tribal Historic Preservation Officer
tpy	Tons per year
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VMP	Vegetation Management Plan
WCA	Wetland Conservation Act
Western Minnesota	Western Minnesota Municipal Power Agency
WHPA	Wellhead protection area

Abstract

Great River Energy, Otter Tail Power Company, Western Minnesota Municipal Power Agency, Agralite Electric Cooperative, and the city of Benson (Applicants), are proposing to construct the Appleton to Benson 115 kilovolt (kV) transmission line project (Project) in Swift County, Minnesota. The project consists of upgrading approximately 18.3 miles of existing 41.6 kV transmission line, rebuilding or reconductoring approximately one mile of an existing 115 kV transmission line, constructing approximately 8.0 miles of new 115 kV transmission line, and constructing an approximately 1.7-mile 115 kV transmission line from Great River Energy's existing AG-BK 115 kV line to the Benson Municipal Substation.

Additionally, the project includes constructing the new Appleton Substations and either relocating or expanding the Moyer and Danvers Substations. Improvements will also be made at the Shible Lake and Benson Municipal Substations to accommodate the new 115 kV transmission line.

The applicants indicate that the proposed project is needed to meet electrical loads in the project area and to avoid potential low voltage issues resulting from the retirement of the 55 megawatt FibroMinn Energy Center near the city of Benson.

The project requires two approvals from the Minnesota Public Utilities Commission (Commission) – a certificate of need (CN) and a route permit. The Applicants submitted a joint CN and route permit application on December 27, 2024. On March 10, 2025, the Commission issued an order accepting the joint application as substantially complete.

Commission Energy Infrastructure Permitting (EIP) staff – formerly Department of Commerce (Commerce) Energy Environmental Review and Analysis (EERA) staff – is responsible for conducting environmental review for route permit and CN applications submitted to the Commission. EIP staff held public scoping meetings on March 12 and March 13, 2025, and has prepared this Environmental Assessment (EA) for the Appleton to Benson 115 kV Transmission Line Project. This EA addresses the issues identified in the EA Scoping Decision issued on May 13, 2025.

Following release of this EA, a public hearing will be held. The hearing will be presided over by an administrative law judge (ALJ) from the Minnesota Office of Administrative Hearings. Upon completion of the environmental review and hearing process, the ALJ will provide a summary report to the Commission for its final permit decision. A decision on the route permit and certificate of need for the project is anticipated in Winter of 2025.

For additional information, or if you have questions, contact the Project's environmental review manager: Sam Weaver (651-539-1531 or sam.weaver@state.mn.us) or Commission staff: Sam Lobby (651-201-2205 or sam.lobby@state.mn.us).

Additional documents and information, including the joint CN and route permit application, can be found on eDockets by searching "24" for year and "263" (CN) or "264" (Route Permit) for the docket number at: https://www.edockets.state.mn.us/EFiling/search.jsp or the Commission EIP webpage https://puc.eip.mn.gov/web/project/16000.

Introduction

The Applicants are proposing to construct approximately 29 miles of rebuilt, upgraded, and new 115 kV transmission line in Swift County. The applicant needs two approvals from the Commission before the project can be built – a certificate of need (CN) and a route permit.

Under the Power Plant Siting Act, the Commission is charged with making sure that large electric power facilities are sited in a manner that minimizes adverse human and environmental impact while ensuring continuing electric power system reliability and integrity and fulfillment of electric energy needs in an orderly and timely fashion.[2]

For high voltage transmission lines (HVTLs), the Commission fulfills this charge through their route permitting process. In the route permitting process:

- Proposers of HVTLs file a route permit application with the Commission;
- The Commission conducts a review of human and environmental impacts with assistance from EIP staff. For this project, EIP staff has prepared an environmental assessment;
- A public hearing is conducted by the Office of Administrative Hearings; and
- The Commission then makes a route permit decision. The permit specifies the route for the project and appropriate mitigation measures.

This environmental assessment (EA) provides information on the human and environmental impacts of the proposed project to the public and decision makers. This EA studies the proposed project and alternatives to the proposed project that could meet the project's stated need. No alternative routes were proposed for study during the scoping period. Because there are no route alternatives, the primary permitting decision before the Commission focuses on the conditions in the route permit to mitigate impacts of the project.

Summary of Impacts

The Applicants provided a proposed route for the project in their application to the Commission. The proposed route largely follows existing rights-of-way (ROWs). Construction and operation of the project would impact human and environmental resources in the project area. Most of the impacts would be short-term and are common to any large construction project, such as noise, dust, and soil disturbance. These impacts can be mitigated through standard and site-specific construction practices. Long-term permanent (operational) impacts, such as aesthetics or avian fatalities, cannot be avoided, but can be minimized by routing choices. The project would not impact future development in the area.

The standard mitigation measures included in the Commission's route permit address many impacts of the project. A draft route permit is included in **Appendix C**. The draft route permit contains project-specific mitigation measures that would further reduce the HVTL's impacts including measures to:

- Minimize Impacts to Irrigators
- Insitute Protections for Blanding's Turtle
- Institute Wildlife-friendly Facility Lighting
- Regulate Dust Control

[2] Minnesota Statutes (Minn. Stat.) 216E.02, Subdivision (Subd.) 1

- Institute Wildlife-friendly Erosion Control
- Adhere to Minnesota Department of Transportation Requirements
- Minimize Impacts to Existing Wells
- Institute Protections for Bats
- Finalize a Vegetation Management Plan

Document Organization

This EA is organized as follows:

- Section 1 provides a brief overview of the proposed project.
- Section 2 provides information about the state-level regulatory framework.
- Section 3 provides information about other permits and approvals that may be required for the project.
- Section 4 provides description of the alternatives to the project that were considered.
- Section 5 provides description of the design, engineering, and construction of the proposed project.
- Section 6 identifies the potential impacts to human and natural resources and identifies measures to avoid, minimize, or mitigate adverse impacts.
- Section 7 discusses cumulative impacts and unavoidable impacts.

1 SECTION ONE: projectOverview

This section provides information about the proposed project, who would own and construct the project, including a description of the route, rights-of-way requirements, estimated cost, and timeline.

1.1 Project Proposer

The project is proposed by Great River Energy, Otter Tail Power, Western Minnesota Municipal Power Agency, Agralite Electric Cooperative, and the City of Benson – collectively, the Applicants.

1.1.1 Great River Energy

Great River Energy (GRE) is a not-for-profit wholesale electric power cooperative based in Maple Grove, Minnesota. GRE provides electricity and related services to approximately 1.7 million people through its 27 member-owner cooperatives and customers. This includes Agralite, a distribution cooperative serving some of the area in which the project will be located, and transmission customers.

1.1.2 Otter Tail Power Company

Otter Tail Power Company (Otter Tail Power) is an investor-owned electric utility headquartered in Fergus Falls, Minnesota, that provides electricity and energy services to over 133,000 customers spanning 70,000 square miles in western Minnesota, eastern North Dakota, and northeastern South Dakota.

1.1.3 Western Minnesota Municipal Power Agency

Western Minnesota Municipal Power Agency (Western Minnesota) is a municipal corporation and political subdivision of the State of Minnesota, headquartered in Ortonville, Minnesota. Western Minnesota owns generation and transmission facilities, the capacity and output of which are sold to Missouri River Energy Services (MRES). MRES, based in Sioux Falls, South Dakota, provides electricity, including conservation program services, to its 61-member municipal utilities in Iowa, Minnesota, North Dakota, and South Dakota, who in turn serve approximately 174,000 customers.

1.1.4 Agralite Electric Cooperative

Agralite is an electric utility headquartered in Benson, Minnesota, which serves customers in west central Minnesota. Agralite serves members in the state's west central area from Swift County, most of Stevens and Big Stone Counties, and the southern part of Pope County.

1.1.5 City of Benson

The city of Benson is located in Swift County, in west central Minnesota, with a population of 3,562. The city of Benson operates an electric utility that services 1,867 customers.

1.2 Project Purpose

The project proposed by the Applicants is intended to meet load serving needs in the project area and avoid low voltage issues under certain contingency scenarios driven by the retirement of the 55 MW FibroMinn Energy Center near the city of Benson. The system is currently experiencing low voltages resulting in insufficient capacity to reliably serve all load under contingency conditions. The project will provide an additional 47 MW of system capacity under the worst possible contingency, which is expected to meet the region's demand for electricity for decades to come.

1.3 Proposed project

The Applicants propose to upgrade approximately 18.3 miles of existing 41.6 kV transmission lines, rebuild or reconduct approximately 1.0 mile of an existing 115 kV transmission line, and construct 8.0 miles of new 115 kV transmission line in Swift County, MN (**Table 1.3-1, Location of the Project)**. The transmission lines that are upgraded, rebuilt, reconductored, and/or newly constructed will connect the following substations: Appleton, Shible Lake, Moyer, Danvers, and Benson (**Figure 1 in Appendix A**).

Table 1.3-1: Location of the Project

Township	Section	Range(s)
120N	42W	2, 3, 4, 5, 6
120N	43W	1, 2, 3, 9, 10, 15, 16
121N	39W	6, 7
121N	40W	1, 2, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 30
121N	41W	19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30
121N	42W	23, 24, 25, 26, 31, 32, 33, 34, 35, 36
121N	43W	35, 36
122N	40W	36

Additionally, an approximately 1.7-mile 115 kV transmission line will be installed from Great River Energy's existing AG-BK 115 kV line southwest of the City of Benson to the Benson Municipal Substation. As part of this construction, 0.7 mile of the existing AG-BK 115 kV line will be removed, including the Chippewa River crossing.

The Applicants will construct the new Appleton transmission and distribution substations and will either relocate or expand the Moyer and Danvers Substations. Improvements will also be made at the Shible Lake and Benson Municipal Substations to accommodate the new 115 kV transmission line. The project will be located within the cities of Appleton, Holloway, Danvers and Benson, and townships of Appleton, Shible, Edison, Moyer, Marysland, Six Mile Grove, Clontarf, and Torning in Swift County, Minnesota. The proposed route, 100-foot ROW, proposed alignment, and substations are shown in **Figure 1**.

1.4 Alternatives Routes Considered by the Applicants but Rejected

1.4.1 Route Alternatives Considered

The Applicants identified four route alternatives that would connect the Appleton, Shible Lake, Moyer, Danvers, and Benson substations and maintain reliability. These alternative routes, shown on **Figure 3**, were evaluated, and rejected for the following reasons:

- Less collocation with existing utility, recreational, and transportation corridors. Specifically, the proposed route utilizes eight more miles of existing transmission line ROW than other route alternatives.
    - More residences within 200 feet of the alternative routes.
- Additional crossings of Minnesota Department of Natural Resources (MDNR) public lands, including the Danvers Wildlife Management Area (WMA)
- Additional crossings of the USFWS Benson Waterfowl Production Area
- Additional crossings and collocation with BNSF Railway and U.S. Highway 12

The Applicants selected the proposed route because it minimizes overall environmental impacts while best adhering to the Commission's routing criteria by using existing transmission line ROW for 67 percent of the route and co-locating with road ROWs for 68 percent of the route.

1.4.2 Alignment Alternatives Considered in the City of Benson

In developing the proposed route, the Applicants evaluated three alignments within the City of Benson along Pacific Avenue and the BNSF Railway to the Benson Municipal Substation. All three alignments are located within the Route Width.

- Alignment 1 would be located along the southside of Pacific Avenue for 0.4 mile.
- Alignment 2 follows Pacific Avenue for approximately 0.4 mile on the northeast side of Pacific Avenue where it would be double-circuited with an existing 115 kV transmission line owned by the City of Benson.
- Alignment 3 would occur on the northeast side of the BNSF Railway for approximately 0.4 mile within City of Benson property before crossing the BNSF Railway and Pacific Avenue into the Benson Municipal Substation.

The Applicants chose to incorporate Alignment 2 into the proposed route because it would impact the fewest residences, require the least amount of tree clearing, and co-locate with existing transmission line ROW.

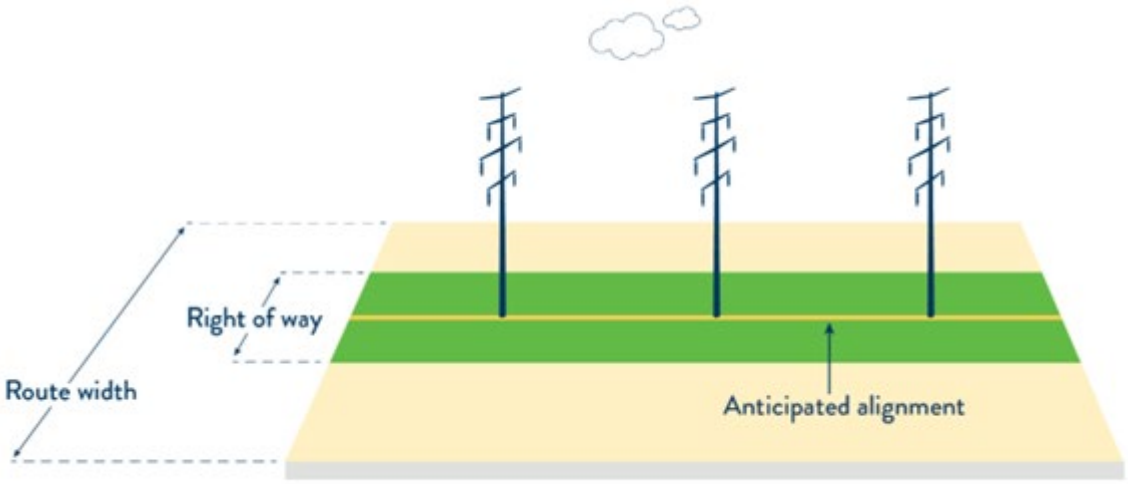
The Applicants are coordinating with the BNSF Railway to discuss the licensing process for this alignment. To the extent that such licensing is ultimately not consistent with the project schedule and cost, Alignments 1 and 3 are feasible and also located within the proposed route. **Table 1.4.2-1** provides a comparison of the relevant human and environmental features crossed by the alignment alternatives in the city of Benson.

Table 1.4.2-1: Comparison of Human and Environmental Features Crossed by the Alignment Alternatives in the City of Benson

Resource / Characteristic	Alignment 1 (SW Pacific Ave)	Alignment 2 (NE Pacific Ave)	Alignment 3 (NE BNSF Railway)
Length (miles)	0.37	0.40	0.47
Located within existing transmission line ROW (miles)	0.0	0.39	0.0
Percent co-located with roads	100%	97%	90%
Percent co-located with railroads	0%	0%	0%
Land Use Features / Utilities and Transportation			
Residences within 200 feet	23	20	23
Number of parcels crossed	17	2	6
Railroad crossings	0	0	2
Road crossings	7	1	5
Tree clearing (100-foot-wide ROW)	1.1	0.3	0.6

1.5 Route Widths and Rights-of-Way

Commission permits specific a route width, a ROW, and an anticipated alignment for a transmission line (**Graphic 1.5-1)**. The ROWs and the route widths requested by the Applicants are shown on **Figure 2**.



Graphic 1.5-1: Route Width and Transmission Alignment

The ROW is the physical land area along the proposed route that is needed to construct, operate, and maintain the transmission line; this is the area that will be maintained by the Applicants. The Applicants anticipate that an approximately 100-foot-wide ROW will be obtained for the Project. Great River Energy and Otter Tail Power currently hold ROWs with respect to their existing facilities. In some instances, these ROWs will be sufficient for the Project, and in other instances, the Applicants anticipate that renewed, amended, and/or written easement agreements will be obtained.

New easements will be required for new ROW acquired for the Project. Some new easements may be obtained along existing ROW where additional space is needed and/or if the project shifts from the existing alignment. The Applicants' representatives will work directly with individual landowners to acquire the necessary easements for the Project.

The Applicants will purchase property for new or expanded substations associated with the Project, to the extent that the substations are constructed/expanded on property not already owned by the Applicants.

The Applicants are generally requesting a 400-foot route width for the length of the proposed route. The applicants are, additionally, requesting varied route widths for specific portions of the route to account for existing infrastructure, to facilitate any necessary interconnections and/or substation expansions/upgrades, or to accommodate agency and/or landowner requests. These route width areas are shown in **Figure 2**. Detailed descriptions of each route width area and the requested widths are as follows:

- Approximately 197 acres in the vicinity of the existing Appleton Substation to accommodate the siting of the new Appleton substations.

- An approximate 9-acre Route Width around the Shible Lake Substation to accommodate potential modifications to the existing substation.
- A 450-foot-wide Route Width near the existing Moyer Substation to accommodate potential modifications to the substation.
- 800-foot-wide route along the proposed route between 60th St SW and 40th St SW for potential siting of a new Moyer Substation.
- An approximate 78-acre route width near the Danvers Substation to accommodate modifications to the existing substation or a new potential substation.
- Approximately 28.5 acres around the Benson Substation.
- A 250-foot-wide route along Minnesota Board of Water and Soil Resource (BWSR) Reinvest in Minnesota (RIM) easements located southwest of the City of Benson.
- A route width up to 1,800 feet wide is requested within the City of Benson to accommodate the new 115 kV circuit and modifications at the Benson Municipal Substation.

1.6 Transmission Line

The upgraded, newly built, and rebuilt transmission line will include new structures and wires. The majority of the new 115 kV transmission line would consist of single circuit, horizontal post, or braced post monopole wood structures. Details on structure types are discussed in **Section Five, Project Engineering, Construction, and Operation**.

1.7 Substation Upgrades

The project will include the construction of a new transmission and distribution substation in Appleton. Two other existing substations (Moyer and Danvers) may also be relocated if there is insufficient space for expansion in their current locations. The final location of these substations will depend on the Project's route and further coordination with stakeholders. To accommodate this further coordination and design, the Applicants have identified substation siting areas as part of the Project's route width.

For the Appleton substations, the Applicants are seeking an approximately 10-acre parcel for the transmission substation and an adjacent, approximately five-acre parcel for the distribution substation. The parcels will allow for future modifications and provide a buffer between the proposed substations and adjacent landowners. The Applicants are currently working with landowners to determine the final location for the new substations that best reduces impacts to local residents and natural resources.

There are three transmission lines that currently connect to the Appleton Transmission Substation, including a MRES-owned 115 kV line that connects to the existing substation from the west, Otter Tail Power-owned 115 kV line that connects to the existing substation from the south, and Otter Tail Power's 41.6 kV line that connects to the existing substation from the east. These two 115 kV lines will be modified to extend to and connect with the new substation location. The 41.6 kV line will extend from the new distribution substation as a new 12.47 kV distribution line. The proposed Route Width described in Section 1.5 is sized sufficiently to accommodate the line modifications.

For the Danvers and Moyer Substations, the Applicants are seeking up to a five-acre parcel for each potential new substation location. Similar to the Appleton substations, the Applicants are currently coordinating with landowners to determine locations for these substations and minimize impacts to residents and natural resources.

1.8 Project Timeline and Cost

The Applicants anticipate starting construction in 2028 and energizing the project by early 2030. The project is expected to be constructed in separate phases to avoid extended outages on the distribution systems.

Estimated costs for the proposed project are approximately $62 million (2024) which includes approximately $23.0 million for substation work and $40 million for transmission line work. All capital costs for the project will be borne by the Applicants.

The estimated annual cost of ROW maintenance and operation of the Applicants' transmission lines (41.6 kV to 500 kV) in Minnesota currently averages up to $6,000 per mile. Storm restoration, annual inspections, and ordinary replacement costs are included in these annual operating and maintenance costs.

2 SECTION TWO: State of Minnesota Regulatory Framework

This section discusses the approvals required from the Commission—a CN and route permit. It further describes the environmental review process and lists the factors the Commission considers when making decisions. The project will also require approvals from other state and federal agencies with permitting authority for actions related to the project. These approvals are discussed in Section 3.

2.1 Certificate of Need

Minnesota Statutes Section 216B.243, subdivision 2, states that "[n]o large energy facility shall be sited or constructed in Minnesota without the issuance of a Certificate of Need by the Public Utilities Commission." A large energy facility is defined as "any high-voltage transmission line with a capacity of 100 kV or more with more than ten miles of its length in Minnesota." The project fits these criteria, and as such requires a CN issued by the Commission prior to siting or construction.

The Commission must determine whether the project is needed or if another project would be more appropriate to satisfy the stated project need. If the Commission determines the project is needed, it will grant a CN (with or without conditions). The CN decision determines the type and size of the project but does not determine its location. A summary and analysis of project alternatives can be found in Section 4 of this EA.

2.2 Route Permit

Project proposers must apply for (and receive) a route permit from the Commission before building an HVTL. This project meets the definition of an HVTL, defined as a "conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kilovolts or more and is greater than 1,500 feet in length."[3] The Commission may not issue a route permit for a project that requires a CN until a CN has been approved by the Commission, though these approvals may occur consecutively at the same Commission meeting.

The applicants filed a joint application for a CN and a route permit on December 27, 2024. The application was filed for review under the alternative review process, which allows applicants to present a single proposed route instead of presenting and analyzing multiple routes for the Commission's consideration.[4] The Applicants requested a route width that was generally 400 feet with varied route widths for specific portions of the route to account for existing infrastructure, to facilitate any necessary interconnections and/or substation expansions/upgrades, or to accommodate agency and/or landowner requests. The applicants also provided a proposed alignment for the centerline of the transmission line.

On March 10, 2025, the Commission issued an order accepting the joint application as substantially complete.[5] After an application is accepted, the permitting process, including environmental review, can move forward.

[3] Minnesota Rules (Minn. R.) 7850.1000, Subchapter (Subp.) 9

[4] Minn. Stat. 216E.04 and Minn. R. 7850.2800–3900

[5] eDockets Document No. 20253-216204-01

2.3 Environmental Review

The environmental review process ensures that the Commission and other stakeholders understand the human and environmental impacts of a proposed project before a permit is issued. EIP staff conducts environmental review by working with stakeholders to identify issues, analyzing impacts of the proposed project or its alternatives, and mitigation measures to minimize the impacts. This allows the Commission to make informed decisions that avoid or reduce impacts to people and the environment, while allowing for reliable and efficient delivery of electricity.

Applications for a CN require preparation of an environmental report (ER). An ER contains "information on the human and environmental impacts of the project associated with the size, type, and timing of the project, system configurations, and voltage." It also contains information on system alternatives to the project, as well as mitigation measures.

Applications for a route permit for a 115 kV HVTL require preparation of an environmental assessment (EA). An EA analyzes the potential human and environmental impacts of a project and possible mitigation measures.

When there are multiple applications before the Commission for a single project, the environmental review required for each application may be combined. For this project, the Commission has authorized EIP staff to combine the environmental reviews required for the CN (an ER) and route permit (an EA). Issues typically analyzed and reviewed in an EA and the system alternatives studied in an ER are combined into a single document. This is the only state environmental review document required for the project. Thus, EIP staff developed a combined EA—an EA that covers applicant proposals in both the CN and route permit applications.

2.3.1 Scoping

Scoping is the process used to determine the topics analyzed in the EA. Scoping focuses on: (1) the most relevant issues and impacts needed for a route permit decision, and (2) identifying and analyzing potential alternatives. The scoping process includes public meetings and comment periods. [6]

EIP staff held scoping and public information meetings to provide information about the permitting process and the project, answer questions, and gather input on topics for study in the EA. [7] A remote access meeting was held on March 13, 2025, and in-person meetings were held in Appleton and Benson on March 12, 2025. The comment period was open from February 11 to March 28, 2025.

EIP staff provided a generic scope for the EA during the meetings, and issued a Scoping Summary Report on April 15, 2025. [8] The Commission accepted EIP's recommendation that the EA study the applicants' proposed route as the sole routing alternative in the scoping decision. On May 13, 2025, a scoping decision for the EA was issued and is included as **Appendix B**.

2.3.2 Scoping Comments

EIP received oral and written comments from two public agencies and one tribal agency. Staff received no comments from the general public.

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

[7] eDockets Document No. 20252-215195-01

[8] eDockets Document No. 20254-217691-01

Comments from public agencies included:

- Stacy Kotch Egstad, Minnesota Department of Transportation (MnDOT):[9]
    - MnDOT addressed potential issues with trunk highway colocation and a need for consultation regarding pole placement along highway rights-of-way, as well as an overview of permit approvals that would likely be required from MnDOT.
- Samantha Bump, Minnesota Department of Natural Resources (MDNR) recommended:[10]
    - The MDNR proposed special permit conditions and recommendations to ensure appropriate avoidance measures are in place to prevent impacts to state-listed species and their habitat, as well as an overview of permits that the Applicants will need to obtain.

Comments from tribal agencies included:

- Isaac Weston, Minnesota Indian Affairs Council[11]
    - The Minnesota Indian Affairs Council stated that the project is unlikely to impact known or suspected burial sites, and emphasized the need for an Inadvertent Discovery Plan.

2.3.3 EA Preparation

EIP staff derived much of the information used in the preparation of this EA from documents prepared by the applicants, including the Joint Certificate of Need and Route Permit Application for the project. In addition to material provided by the Applicants, information from the comments received, relevant environmental review documents for similar projects, spatial data, and information gathered during EIP visits to the project area, were also used to prepare this document. Photos of the project area taken by EIP staff are included in **Appendix F**.

Consistent with the scoping decision, there are some issues that this EA does not address because they are beyond the scope of what is relevant to the Commission's decision-making. Specifically, this EA does not address:

- Any route, route segment, or alignment alternative not specifically identified for study in the scoping decision.
- Any system alternative not specifically identified for study in the scoping decision.
- Policy issues concerning whether utilities or local governments should be liable for the cost to relocate utility poles when roadways are widened.
- The manner in which landowners are paid for transmission line right-of-way easements.

2.4 Public Hearing

A public hearing will be held after the EA is issued.[12] An administrative law judge from the Office of Administrative Hearings conducts the public hearing. The hearing is an opportunity for interested persons to comment on the project, the EA, and the upcoming Commission's CN and permit decisions. People can do this by attending the hearing and speaking, presenting evidence, asking questions, and

[9] eDockets Document No. 20253-216894-01
[10] eDockets Document No. 20253-216974-01
[11] eDockets Document No. 20252-214980-01
[12] Minn. R. 7850.3800, Subp. 1

making comments. Written and oral comments received during the hearing become part of the record in the proceeding. EIP staff will be available to respond to questions and comments about the EA. These questions and answers become part of the record, but staff does not revise or supplement the EA document.

After the public comment period is over, the ALJ provides a report and a recommendation to the Commission based on all of the information in the record.

2.5 Commission Decision

Once the Commission has received the ALJ's report, they schedule a meeting to decide whether to issue a CN and/or route permit. When the Commission issues a CN or route permit it draws on the record (application, comments, environmental review, and all other documents in the project docket) to approve a route, route width, and an anticipated alignment. Route permits also outline conditions specifying construction and operation standards and mitigation measures that must be taken to reduce project impacts. A draft route permit is included as **Appendix C**.

2.5.1 Certificate of Need Decision

The Commission must determine whether the project is needed or if another project would be more appropriate for the state of Minnesota. Minnesota Rule 7849.0120 provides the criteria the Commission must use when determining whether to grant a CN.

A. The probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicants' customers, or to the people of Minnesota and neighboring states.

B. A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record.

C. The proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health.

D. The record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.

If the Commission determines the applicants have met these criteria, it will grant a CN (with or without conditions). The CN decision determines the type and size of the project but does not determine its location.

2.5.2 Route Permit Decision

At the Commission meeting for permitting the project, the Commission will weigh human and environmental factors in its decision. The specific factors the Commission must weigh are specified in statute and rule.

Minnesota Statute 216E.03 lists considerations that guide the study, evaluation, and designation of route permits. Minnesota Rule 7850.4100 lists the factors the commission must consider when making a route permit decision:

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

B. Effects on public health and safety.

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

D. Effects on archaeological and historic resources.

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

F. Effects on rare and unique natural resources.

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

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

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

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

K. Electrical system reliability.

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

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

N. Irreversible and irretrievable commitments of resources.

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

The Commission must make a final decision on the route permit within 60 days after receiving the ALJ report. A final decision must be made within six months after the Commission's determination the application is complete; however, this time limit may be extended for up to three months for just cause or upon agreement of the applicant. A decision by the Commission on a route permit application for the project is anticipated Winter of 2025.

The HVTL must be constructed within the Commission's designated route and along the anticipated alignment unless subsequent permissions are requested and approved by the Commission. "Any right-of-way modifications within the designated route [must be] located so as to have comparable overall impacts relative to the factors in Minnesota Rule 7850.4100 and shall be specifically identified and documented in and approved as part of the plan and profile."[14] Modifications to the anticipated alignment generally result from landowner requests or unforeseen conditions.

[13] Minn. Stat. 216E.03, Subd. 7(a)

[14] Sample Route Permit, eDockets Document No. 20242-203174-01

3 SECTION THREE: Other Permits, Approvals, and Applicable Codes

A route permit from the Commission is the only state permit required for routing the project. The Commission's route permit supersedes local planning and zoning and binds state agencies. Thus, state agencies are required to participate in the Commission's permitting process to aid the Commission's decision-making and to indicate routes that are not permittable.

After the Commission issues a route permit, however, various federal, state, and local permits may be required for activities related to the construction and operation of the project in the route that the Commission has authorized. All permits subsequent to the Commission's route permit, and necessary for the project (commonly referred to as "downstream permits"), must be obtained by a permittee. **Table 3-1** identifies potential permits that might be required in addition to the Commission's route permit.

Table 3-1: Summary of Possible Permits, Licenses, Approvals, and Consultations

Permit	Jurisdiction
Federal	
Section 404 Clean Water Act Permit	United States Army Corps of Engineers
Endangered Species Act / Migratory Bird Treaty Act Consultation	United States Fish and Wildlife Service (USFWS)
Part 7460 Airport Obstruction Evaluation and Notification	Federal Aviation Administration (FAA)
State	
State Endangered Species Consultation	Minnesota Department of Natural Resources (MDNR) – Ecological and Water Resources Division
National Historic Preservation Act Consultation Minnesota Statutes Chapter 138 (Minnesota Field Archaeology Act and Minnesota Historic Sites Act)	State Historic Preservation Office (SHPO) Tribal Historic Preservation Officers (THPOs)
Water Appropriation General Permit – Construction Dewatering	MDNR – Ecological and Water Resources Division
Utility License to Cross Public Waters	MDNR – Lands and Minerals Division
National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit	Minnesota Pollution Control Agency (MPCA)
Section 401 Clean Water Act Water Quality Certification	MPCA
Wetland Conservation Act	Minnesota Board of Water and Soil Resources (BWSR), MDNR, Minnesota Department of Transportation (MnDOT), Swift County Parks, Drainage & Wetlands
Utility Accommodation on Trunk Highway ROW	MnDOT
Miscellaneous Work Permit for Trunk Highways	MnDOT
Oversize and/or Overweight Permit	MnDOT
Local	
Road Crossing/Driveway/ROW Permits	Swift County, City of Appleton, City of Benson, Appleton Township, Shible Township, Moyer Township, Marysland Township, Six Mile Grove Township
Over-Width Load Permits	Swift County, City of Appleton, City of Benson, Appleton Township, Shible Township, Moyer Township, Marysland Township, Six Mile Grove Township
Other	
Utility License Agreement	BNSF Railway
Crossing Permits/Agreements	Other utilities (such as pipelines)

3.1 Federal Permits

The United States Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into waters of the United States, including wetlands. Dredged or fill material could impact water quality. A permit is required from USACE if the potential for significant adverse impacts exists.

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

The Federal Aviation Administration (FAA) ensures the safety of air navigation and the efficient utilization of navigable airspace by aircraft. The FFA requires that anyone building a structure near an airport submits FAA Form 7460, at which point the FAA initiates an Obstruction Evaluation / Airport Airspace Analysis process, and determines if additional safety measures are required, such as marker balls or beacon lights.

3.2 State Permits

Potential impacts to state lands and waters, as well as fish and wildlife resources are regulated by MDNR. Utilities are required to obtain a License to Cross State Lands and Waters. Projects affecting the course, current, or cross-section of lakes, wetlands, and streams that are public waters may require a Public Waters Work Permit. Not unlike the USFWS, MDNR encourages project proposers to consult with the agency to determine if a project has the potential to impact state-listed threatened or endangered species. Consultation can lead to the identification of mitigation measures for potential impacts associated with the project, depending on the potential for the project to affect natural resources under their jurisdiction.

A permit from MnDOT is required for construction, placement, or maintenance of utility lines adjacent or across trunk highway rights-of-way. MnDOT requires these permits to ensure that use and occupancy of the right-of-way does not interfere with the free and safe flow of traffic, among other reasons.

The Minnesota Pollution Control Agency (MPCA) regulates generation, handling, and storage of hazardous wastes, regulation of pollutants. Construction projects that disturb one or more acres of land require a general National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater Permit from the MPCA. The Applicants anticipate that ground disturbance will be under an acre, and the project would not require coverage under the construction stormwater permit.[15]

A Clean Water Act Section 401 Water Quality Certification from MPCA may also be required. Section 401 of the Clean Water Act requires that persons conducting activities that may result in a discharge of a pollutant into waters of the United States obtain certification from relevant States that the discharge complies the applicable water quality standards.

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

The Board of Water and Soil Resources (BWSR) oversees implementation of Minnesota's Wetland Conservation Act (WCA). The WCA is implemented by local units of government.

[15] Application, p. 7-35

3.3 Local Permits

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

- Overwidth Load: Coordination may be required to move over-width or heavy loads on county or city roads.
- Road Crossing and Right-of-Way: Coordination may be required to cross or occupy county or city road rights-of-way.
- Road or Lane Closure: Coordination may be required to close a street or lane to accommodate construction.

3.4 Applicable Codes

In addition to these downstream permits, all transmission lines, regardless of route location, must meet requirements of the National Electrical Safety Code (NESC) for HVTLs. NESC standards are designed to safeguard human health from hazards associated with the installation and operation of operation overhead and underground electrical lines. They also ensure that the transmission line and all associated structures are built from materials that withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided routine operational maintenance is performed.

Route permits issued by the Commission require permittees to comply with North American Electric Reliability Corporation (NERC) standards. NERC standards define the reliability requirements for planning and operating the electrical transmission grid in North America.

4 SECTION FOUR: Alternatives to the Proposed Project

As described in Section 2, as part of its consideration of a CN application, the Commission must determine whether the proposed project is needed or if another project would be more appropriate. For example, a project of a different type or size, or a project that connects different endpoints (substations). These alternatives are commonly referred to as system alternatives.

This section discusses whether these system alternatives are feasible (whether they can be engineered, designed, and constructed) and available (whether the alternative is readily obtainable and at the appropriate scale) and, if so, whether they can meet the need for the project.

4.1 No Build Alternative

Under the no build alternative, the project would not be built. The human and environmental impacts of the project, discussed in Section 6, would not occur. However, if the project is not constructed, the project area will continue to have a deficit in load serving capability, placing the communities at risk of service interruptions under certain contingency conditions.

4.2 New Generation/Non Wires Alternatives

The sections below consider generation alternatives, including new dispatchable generation, distributed generation, renewable generation, battery energy storage and conservation, and DSM.

4.2.1 Dispatchable Fossil-Fueled Generation

To be a viable alternative to the Project, a generation alternative must, at a minimum, address the need for the project by being available for reliability at rates comparable to the transmission line which will have availability of more than 99.99 percent. A new dispatchable resource would most likely be a dual-fueled (e.g., natural gas or distillate fuel oil) combustion turbine, where dual fuel capability would result in a reliability of more than 90 percent. Dispatchable generation can be used to meet resource requirements but also serve as a form of congestion management to relieve a transmission overload by injecting power at the generator's point of interconnection as well as provide voltage support by supplying reactive power. Generation would also only benefit the area surrounding the point of interconnection. In contrast, the proposed project will link two areas together and provide benefits on both sides of the transmission line.

To develop a new generation alternative to this Project, findings from the Energy Information Administration Annual Energy Outlook 2025 (AEO2025), Capital Cost and Performance Characteristics for Utility-Scale Electric Power Generating Technologies were used. The resulting cost for an alternative generation solution is $1,606 per kW net. For the purposes of a non-wires alternative, Great River Energy would only construct a single turbine. Larger projects, like the four-turbine configuration referenced in this AEO2025 analysis, typically achieve economics of sale. As such, a smaller one-turbine configuration may realize a higher cost on a per-kW basis. Realizing this cost may be higher for a single configuration, the Applicants used $1,606/kW as an approximation for the alternative generation solution. The final cost approximation is therefore $84.7 million (52,700 kW x $1,606 per kW). The cost approximation for the proposed project is $62 million.

Timing is also a major concern when weighing the alternative generation solution. MISO's generator interconnection queue has experienced significant congestion in the past several years, leading to wait

times of up to five years for new projects. The transmission solution could be fully operational by 2030. These relative schedules must also be considered when considering alternatives.

Lastly, the recently enacted carbon free standard in Minnesota requires 100% carbon-free energy generation by 2040 with limited exceptions. Thus, the MISO interconnection queues on top of the necessary site permit and carbon complications would push availability out even farther. Therefore, due to the comparative benefits of the Project, cost, and Minnesota's carbon-free standard, the Applicants determined that dispatchable fossil-fueled generation is not a feasible alternative to the Project.

4.2.2 Distributed Generation

Distributed generation was considered as an alternative to the Project. Distributed generation means dispatchable generation, most likely run on natural gas or other fossil fuels, which is connected to the local distribution system and able to run continuously when called upon. Renewable distributed generation and battery energy storage are also discussed in subsequent sections. Fossil-fueled distributed generation has the same fundamental limitations as transmission-connected dispatchable generation (discussed in Section 4.2.1), and likely at a greater cost if consisting of a number of smaller generators in diverse locations. Therefore, the addition of new fossil-fueled distributed generators is not a feasible alternative to the Project.

4.2.3 Renewable Generation

Renewable generation, i.e., solar and wind, are non-dispatchable resources. As such, they are not feasible alternatives to the Project.

4.2.4 Battery Storage

Energy storage, both by itself and combined with new renewable generation, was considered as an alternative to the Project. Energy storage, in this context, means a battery or another energy storage technology capable of being charged and discharged when called upon to do so if there is sufficient energy available.

Storage was evaluated to provide both thermal and reactive support to the area. A 50 MW/100 megawatt hour lithium-ion battery was considered as a replacement which could provide support for 2 hours. This solution, however, could require the addition of solar to allow for charging during longer-duration outages and would require the battery to be replaced at least once to have a comparable life to transmission solutions of at least 40 years. The total end of life cost to accomplish this solar plus storage solution would be approximately $304 million, whereas the cost of the proposed project would be $62 million. While a 40-year transmission life is used for estimates, many transmission lines can last upwards of 80 years, so a comparable storage solution cost would be much more.

4.2.5 Demand Side Management and Conservation

Demand side management (DSM) and conservation may serve as viable alternatives to the Project. In this context, DSM and conservation are assumed to encompass all forms of peak-shaving programs such as interruptible loads and dual fuel programs, as well as more general energy conservation programs, such as energy-efficiency rebates. Great River Energy, Otter Tail Power, and Western Minnesota have provided information on their conservation and energy-efficiency programs (**Appendix D)**. To meet the identified need, DSM and conservation in the amount of 40 MW would have to be achieved. Although conservation programs will continue to be implemented in the project area to encourage efficient use of

electricity, these programs are insufficient to reduce the 83 MW existing load by half. For these reasons, solutions involving DSM and conservation are not feasible alternatives to the Project.

4.3 Transmission Alternatives

The proposed project will already be an upgrade of existing lines mainly utilizing existing corridor; there are no other existing transmission lines that could be upgraded as an alternative to the Project.

4.3.1 Different Voltages/Conductors

Higher or lower voltage alternatives could meet the identified needs. Voltages above 115 kV were not carried forward for detailed analysis because voltages higher than 115 kV have not been established at Appleton or Benson and 115 kV was sufficient for load serving needs in this area. To establish voltages greater than 115 kV at Appleton or Benson, new transformers and substation equipment would be needed, and larger conductors would be required.

A lower voltage Appleton-Benson 41.6 kV alternative was also evaluated. Upgrading the existing 41.6 kV line and operating network would not provide the necessary capacity to supply the system at peak loads. Operating this system networked would cause reliability concerns due to the lack of communication between relays on each end of the system at 41.6 kV.

Different conductors were also considered. Both single and twisted pair conductors were considered. The conductors selected and described in Section 5.1.1 allow for sufficient capacity to supply loads in the area, allow for future growth, and are better suited for the wind and ice conditions for the area.

4.3.2 Transmission Lines with Different Terminals or Substations Alternative Endpoints

Different project options were chosen with the aim of providing a new high voltage source into the study area that centers on Benson. A voltage of 115 kV was chosen for these alternatives because Benson is at the center of an existing 115 kV network. The Benson Substation also contains 69 kV line terminations. However, the 69 kV transmission system currently has a need for improvement and networking additional 69 kV lines would not provide reliable service to 115 kV connected loads. It would also introduce more losses than 115 kV and place thermal limitations on the 115/69 kV transformer that was not designed to provide power from the 69 kV to the 115 kV system. Three alternative configurations considered are summarized in **Table 4.3.2-1**.

Table 4.3.2-1: Alternative End Point Options

Project Option	Line Length (miles)
Appleton-Benson 115 kV (Proposed Project)	**29 miles**
Willmar-Benson 115 kV	**45 miles**
Minnesota Valley-Benson 115 kV	**45 miles**

Each alternative configuration performs similarly to address single contingency (N-1) low voltage concerns. Neither the Willmar-Benson nor the Minnesota Valley-Benson alternatives perform better than the Project. Because of their longer lengths, they would also have greater losses and relatively higher cost and impacts, as compared to the Project.

An additional benefit of the proposed project over the alternatives is using the existing 41.6 kV corridor, which allows the Applicants to then upgrade the distribution substations to 115 kV on the high-side to provide increased capacity with lower losses.

4.3.3 Double Circuiting of Existing Transmission Lines

Double circuiting of existing lines was also considered. However, this would not address reliability issues that result in the loss of the structures serving lines into the Benson area. The proposed project will bring a second source of power into the City of Benson. If existing 115 kV transmission lines were double circuited, it would allow for greater capacity to serve the City of Benson, but could not improve reliability because both lines would be lost due to an outage caused by a weather event. Due to the length of the existing 115 kV circuit, from Morris to Benson and Benson to Willmar and Minnesota Valley, double circuiting these lines would also impact more landowners and cost more than the proposed Project. Double circuiting of existing 41.6 kV or 69 kV lines would not provide enough capacity or voltage support to supply 115 kV loads after a loss of the 115 kV system.

4.3.4 Direct Current Lines

HVDC lines are typically proposed for transmitting large amounts of electricity over long distances (e.g., several hundred miles) because line losses are significantly less over long distances on a HVDC line than an AC line. HVDC lines require expensive conversion stations at each delivery point because the DC power must be converted to AC power before it can be used by customers. A single converter station can be upwards of $400 million, not including the required DC line construction. This alternative is not a feasible alternative because of the limited line length and cost.

4.3.5 Undergrounding

Undergrounding is seldom used for HVTLs like those being proposed for the Project. One of the primary reasons underground HVTLs are seldom used is that they are significantly more expensive than overhead lines. The construction cost of locating the entire length of the Project's proposed transmission underground is estimated to be as much as 5 to 16 times greater per mile than if it were to be constructed overhead as proposed. This cost does not include the large reactors that would likely be required at each substation to counteract the large line charging currents present on underground high-voltage lines. In addition, the increased line losses and additional maintenance expenses incurred throughout the useful life of an underground high-voltage line further increase the total additional cost of building an underground line instead of an overhead line.

Beyond initial costs, another important consideration of undergrounding lines is consistency with existing lines and standards. The Applicants do not have any buried lines at voltages of 115 kV and above. The addition of underground transmission is outside the Applicants' current standards and would require new installation training, tooling, equipment, and new inventory to be carried for maintenance and critical spares, resulting in increased costs and/or a reduction in inventory levels of other items. For these reasons, undergrounding is not a feasible alternative.

4.4 Combination of Alternatives

No combination of the above alternatives was identified that could meet the project need.

4.5 Effect of Promotional Practices

Applicants have not conducted any promotional activities or events that have triggered the need for the Project. Rather, the project is driven by regional reliability issues that have arisen from the shutdown of the 55 MW FibroMinn Energy Center near Benson, Minnesota. The project will provide the necessary transmission system improvements to service current load and forecasted load in the decades to come.

4.6 Effect of Inducing Future Development

The project is not intended to induce future development, but rather is intended to maintain reliable service to the local communities.

5 SECTION FIVE: Project Engineering, Construction, and Operation

Construction begins after a route permit is issued and all the necessary downstream permits have been obtained. The project must be constructed according to the design and construction procedures outlined in the route permit application, applying any mitigation that is required by permit. This section summarizes the engineering and construction of the proposed project.

5.1 Engineering and Design

The Applicants propose to upgrade approximately 18.3 miles of existing 41.6 kV transmission lines, rebuild or reconductor approximately 1.0 mile of an existing 115 kV transmission line, and construct 8.0 miles of new 115 kV transmission line. The transmission lines that are upgraded, rebuilt, reconductored, and/or constructed new will connect the following substations: Appleton, Shible Lake, Moyer, Danvers, and Benson (see **Figure 1**).

Additionally, an approximately 1.7-mile 115 kV transmission line will be installed from Great River Energy's existing AG-BK 115 kV line southwest of the City of Benson to the Benson Municipal Substation. As part of this construction, 0.7 mile of the existing AG-BK line will be removed, including the Chippewa River crossing.

The Applicants will construct the new Appleton transmission and distribution substations and will either relocate or expand the Moyer and Danvers Substations. Improvements will also be made at the Shible Lake and Benson Municipal Substations to accommodate the new 115 kV transmission line. The project will be located within the cities of Appleton, Holloway, Danvers and Benson, and townships of Appleton, Shible, Edison, Moyer, Marysland, Six Mile Grove, Clontarf, and Torning in Swift County, Minnesota.

5.1.1 Transmission Structures and Equipment

Potential structure designs and photographs are provided in **Graphics 5.1.1-1** and **5.1.1-2**. Structure dimensions are provided in **Table 5.1.1-1**.

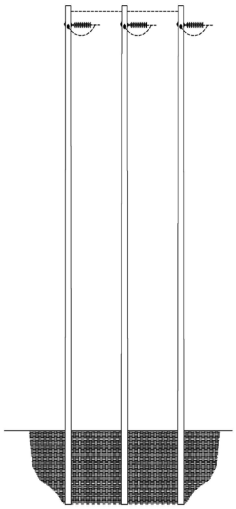
Table 5.1.1-1: Typical 115 kV Structure Dimensions

Structure Type	Material	Approximate Height Above Ground (feet)	Structure Base Diameter (inches)	Span Between Distances (feet)
Monopole with horizontal post or braced post	Wood, steel, or ductile iron	50 - 100	18 - 36	300 - 500
H-Frame	Wood, steel, or ductile iron	50 - 90	18 - 36	350 - 800
Three-pole	Wood, steel, or ductile iron	50 - 90	18 - 36	350 - 800

Graphic 5.1.1-1: Typical Transmission Structure Types

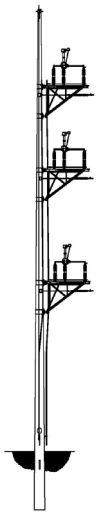
SINGLE CIRCUIT
HORIZONTAL POST

SINGLE CIRCUIT
BRACED POST

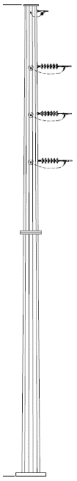


SINGLE CIRCUIT
3–POLE DEADEND

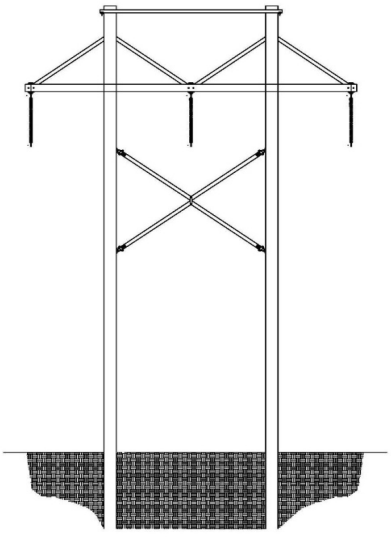
DOUBLE CIRCUIT
HORIZONTAL POST



3–WAY SWITCH
STRUCTURE

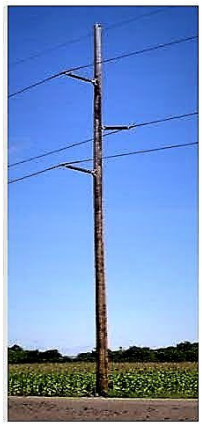


LAMINATE POLE
DEADEND



SINGLE CIRCUIT
H–FRAME

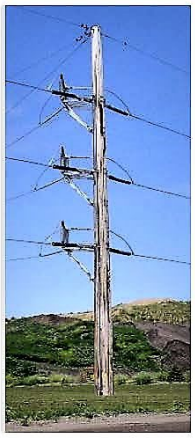
Graphic 5.1.1-2: Photos of Typical 115 kV Transmission Structures



Single Circuit

Braced Post

3-Pole Deadend



Switch

Steel Deadend

H-Frame

Double Circuit

The majority of the new 115 kV transmission line will consist of single circuit, horizontal post, or braced post direct-imbedded monopole wood or steel structures spaced approximately 300 to 500 feet apart. Transmission structures will typically range in height from 50 to 100 feet above ground, depending upon the terrain and environmental constraints. The average diameter of the direct-embedded wood structures at ground level will be approximately 20 inches.

Laminated wood structures or steel structures on concrete foundations may be needed for switches and angled structures; the size of these structures will be dependent on the weight of the switch material, the tension on the line, and/or the angle of deflection the structure location causes on the transmission line. Specific sizing of these structures will be determined after a route permit is issued and detailed engineering design is initiated.

Multi-pole (e.g., 3-pole deadend) and/or H-frame structures are designed in a horizontal configuration, which maintains the transmission line conductors parallel to the ground. Horizontal configuration is sometimes desirable where the proposed transmission line crosses under other existing high voltage transmission lines. The horizontal configuration allows the upgraded 115 kV transmission line to be as low as possible at the crossing point, while still maintaining the required clearances set by the NESC. Specific sizing of these structures will be determined after a route permit is issued and detailed engineering design is initiated. In some cases where overhead clearances require the use of H-frame structures, it may be necessary to also bury the optical ground shield/communication wire. In such a situation, the optical ground wire will be directionally bored underground between the two structures adjacent to the H-frame structure. At this time, the Applicants do not anticipate the proposed route will require H-frame or 3-pole structures.

A deadend structure is used to change direction and/or wire tension on a transmission line. Deadend structures are also used as a "storm structure" to limit the number of structures damaged by a cascading effect due to higher line tensions when a structure is knocked down by a storm. Deadend structures can use wood, wood laminate, direct steel embedded, or steel on concrete foundation structures and can have a larger cross section than the typical structures. The location of deadend structures will be determined after a Route Permit is issued and detailed engineering design is initiated.

NESC sets minimum clearances of the conductors from structures adjacent to or within the ROW. NESC clearance requirements are summarized in **Table 5.1.1-2**. For a 115 kV transmission line like the Project, the NESC minimum clearance under a 48 miles per hour (mph) wind is 8.6 feet. When there is no wind, the conductors must have a clearance of 9.1 to 11.6 feet from various structures as listed in **Table 5.1.1-2**. In addition, the Applicants typically require the blowout to remain within the ROW under a more extreme wind condition of 98 mph. The amount of blowout is dependent on a number of factors, including the span length and conductor type. On a typical 115 kV transmission line with a 300-foot span, blowout is approximately five feet with 48 mph winds and approximately ten feet with 98 mph winds.[16] The final line design will evaluate blowout based on actual span distances and the type of conductor being used.

[16] NESC also has standards regarding vegetation management which necessitates typically greater clearance distances. See Section 6.4 for vegetation management requirements.

Table 5.1.1-2: NESC Horizontal Clearance Requirements for 115 kV Transmission Lines

Risk Case	Minimum Separation (feet)	
	No Wind	NESC 48 mph wind
From a lighting support, traffic signal support, or support structure for another line.	9.1	8.6
From any other buildings, walls, projections, structures, bridges, etc.	11.6	8.6

The single circuit structures will have three single conductor phase wires and one shield wire. The phase wires proposed will be twisted pair conductor with 266 Aluminum Conductor Steel Reinforced (ACSR) or 366 ACSR wire sizes or a conductor with similar capacity. The shield wire will be 0.528 optical ground wire.

To the extent project facilities overtake existing distribution lines, the Applicants will coordinate with the applicable distribution owner regarding the relocation of those facilities, including burying or underhanging the facilities.

5.1.2 Substation Upgrades

Substations are a part of the electric transmission and distribution system and contain high-voltage electric equipment to monitor, regulate, and distribute electricity safely and reliably. **Table 5.1.2-1** identifies the existing and planned substations in the project area and provides a summary of the improvements planned at those substations as part of the Project.

Table 5.1.2-1: Substations within project area and Summary of Improvements

Substation Name	Transmission / Distribution	Ownership	Project Improvements	Improvement Area (Acres)
Appleton Transmission Substation	Transmission	Western Minnesota	The existing site will be decommissioned. Applicants have identified three potential approximately 10-acre parcels within the proposed route for the new substation. A stormwater pond will be constructed for the site.	10
Appleton Distribution Substation	Distribution	Otter Tail Power	The existing Appleton Distribution Substation, currently co-located with the transmission substation will be decommissioned. The new distribution substation will be located adjacent to the new transmission substation within the proposed route on an approximately 5-acre parcel. The Appleton Distribution substation will connect to the Appleton Transmission Substation.	5
Shible Lake	Distribution	Agralite	Connection to 115 kV transmission line; this substation will be expanded to accommodate the new service.	1
Moyer Substation	Distribution	Agralite	Connection to the 115 kV transmission line. Agralite is considering either expanding or relocating the substation to a new location adjacent to the 115 kV line.	1 to 5
Danvers Substation	Distribution	Otter Tail Power	Connection to 115 kV transmission line; to be converted to a 115 kV substation. Otter Tail Power is considering either expanding or relocating the substation to a new location within the proposed route to accommodate the new service.	1 to 5
Benson Substation	Transmission and Distribution	Great River Energy	Connection to 115 kV transmission line.	0

Substation Name	Transmission / Distribution	Ownership	Project Improvements	Improvement Area (Acres)
Benson Municipal Substation	Distribution	City of Benson	Connection to 115 kV transmission line; fence line to be expanded on City of Benson's existing parcel.	1

The project will include the construction of the new Appleton substations. Two other existing substations (Moyer and Danvers) may also be relocated if there is insufficient space for expansion in their current locations. The final location of these substations will depend on the Project's route and further coordination with stakeholders. To accommodate this further coordination and design, the Applicants have identified substation siting areas as part of the Project's route width.

For the Appleton substations, the Applicants are seeking an approximately 10-acre parcel for the transmission substation and an adjacent, approximately five-acre parcel for the distribution substation. The parcels will allow for future modifications and provide buffer between the adjacent landowners. The Applicants are currently working with landowners to determine the final location for the new substations that best reduces impacts to local residents and natural resources.

There are three transmission lines that currently connect to the Appleton Transmission Substation, including a MRES-owned 115 kV line that connects to the existing substation from the west, Otter Tail Power-owned 115 kV line that connects to the existing substation from the south, and Otter Tail Power's 41.6 kV line that connects to the existing substation from the east. These two 115 kV lines will be modified to extend to and connect with the new substation location. The 41.6 kV line will extend from the new distribution substation as a new 12.47 kV distribution line. The proposed Route Width described in Section 1.5 and shown on **Figure 2** is sized sufficiently to accommodate the line modifications.

For the Danvers and Moyer Substations, the Applicants are seeking up to a five-acre parcel for each potential new substation location. Similar to the Appleton substations, the Applicants are currently coordinating with landowners to determine locations for these substations and minimize impacts to residents and natural resources.

5.1.3 Design Options to Accommodate Future Expansion

Minnesota statutes and rules require the consideration of the potential for a project to accommodate future improvements to the transmission system. As discussed in **Section 4** of this Application, the project is designed to be sufficient to serve this area for many years into the future.

5.2 Construction

All construction would be completed in accordance with state, NESC, and the applicants' construction standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, erection of structures, and stringing of transmission line conductors. Construction would not begin until all the necessary approvals and land rights have been obtained, and final design is complete. The applicants anticipate starting construction in 2028.

5.2.1 Transmission Line Construction Procedures

The first phase of the transmission line construction activities will involve survey staking of the transmission line centerline, ROW, foundation or structure locations, sensitive environmental resource boundaries, property or section lines, and underground and above ground utilities. Survey staking of structure locations may again occur after vegetation has been removed and just prior to structure installation.

Installation of erosion and sediment control BMPs will be implemented prior to anticipated ground disturbance and in accordance with the Minnesota Pollution Control Agency (MPCA) National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit (General Permit) (see **Table 3-1**). BMPs will be inspected, maintained, repaired, and replaced in accordance with the MPCA General Permit.

In order to access the ROW, the Applicants may need to improve existing access roads or develop new access roads. Road improvements may include tree trimming, tree clearing, road grading, widening, and fill placement. Depending on landowner preferences and permit requirements, access roads may be left in place or returned to prior conditions following construction.

The Applicants will minimize vehicle tracking of soil from construction sites by implementing BMPs such as installing rock access pads or construction mats, reducing equipment/vehicle access to the construction workspace where practicable, and using off-ROW parking or equivalent practices. The Applicants will install rock or construction mat access pads in accordance with state or local road authority specifications. If such BMPs are not adequately preventing sediment from being tracked onto paved public roads, the Applicants will conduct street sweeping, or other equivalent means of collecting sediment in accordance with the General Permit.

To facilitate construction equipment access and ensure safe clearances between vegetation and the transmission line, all tall-growing vegetation will be cleared from the ROW during construction. Stumps will typically be cut two inches from ground level or as agreed to with landowners. Roots will generally be left in place to avoid more significant soil disturbances. All materials resulting from clearing operations will be stacked outside of the ROW for use by the property owner, as desired. Otherwise, it will be removed and properly disposed of in accordance with agency requirements.

Where clearing is required in wetlands, no more than one inch of chips, shred, or mulch will be allowed in wetlands. Larger trees and shrubs will be moved outside of the wetlands for processing in upland areas to ensure no more than one inch of residue is left in wetlands. Clearing in wetlands will either be conducted when the ground and wetlands are frozen, or mats will be used to minimize impacts to vegetation.

Construction mats may be used as a protective measure to minimize ground impacts and may be installed to provide access through wetlands or other unstable soil areas prior to construction. Mats may also be used to support and stabilize large equipment required for construction. Construction mat travel lanes will generally be 16 to 20 feet wide. In addition, permitted temporary bridges will be installed over waterways. Equipment bridges will be designed to meet the requirements of the applicable agencies and local authorities. Bridges will be installed during clearing and will be removed as soon as possible during final restoration once the bridge is no longer required to complete and monitor restoration activities. Fording of waterbodies is prohibited (i.e., civil survey, potholing, or other equipment are not permitted to ford waterbodies prior to bridge placement).

Temporary construction workspace beyond the 100-foot-wide ROW may be required at certain locations, such as road or railroad intersections, utility crossings, and along steep slopes. Temporary workspace will also be required adjacent to some structures where the direction of the line changes to allow for the pulling and stringing of the wires. In addition, there will be temporary staging of materials, such as structures and hardware, in the project area prior to construction installation. The Applicants will avoid the placement of temporary construction workspace in wetlands and near waterbodies, as practicable.

The second phase of construction will involve structure installation and stringing of conductor wire. During this phase, existing underground utilities will be identified along the route through the required Gopher State One Call process.

Transmission line structures are generally designed for installation at existing grades. Therefore, structure sites will not be graded or leveled unless it is necessary to provide a reasonably level area for construction access and activities. For example, if vehicle or installation equipment cannot safely access or perform construction operations properly near the structure, temporary matting and/or minor grading of the immediate terrain may be necessary to establish a safe working area.

The majority of the proposed structures will be direct embedded wood structures, which will be installed by augering a hole typically 10 to 25 feet deep and three to five feet in diameter for each structure; actual depths will be determined based on soil borings and final line design. Any excess soil from the excavation will be spread and leveled near the structure in uplands or removed from the site if requested by the property owner or regulatory agency.

Concrete foundations may be required for large angles, longer spans, or to avoid using guy wires in farm fields and yards. A steel pole structure will be mounted on top of the concrete foundation. The foundations are typically five to eight feet in diameter and 15 to 45 feet deep (also determined with soil boring and final design) with one foot exposed above the existing ground level. Concrete trucks will be used to bring the concrete in from a local concrete batch plant.

After a direct embedded structure is set into the hole, the void space will be backfilled with crushed rock. Based on typical soil types in Minnesota, it is anticipated that structure 50 to 100 feet above ground poles will be buried approximately 10 to 25 feet into the ground. In poor soil conditions (e.g., peat, marl, soft clay, loose sand), a galvanized steel culvert may be installed vertically with the structure set inside.

After a number of proposed structures have been erected, the Applicants will begin to install the shield wire and conductors by establishing stringing setup areas within the permanent ROW or temporary ROW as negotiated with the landowner. These stringing setup areas will be located at deadend structures along the proposed route and occupy approximately 15,000 square feet for linear segments of the line and approximately 30,000 square feet for angled segments of the line. The conductor and static wires will then be pulled and clipped into place. This stringing and clipping activity will require access to each structure with a bucket truck or crane. Other handling equipment used for this phase of construction will include reel trailers, wirepullers, and related stringing equipment.

Temporary guard or clearance structures will be installed, as needed, over existing distribution or communication lines, streets, roads, highways, railways, or other obstructions after any necessary notifications are made or permits obtained. This will ensure that conductors will not obstruct traffic or

contact existing energized conductors or other cables. In addition, the conductors will be protected from damage.

Where replacing or overbuilding existing transmission circuits, the existing structures and wire will be removed. The removed materials will be evaluated to determine the appropriate disposal method. Where existing transmission structures are to be removed, it is common practice to remove the structure to a depth of at least 4 feet below grade; however, in some cases the structure may be cut off at grade. The determination will be site specific and will be based on the type of structure, land use at the site, and construction vehicle access constraints.

Construction equipment for project construction would include backhoes, bulldozers, large trucks, excavators, boom trucks, skid steers, cranes, and assorted small vehicles.

5.2.2 Substation Construction Procedures

5.2.2.1 Expansion / Modification of Existing Substations

If an existing substation is to be expanded, typical construction activities will include survey and staking, clearing vegetation, and excavation of the expansion area. Appropriate fill will be placed as necessary to provide a stable surface. Fencing will be installed to secure the substation area. Holes will be drilled and concrete poured for pier footings. Forms will be laid and concrete poured for slab foundations. Cable trays will be installed where communication and relay cables will be placed as needed for connection between the control building and equipment. Bus work and equipment will be installed on the foundations and erected. Control system modifications, if included at the substation, will be wired to onsite enclosures. Finally, the substation will be topped off with rock to grade.

5.2.2.2 New Substations

New substation construction activities are similar to what is done for an expanded substation. Construction would commence with surveying and staking the site, and typically includes obtaining soil borings to confirm site characteristics. Appropriate fill will be placed as necessary to provide a stable surface. Fencing will be installed to secure the substation area. Holes will be drilled and concrete poured for pier footings. Forms will be laid and concrete poured for slab foundations. Cable trays will be installed where communication and relay cables will be placed as needed for connection between the control building and equipment. Bus work and equipment will be installed on the foundations and erected. Control system modifications, if included at the substation, will be wired to onsite enclosures. Finally, the substation will be topped off with rock to grade.

5.2.3 Restoration

Upon completion of transmission line and substation construction, cleanup and site restoration will occur. This will include removing construction mats, temporary bridges, and other material or debris from the ROW. Any necessary seedbed preparation and seeding will be performed along with BMPs. The Applicants have developed a draft Vegetation Management Plan (VMP), which further describes the restoration procedures that will be implemented (see the draft VMP, **Appendix E**). Typical equipment used for these activities will include mat trucks, skid steers, pickup trucks, and other light-duty vehicles.

Disturbed areas will be restored to their original condition to the maximum extent practicable, or as negotiated with the landowner. Post-construction reclamation activities will include removing and disposing of debris, removing all temporary facilities (including staging and laydown areas), installing appropriate erosion and sediment control BMPs, reseeding areas disturbed by construction activities

with vegetation similar to that which was removed with a seed mixture certified as free of noxious or invasive weeds, and restoring the areas to their original condition to the extent possible. In cases where soil compaction has occurred, the construction crew or a restoration contractor will use various methods to alleviate the compaction, or as negotiated with landowners. Further details are provided in **Appendix E**.

The Applicants will contact landowners after construction is complete to determine if the clean-up measures have been to their satisfaction and inquire if any other damage may have occurred. If damage has occurred to crops, fences, or the property, the Applicants will compensate the landowner. In some cases, an outside contractor may be hired to restore the damaged property as near as possible to its original condition.

5.2.4 Construction Personnel and Equipment

The Applicants anticipate 15 to 35 workers will be employed daily during construction of the transmission line portion of the Project. The Applicants will also have a construction supervisor onsite throughout the construction phase.

5.3 Operation and Maintenance

Access to the ROW of a completed transmission line will be required to perform periodic inspections, conduct maintenance, and repair damage. Regular maintenance and inspections will be performed during the life of the transmission line to ensure its continued integrity. Generally, the Applicants will inspect the condition of the transmission line and structures once per year. Inspections will be limited to the ROW and to areas where off-ROW access is required due to ROW obstructions or terrain impediments. If problems are found during inspection, repairs will be performed, and property restoration will occur, or the landowner will be provided reasonable compensation for any damage to the property.

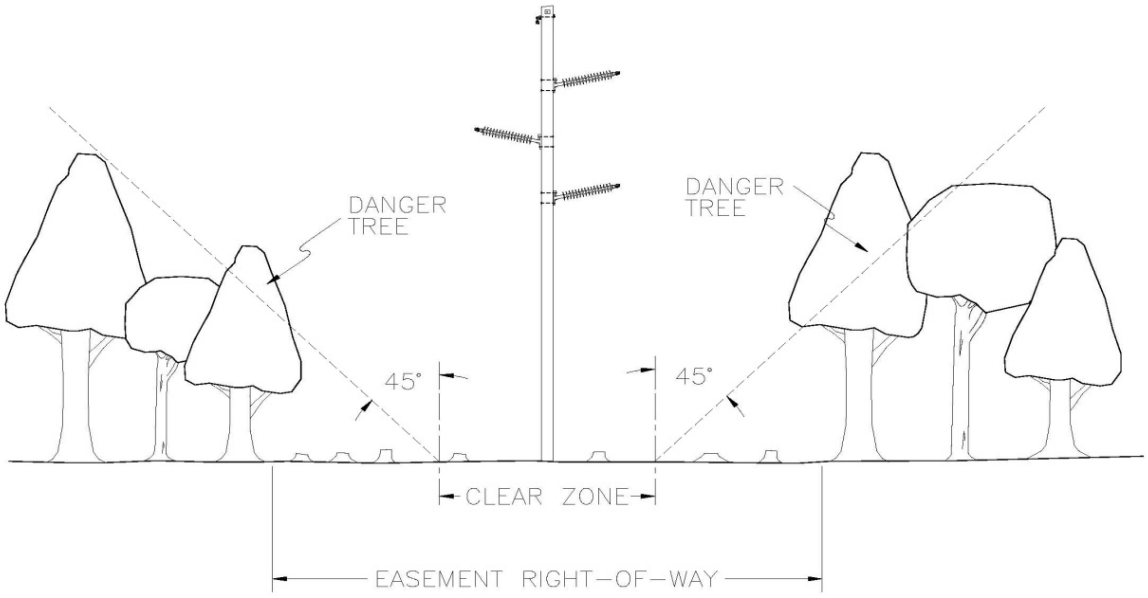
The ROW will be managed to remove vegetation that interferes with the operation and maintenance of the transmission line. Shrubs that will not interfere with the safe operation or accessing and traversing the ROW of the transmission line will be allowed to reestablish in the ROW. The Applicants will use an integrated VMP (see **Appendix E**) that generally incorporates a wire/border zone practice for ROW clearing and maintenance, unless another maintenance practice is required by applicable permit or approval.[17] As a general practice, low-growing brush or smaller tree species will be allowable at the outer limits (e.g., the "border zone") of the easement area. Taller tree species that endanger the safe and reliable operation of the transmission facility will be removed. In developed areas, and to the extent practical, existing low-growing vegetation that will not pose a threat to the transmission facility or impede construction or maintenance may remain in the border zone, as agreed to during easement negotiations. The area below the outer conductors plus 10 to 15 feet (e.g., the "wire zone" or "clear zone") will be cleared of all shrubs and trees to ensure maintenance trucks can access the line and no vegetation interferes with the safe operation of the transmission line.

The NESC states that vegetation that may damage ungrounded supply conductors should be pruned or removed. Trees beyond the easement area that are in danger of falling into the energized transmission line, could grow into the wire zone, or are otherwise deemed to be a hazard to the safe operation of the

[17] For example, the Applicants are aware that the MnDOT may not support the wire/border zone practice for facilities in MnDOT ROW.

line (e.g., “danger trees”) may be removed or trimmed to eliminate the hazard as shown in **Graphic 5.3-1**, if allowed by the terms in the easement. Danger trees generally are those that are dead, diseased, weak, or leaning towards the energized conductors. Tree trimming may be possible to minimize tree removal based on negotiations with individual landowners.

Graphic 5.3-1: Applicants’ Standard Tree Removal Practices during Transmission Line Operations



The Applicants’ practice generally provides for the regular inspection of 115 kV transmission lines to determine if clearing is required. ROW clearing practices will include a combination of mechanical and hand clearing, along with herbicide application where allowed, to remove or control vegetation growth. The Applicants’ have developed a draft VMP to outline the practices that will apply to operational vegetation management activities across the project (see **Appendix E**).

6 SECTION SIX: Affected Environment, Potential Impacts, and Mitigation

This section describes the environmental setting, affected resources, potential impacts, and mitigation.

Construction and operation of the project would impact human and environmental resources in the project area. Some impacts would be short term and like those of any large construction project (e.g., noise, dust, soil disturbance). These impacts are independent of the route selected for the project. However, they can be mitigated by measures common to most construction projects, for example, the use of erosion control blankets or watering for dust control.

Other impacts would exist for the life of the project, such as aesthetic impacts. These long-term impacts are generally not well mitigated by construction measures. That is, these impacts do not flow from how the project is constructed but rather where it is located and its design. Long-term impacts can be mitigated through prudent selection of the route and design of the project.

Impacts vary based on duration, size, intensity, and location. This context is used to determine an overall resource impact level using qualitative descriptors. These descriptors ensure a common understanding among readers and allow for comparison of resource impacts between alternatives.

> **Minimal**: Minimal impacts do not considerably alter an existing resource condition or function. Minimal impacts may, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short term.
>
> **Moderate**: Moderate impacts alter an existing resource condition or function and are generally noticeable or predictable for the average observer. Effects may be spread out over a large area, making them difficult to observe, but can be estimated by modeling or other means. Moderate impacts may be long term or permanent to common resources but are generally short- to long-term for rare and unique resources.
>
> **Significant**: Significant impacts alter an existing resource condition or function to the extent that the resource is severely impaired or cannot function. Significant impacts are likely noticeable or predictable for the average observer. Effects may be spread out over a large area making them difficult to observe but can be estimated by modeling. Significant impacts can be of any duration and may affect common or rare and unique resources.
>
> **Direct**: Direct impacts are caused by the project and occur at the same time and place.
>
> **Indirect**: An indirect impact is caused by the project but is further removed in distance or occurs later in time.

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

> **Avoid**: Avoiding an impact means that the impact is eliminated altogether by moving or not undertaking parts or all of a project.

Minimize: Minimizing an impact means to limit its intensity by reducing the project size or moving a portion of the project from a particular location.

Mitigate: Impacts that cannot be avoided or minimized could be mitigated. Impacts can be mitigated by repairing, rehabilitating, or restoring the affected environment, or compensating for it by replacing or providing a substitute resource elsewhere.

Potential impacts to human and environmental resources are analyzed within specific geographic areas called regions of influence (ROIs). Impacts to resources may extend beyond these distances but are expected to diminish quickly. ROIs vary between resources. **Table 6-1** summarizes the ROIs used in this EA.

Table 6-1: Regions of Influence for Human and Environmental Resources

Resource Category	Resource Type	Region of Influence
Human Settlement	Displacement, Land Use and Zoning	Route Width
	Aesthetics, Noise, Property Values, Electronic Interference, Hazardous Materials	Project Vicinity*
	Cultural Values, Recreation, Public Services	Project Area+
	Socioeconomics, Environmental Justice	County
Public Health and Safety	Electric and Magnetic Fields, Stray Voltage, Induced Voltage, Worker and Public Safety	Route Width
Land-Based Economies	Agriculture, Forestry, Mining	Route Width
	Tourism	Project Area
Archaeological and Historic Resources	—	Project Area
Natural Environment	Geology and Groundwater, Soils, Vegetation	Route Width
	Air Quality, Water Resources, Wildlife, Rare and Unique Resources	Project Vicinity
	Greenhouse Gases, Climate Change	State

Notes:
*Project Vicinity is the area within 1,600 feet of the route width.
+ Project area is the area within one mile of the route width.

This section describes the existing resources that may be impacted by the project, assesses potential project impacts, and identifies measures that to mitigate project impacts. The effect of HVTLs on the human and natural environment are well documented, and the general impacts and mitigation are well understood. Where relevant, this EA draws on the existing body of work.

The level of detail in the analysis in this section focuses on decisions about potential mitigation. Therefore, where a quantitative data analysis is relevant to the selection of appropriate mitigation, impact numbers are presented. However, where a more qualitative discussion of the nature and magnitude of impacts is sufficient to inform decisions regarding mitigation, detailed data analysis has not been included.

Because there is only one route under consideration, the Commission's permitting decision centers on avoiding and minimizing impacts consistent with state goals to conserve resources, to minimize environmental impacts, and to minimize human settlement and other land use conflicts.

Finally, where other planned projects would have overlapping impacts on the resources affected by the proposed project, these cumulative effects have also been evaluated.

6.1 Environmental Setting

The project is situated within a predominantly rural and agricultural setting between Appleton and Benson, Minnesota. This area is within the Minnesota River Prairie Subsection of the North Central Glaciated Plains Section of the Prairie Parkland Province as defined by the MDNR Ecological Classification System.

Prior to Euro-American settlement, native vegetation was primarily tallgrass prairie with islands of wet prairie and forests of silver maple, elm, cottonwood, and willow on floodplains along the Minnesota River and other streams. Presently, agriculture is the dominant land use. Surface topography is generally flat with wooded areas and hydrologic features, including wetlands, streams, and ponds interspersed occasionally throughout the proposed route.

There are several existing transmission lines in the area, including the existing Great River Energy 115 kV systems and Otter Tail Power's existing 41.6 kV system that connects multiple distribution substations in the project area. There are also many distribution lines within the area. Alliance Pipeline maintains a natural gas transmission pipeline in the project area (see **Figure 5**). The BNSF Railway extends from the city of Appleton to the city of Benson and there are many state and county highways, and local roads throughout the project area.

6.2 Human Settlement

Transmission lines have the potential to negatively impact human settlements through a variety of means. Transmission line structures and conductors could change the aesthetics of the project area, displace homes or businesses, introduce new noise sources, lower property values, be incompatible with local zoning, or interfere with electronic communications.

Impacts to human settlements resulting from the project are anticipated to be minimal. Despite limited anticipated impacts, Impacts to human settlements can be minimized by prudent routing (e.g., by choosing routes and alignments that avoid residences, businesses, and other places where people congregate). Impacts could also be mitigated by limiting the aesthetic impacts of the structures

themselves and by the use of structures which are, to the extent possible, compatible with human settlements and activities.

6.2.1 Aesthetics

Aesthetic and visual resources include the physical features of a landscape such as land, water, vegetation, and structures. Determining the relative scenic value or visual importance of these features is a complex process that depends on what individuals perceive as being aesthetically appealing. Viewers' perceptions are based on their psychological connection to the viewing area and their physical relationship to the view, including distance to the structures, perspective, and duration of the view. Landscapes which are, for the average person, harmonious in form and use are generally perceived as having greater aesthetic value. Infrastructure which is not compatible with a landscape or negatively impacts existing features of a landscape could negatively affect the aesthetics of an area.

6.2.1.1 Impacts

The visual impact of the project largely depends on the perceptions of observers, but overall impacts of the project would be similar to present conditions. The existing structure heights along the 41.6 kV system range between 35 to 80 feet above ground, and between 55 and 75 along Great River Energy's existing 115 kV system. Typical structure heights for the new 115 kV line will range from 50 to 100 feet above ground and spans between structures will generally range from 300 to 500 feet. The project will primarily use single-pole wood structures.

Approximately 67 percent of the project will be constructed within the existing transmission line ROW, and the project will be co-located with existing road ROW for 68 percent of the proposed alignment; 8.0 miles of new construction is proposed. Where trees need to be cleared, the change to the landscape will typically result in a noticeable visual impact. The proposed route was developed in part to minimize the amount of tree clearing, which will help to minimize visual impacts.

There are residences and other buildings along the proposed route (**Table 6.2.1.1-1**). There are eight residences within 100 feet of the proposed alignment and 36 residences with 200 feet. Because many of these residences are near existing 41.6 kV and 115 kV lines, aesthetic impacts are anticipated to be incremental.

Table 6.2.1.1-1: Building Distances from Proposed Alignment

Building Type	0-50 feet	50-100 feet	100-150 feet	150-200 feet	Total
Home	0	8	13	15	36
Business/Industrial	3	4	8	22	37
Outbuilding	0	4	11	15	30
Total	**3**	**16**	**32**	**52**	**103**

6.2.1.2 Mitigation

The Applicants will work with landowners to identify concerns related to the transmission line and aesthetics. In general, mitigation includes enhancing positive effects as well as minimizing or eliminating negative effects. Potential mitigation measures include:

- Locations of structures, ROW, and other disturbed areas will be determined by considering input from landowners to minimize visual impacts.

- Care will be used to preserve the natural landscape. Construction and operation will be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work.
- Landowners may be compensated for the removal of trees and vegetation based on easement negotiations.
- Structures will be placed at the maximum feasible distance from trail and water crossings, within limits of structure design and applicable regulations.

6.2.2 Cultural Values

Cultural values can be described as shared community beliefs or attitudes, among a given area or population that define what is collectively important and worthwhile to the group. Major infrastructure projects can be inconsistent with the cultural values of an area, resulting in a deterioration of a community's shared sense of itself.

Eastern Dakota people have been a part of Minnesota for centuries. The likely first encounters with Europeans began in the mid-to-late seventeenth century, as mostly French fur traders began exploring Dakota lands. The land itself would remain largely unsettled by Euro-Americans until the early nineteenth century when the Tribe began signing treaties with the United States government and after the Dakota War of 1862.

Swift County was later established on February 18, 1870, and named after Henry Swift, Minnesota's Governor in 1863. Swift County covers 757 square miles and is divided into 21 townships. Agriculture remains the main industry. The Swift County Historical Society was founded in 1929 to preserve the County's history. Swift County partners with Western Minnesota Prairie Waters which promotes living in and visiting the northern/western portion of the Minnesota River Valley and exploring its prairies, meandering canoe routes, and ethnic and culture heritage, festivals, art and recreational opportunities.

In 1872, a group of people, mostly from Eastern America, Germany, and Scandinavia, organized a township called Phelps that was subsequently renamed Appleton. A petition was sent to the Minnesota State Legislature on December 25, 1880, asking for the formation of the Village of Appleton. Appleton is the only town in the country with all its streets and avenues named after fallen war heroes. The City of Appleton currently has a population of approximately 1,346 people in an area of approximately 1.9 square miles. The city hosts several community events throughout the year including Applefest and the Meander Art Crawl. Appleton is also the home of Southwestern Minnesota's First Off-Highway Vehicle Recreation Area and Appleton is located next to the Lac qui Parle Game Refuge and Marsh Lake.

The development of the City of Benson was strongly related to the railroad. The first general store was opened in Benson in 1869 and by 1870 a trading center was opened and named "Benson" in memory of a prominent politician from Anoka. Benson was incorporated as a city in 1908. The City of Benson currently has a population of approximately 3,480 people in an area of approximately 3.02 square miles.

6.2.2.1 Impacts and Mitigation

Construction and operation of the proposed project is not expected to conflict with the cultural values of the area. No mitigation is proposed.

6.2.3 Displacement

Displacement is the need to remove structures (e.g., homes, businesses) to facilitate the construction and operation of the project.

No displacement of residential homes, structures, or businesses will occur as a result of this project. The NESC and the Applicants' standards require certain clearances between transmission line structures and buildings or structures within the ROW for safe operation of the proposed transmission line (see **Table 5.1.1-2**). The proposed route, which includes locations for proposed substation expansions and relocations, provides sufficient design flexibility and distances from existing homes and structures for a transmission line design that achieves the requisite clearances. **Table 6.2.1.1-1** summarizes the residential and non-residential buildings at various distances to the proposed alignment for the Project. The Applicants do not anticipate placing the new line closer to homes and buildings than currently exists with the 41.6 kV and 115 kV lines.

6.2.3.1 Impacts and Mitigation

No residences or businesses are anticipated to be displaced by the project. The project will be designed in compliance with local, state, NESC, and the Applicants' standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings (including residences), strength of materials, and ROW widths.

The Applicants will work with landowners to address construction timelines, transmission alignment adjustments, and/or structure placement, as necessary to avoid impacts to irrigators within the proposed route width.

6.2.4 Electronic Interference

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

Electronic interference refers to an electronic signal disturbance that impairs the proper functioning of an electronic device. Under certain conditions, the localized Electric Field (EF) near an energized transmission line conductor can produce small electric discharges, which can ionize nearby air. This is commonly referred to as the "corona" effect. Most often, corona formation is related to some sort of irregularities on the conductor, such as scratches or nicks, dust buildup, or water droplets. The air ionization caused by corona discharges can result in the formation of audible noise and radio frequency noise. Corona formation is a function of the conductor radius, surface condition, line geometry, weather condition, and most importantly, the line's operating voltage. Corona-induced audible noise and radio and television interference are typically not a concern for power lines with operating voltages below 161 kV (like the Project), because the EF intensity is too low to produce significant corona.

6.2.4.1 Impacts

Because the likelihood of significant corona formation on the project is minimal, the likelihood of radio and television interference due to corona discharges associated with the project is also minimal. The Applicants are unaware of any complaints related to radio or television interference resulting from the operation of any of its existing 115 kV facilities and do not expect radio and television interference to be an issue along the proposed route.

6.2.4.2 Mitigation

Construction and operation of the proposed project is not expected to interfere with any modes of electronic communication in the project area. The Commission's Route Permit includes Standard Condition 5.4.3, which requires permittees to ensure that interference with communication and navigation systems does not worsen in the area as a result of project activities.

6.2.5 Land Use and Zoning

Land use planning and zoning are tools used to manage land resources in a way that encourages orderly development and protects the resources and uses that are valued by people living in an area. If transmission lines are routed in areas where they are incompatible with existing or planned land uses, it can restrict land use, landowners and communities from using their land resources in ways they prefer, or affect the efficient, organized use, and development of land.

Though the Commission's route permit supersedes local planning and zoning (see **Section 2: State of Minnesota Regulatory Framework**), the Commission is charged with minimizing land use conflicts when making a route permit decision.[18]

6.2.5.1 Impacts

Land cover along the proposed route is primarily agriculture (row crops) and developed.[19]

Zoning along the proposed route is primarily Agricultural Preservation District 1 (see **Figure 6).**[20] The proposed route also traverses the following zoned municipal areas:

- City of Appleton – Within the city of Appleton, the proposed route crosses developed land zoned for industrial, heavy/medium land use The Applicants have identified three potential locations for the new Appleton substations. According to the city of Appleton's Comprehensive Plan, one location is zoned for indusrial land use and the other two locations are directly north of Highway 7 and the city of Appleton's industrial park (outside of the city limits).
- Town of Holloway – Within the town of Holloway, the proposed route crosses developed–open space, Northern Tallgrass Prairie, and cultivated cropland based on U.S. Geological Survey (USGS) Gap Analysis Program data. The town of Holloway does not have a Comprehensive Plan.
- Town of Danvers - The proposed route crosses developed–open space adjacent to but outside of the town of Danvers. The town of Danvers does not have a Comprehensive Plan.
- City of Benson–According to the city of Benson's Comprehensive Plan, [21] the proposed route crosses land zoned for commercial, public/semi-public, limited industrial, railroad ROW, and

[18] Minn. Stat. 216E.03 Subd. 7(a)

[19] U.S. Geological Survey Gap Analysis Program. 2016. GAP/LANDFIRE National Terrestrial Ecosystems 2011, Version 3. Available online at: http://gapanalysis.usgs.gov/gaplandcover. Accessed July 2025.

[20] Swift County. No Date. Zoning and Land Regulations Code. Available online at: https://www.swiftcounty.com/vertical/sites/%7BCB23E7E9-8CD6-437F-AE42-22084996955A%7D/uploads/Ch1_Sec1_GeneralProvisions.pdf. Accessed September 2024.

[21] town of Benson. 2000. Comprehensive Plan. Available online at: https://www.bensonmn.org/vertical/sites/%7B4CF162DA-DB48-48F1-B00C-5A678A59875D%7D/uploads/%7B85D282E8-FD80-4674-957B-548C63AB7E17%7D.PDF. Accessed July 2025.

park–open space land uses. The Benson Municipal Substation fence line will be expanded on the city of Benson's existing parcel (see Section 3.2).

The proposed route also crosses four BWSR administered RIM riparian and floodplain restoration easements[22]. However, the Proposed ROW only crosses three RIM easements, of which one intersects the proposed alignment. The RIM Reserve program is the primary land acquisition program for state held conservation easements and restoration of wetlands and native grasslands on privately owned land in Minnesota.[23] Among other restrictions, easements can prohibit harvesting of trees and erecting or constructing any type of structure, temporary or permanent, on the easement area.

The Applicants initiated consultation with BWSR on September 5, 2024, to confirm easement applicability with the project and any land use restrictions.

Impacts to land use as a result of the project are expected to be minimal, and the project is not expected to change land uses or zoning designations since the project will largely be located within existing utility and road ROW and is largely consistent with existing land uses

6.2.5.2 Mitigation

The proposed project is not expected to change land uses or zoning designations since the project will largely be located within existing utility and road ROW and is largely consistent with existing land uses. Therefore, no mitigation is proposed.

6.2.6 Noise

Noise is defined as unwanted and objectionable sound. Sound levels are usually measured and expressed in decibels (dB), which are logarithmic units that can be used to conveniently compare wide ranges of sound intensities. Because human hearing is not equally sensitive to all frequencies of sound, the most noticeable frequencies of sound are given more weight in most measurement schemes. The A-weighted scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA, which is the A-weighted sound level recorded in units of decibels.

A noise level change of 3 dBA is considered the lowest perceptible level of change to human hearing. A 5 dBA change in noise level is considered clearly noticeable. A 10 dBA change in noise level is perceived as a doubling of noise loudness, while a 20 dBA change is considered a dramatic change in loudness. **Table 6.2.6-1** shows noise levels associated with common, everyday sources.

Table 6.2.6-1: Common Noise Sources and Levels

Sound Pressure Level (dBA)	Noise Source
110	Rock band at 5 meters
100	Jet flyover at 300 meters

[22] The Reinvest in Minnesota Resources Act was enacted to restore certain marginal and environmental sensitive agricultural land to protect soil and water quality and support fish and wildlife habitat. BWSR acquires, on behalf of the state, conservation easements to permanently protect, restore and manage critical natural resources without owning the land outright. The program goal is to restore and protect riparian and floodplain areas across the state to improve and enhance water quality and wildlife habitat.

[23] BWSR. No Date. Reinvest in Minnesota Overview. Available online at: https://bwsr.state.mn.us/reinvest-minnesota-overview. Accessed September 2024.

Sound Pressure Level (dBA)	Noise Source
90	Gas lawnmower at 1 meter
80	Food blender at 1 meter
70	Vacuum cleaner at 3 meters
60	Normal speech at 1 meter
50	Dishwasher next room, quiet urban daytime
40	Library, quiet urban nighttime
30	Bedroom at night
20	Quiet rural nighttime
10	Broadcast recording studio
0	Threshold of hearing
Source: Minnesota Pollution Control Agency. 2015. A Guide to Noise Control in Minnesota. Available online at: https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf.	

The Minnesota Pollution Control Agency has developed protective standards for daytime and nighttime noise levels that vary based on land use at the location where the sound is heard (Noise Area Classification or [NAC]). MPCA noise standards are provided in **Table 6.2.6-2**. The standards are expressed as limiting levels of dBA within a one-hour period; L50 is the dBA not to be exceeded over 50 percent of the time (30 minutes) within an hour, while L10 is not to be exceeded over 10 percent of the time (6 minutes) within the hour.

Table 6.2.6-2: MPCA Noise Limits by Noise Area Classification (dBA)[24]

Applicable Noise Area Classification	Description	Daytime (7a – 10p)		Nighttime (10p – 7a)	
		L_{50}	L_{10}	L_{50}	L_{10}
1	Residential-type Land Use Activities	60	65	50	55
2	Commercial-type Land Use Activities	65	70	65	70
3	Industrial-type Land Use Activities	75	80	75	80

Land areas are assigned an NAC based on the land use activities at the location of the receiver and determine the noise standards applicable to that land use activity. The NAC is listed in the MPCA noise regulations to distinguish the categories. Residential areas, churches, educational and health services, and similar type land use activities are included in NAC 1; commercial-type land use activities are included in NAC 2; and industrial-type land use activities are included in NAC 3. Receptors along the proposed route include residences, businesses, and churches.

6.2.6.1 Impacts

Noise generated by the proposed project is discussed here in three categories – transmission line and substation construction, substation operation, and transmission line operation.

6.2.6.1.1 Noise related to Transmission Line and Substation Construction

Construction noise, including removal activity, is generally expected to occur during daytime hours as the result of heavy equipment operation and increased vehicle traffic associated with the transport of construction personnel and materials to and from the work area. Construction activities will be

[24] This table identifies the classifications potentially relevant to this Project. *See* Minn. R. 7030.0050 for the complete text of the rule.

performed with standard heavy equipment such as backhoes, cranes, boom trucks, and assorted small vehicles. Construction equipment noise levels will typically be less than 85 dBA at 50 feet when equipment is operating at full load[25] and will only occur when equipment is operating. Upon completion of construction activities, noise associated with construction equipment will cease.

6.2.6.1.2 Noise related to Substation Operation

The project will include construction of new substations and modifications to existing substations to connect to the 115 kV transmission line. A typical 115 kV transformer will result in noise levels of about 50 dBA at a distance of approximately 50 feet from the transformer. No perceptible change in noise levels is expected at receptors near the substations due to these location changes and upgrades.

6.2.6.1.3 Noise related to Transmission Line Operation

Transmission lines can generate a small amount of sound energy during corona activity (see also Section 7.3.5.3) where a small electrical discharge caused by the localized EF near energized components and conductors ionizes the surrounding air molecules. Corona is the physical manifestation of energy loss and can transform discharge energy into very small amounts of sound, radio noise, heat, and chemical reactions of the air components. Several factors, including conductor voltage, shape and diameter, and surface irregularities such as scratches, nicks, dust, or water drops can affect a conductor's electrical surface gradient and its corona performance.

Noise emissions from a transmission line occur during certain weather conditions. In foggy, damp, or rainy weather, power lines can create a crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain, the background noise level of the rain is usually greater than the noise from the transmission line. As a result, people do not normally hear noise from a transmission line during heavy rain.

The industry standard for utilities is calculated based on L_{50} and L_5 for audible noise emissions. The worst-case scenario is when the transmission line is exposed to heavy rain conditions (i.e., one inch per hour). Applicants have estimated noise levels from the transmission line as summarized in **Table 6.2.6.1.3-1**.

Table 6.2.6.1.3-1: Anticipated Transmission Line Noise Levels with Heavy Rain

L_5	L_{50}	Location
24 dBA	5 dBA	Edge of ROW
19 dBA	10 dBA	Directly Under Line

Operational noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually perceivable. As such, noticeable operational noise impacts are not anticipated as a result of the Project. Further, proper design and construction of the transmission line in accordance with industry standards will help to ensure that noise impacts do not exceed applicable limits.

[25] United States Federal Highway Administration, 2006. FHWA highway construction noise handbook. No. DOT-VNTSC-FHWA-06-02; FHWA-HEP-06-015. https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook00.cfm.

6.2.6.2 Mitigation

Standard language in Commission route permits requires permittees to adhere to MPCA noise standards which protect against impacts human health and welfare. The draft permit includes standard condition 5.3.6, which requires that the applicants comply with noise standards established by the MPCA.

Noise associated with construction of the project will be temporary in nature. To mitigate noise impacts associated with construction activities, work will generally be limited to daytime hours between 7 a.m. and 7 p.m. weekdays. Occasionally, there may be construction outside of those hours or on a weekend, if required, to work around customer schedules, line outages, or if the schedule has been significantly impacted due to delays or other factors. The Applicants will work with stakeholders in the event construction becomes necessary outside of these hours. Heavy equipment will also be equipped, as required by local ordinances, with sound attenuation devices such as mufflers to minimize the daytime noise levels.

Operational noise levels are expected to be well below the state noise limits at receptors; therefore, the project is not anticipated to contribute to an exceedance of noise standards. No mitigation is proposed.

6.2.7 Recreation

Recreation includes outdoor leisure activities done for enjoyment, amusement, and pleasure – e.g., hiking, boating, hunting. Transmission lines are a concern for recreation because they can (1) alter recreational resources in a way that diminishes their use or (2) alter the visual setting in a way that changes the experience and reduces the user's enjoyment, amusement, or pleasure. Both types of impacts tend to occur where the transmission line is located immediately adjacent to the recreational resource.

Recreational resources near the proposed route are shown on **Figure 7**.

6.2.7.1 Impacts

The proposed alignment and ROW cross the Pomme de Terre River, a state water trail, and adjacent to the MDNR-administered Pomme de Terre River, Larson Landing Public Water Access Site. The Chippewa River, another state water trail, is located within the proposed route but is not crossed by the proposed alignment.

The proposed alignment and ROW are located north of 30th Street SW, which is adjacent to, but does not cross, the Clair Rollings WMA which is 534.5 acres and home to game species including deer, small game, forest upland birds, pheasants, waterfowl, and turkey[26] (see **Figure 7**).

Additionally, the Lac qui Parle WMA is located approximately one mile southwest of City of Appleton. This WMA is 25 miles long, 1 to 3 miles wide, 24,300-acres in area, and is the largest contiguous block of public land in west-central Minnesota and a popular destination for hunters, bird and wildlife watchers and others.[27] Lac qui Parle Lake and Marsh Lake are the most prominent features.[28]

[26] MDNR WMA. 2024. Clair Rollings WMA: https://www.dnr.state.mn.us/wmas/detail_report.html?id=WMA0141000. Accessed July 2025.

[27] MDNR Wildlife. 2024. Lac qui Parle WMA: https://www.dnr.state.mn.us/areas/wildlife/lac_qui_parle_wma.html. Accessed on July 2025

[28] Minnesota River Valley National Scenic Byway. Undated. Lac qui Parle WMA:https://www.mnrivervalley.com/map-location/lac-qui-parle-wildlife-management-area/?mpfy-pin=723. Accessed July 2025

There are several snowmobile trails located within the proposed route. The proposed alignment and associated ROW cross six snowmobile trails and are co-located with approximately 6,000 feet of the Ridge Runner Trails and 8,000 feet of the Northern Lights Trails. Both of these trails are Grant-in-Aid trails used for snowmobiling.[29, 30]

Finally, a park area maintained by the city of Benson is located within the proposed route north of and along the BNSF Railway; however, the proposed alignment does not cross this park.

The Project, including substation relocations and expansions, will not preclude recreational activities or appreciably diminish the use or experience at these locations. The project is not anticipated to affect wildlife viewing or recreational opportunities, although tree clearing or trimming will occur which may have effects on wildlife viewing opportunities.

Direct impacts to watercourses are not anticipated (see Section 6.6.6) and the Applicants do not anticipate disrupting recreational activities along the state water trails.

6.2.7.2 Mitigation

The Applicants may need to temporarily close or reroute access to snowmobile trails during construction activities. If construction activities impact any of the snowmobile trails, the Applicants will coordinate with the trail associations regarding any trail closures to mitigate impacts by assisting in finding alternate routes. The Applicants may also need to temporarily close or reroute access to other recreational areas during construction activities. The Applicants will work with the cities and towns crossed by the project to ensure public safety, coordinate temporary closures and/or reroutes, and notify the public. To ensure that any short-term and infrequent traffic impacts are minimized, the Applicants will coordinate with all affected road authorities and, to the extent practicable, schedule large material/equipment deliveries to avoid periods when traffic volumes are high.

6.2.8 Socioeconomics and Environmental Justice

Socioeconomic factors provide an indication of how economic activity affects and is shaped by social processes. Socioeconomic measures tell us how societies progress, stagnate, or regress because of their local or regional economy, or the global economy.

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

6.2.8.1 Impacts

The socioeconomic setting of the project area was evaluated on a regional basis, comparing data for the State of Minnesota, Swift County, City of Appleton, City of Benson, Town of Holloway, and Town of Danvers. Data compiled from the U.S. Census Bureau are summarized in **Table 6.2.8.1-1.**

[29] Northern Lights Trails Snowmobile Club. 2024. Available online at: https://northernlightstrails.org/. Accessed September 2024.

[30] Minnesota United Snowmobiler Association. 2024. Available online at: https://www.mnsnowmobiler.org/get-involved/our-clubs/club-listing/appleton-ridgerunners. Accessed September 2024.

Table 6.2.8.1-1: Socioeconomic Characteristics within the Project area[31]

Location	2022 Population	Percent Minority	Median Household Income (2018-2022)	Percent Below Poverty Level	Percent Language Other than English Spoken at Home (2018-2022)
State of Minnesota	5,695,292	22.3	$84,313	9.3	12.4
Swift County	9,806	11.9	$58,362	10.7	6.6
City of Appleton	1,346	18.1	$40,000	21.2	11.2
City of Benson	3,453	9.9	$50,435	8.4	2.1
Town of Danvers	142	0.0	$113,472	0.0	0.0
Town of Holloway	65	0.0	$44,688	12.3	0.0

An EJ analysis for the project was completed using the methodology in Minn. Stat. 216B.1691, subd. I(e) (rev. 2023), which provides:

"Environmental justice area means an area in Minnesota that, based on the most recent data published by the United States Census Bureau, meets one or more of the following criteria:

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

Census tracts that intersect with the proposed route were analyzed for EJ areas consistent with this statute. Census tracts are the best approximation of a geographic area where adverse impacts can occur from the Project. Census tracts are shown in **Figure 4**. Swift County was used as a reference population for the census tracts.

MPCA's "Understanding Environmental Justice in Minnesota" web-based mapping tool was used to determine whether the project intersects any census tracts with EJ populations based on the definitions above. Two census tracts that intersect with the proposed route are considered EJ communities. Census Tracts 9602 and 9604 exceed the threshold of 35 percent or more with an income that is at or below 200 percent of the federal poverty level. These census tracts are identified in **Table 6.2.8.1-2**.

Table 6.2.8.1-2: Environmental Justice Communities per Minn. Stat. 216B.1691, subd. 1(e) Criteria[32]

Census Tract	Percent People of Color	Percent Below 200 Percent of Poverty Level	Percent Limited English Proficiency
Census Tract 9602	7.2	36.8 (+/- 8.5)	0.5

[31] U.S. Census QuickFacts. Available online at: https://data.census.gov/. Accessed July 2025.

[32] MPCA, 2023. Understanding environmental justice in Minnesota. Available online at: https://mpca.maps.arcgis.com/apps/MapSeries/index.html?appid=f5bf57c8dac24404b7f8ef1717f57d00. Accessed July 2025.

Census Tract	Percent People of Color	Percent Below 200 Percent of Poverty Level	Percent Limited English Proficiency
Census Tract 9603	7.5	15.5	3.0
Census Tract 9604	9.7	**39.1 (+/- 9.0)**	4.0
Notes: Margin of error included only when the addition of the margin of error indicated a census tract was considered an EJ community per Minn. Stat. 216B.1691, subd. 1(e). EJ communities are indicated in bold type and grey shading.			

The project does not cross any areas located within "Indian country," as defined in 18 USC 1151

Census tract 9602 intersects the proposed route almost entirely within the city of Benson. Census tract 9604 approximately intersects the proposed route from the town of Holloway to the city of Appleton (**Figure 4)**. During construction, increased traffic could impact communities. Construction operations will be conducted to offer the least possible obstruction and inconvenience to the traveling public. Traffic impacts to communities will be less than significant (see Section 6.2.10). Noise impacts associated with the project will be temporary in nature and construction activities will generally be limited to daytime hours between 7 a.m. and 7 p.m. weekdays (see Section 6.2.6). Air quality impacts during construction are also anticipated to be minimal and temporary; no impacts to air quality are anticipated due to the operation of the project (see Section 6.6.1). During construction, there may also be short-term positive impacts to the nearby communities including potential increases in local revenue for businesses, such as hotels, grocery stores, gas stations, and restaurants to support utility personnel and contractors. These changes are consistent with the current viewshed and minimal impacts to visual resources are anticipated see Section 6.2.1).

The EJ communities identified in **Table 6.2.8.1-2** will not be impacted disproportionately when compared to other, non-EJ communities. While the areas of the proposed route expected to experience the most significant impacts (new substations or transmission line construction) largely occur within census tract 9604, impacts from these activities are still expected to be minimal and incremental in nature.

Long term benefits of the project include the ongoing reliable electrical services and the ability to serve existing and new local load growth. The benefits apply to the local community regardless of economic status, race, and personal identification.

6.2.8.2 Mitigation

Because impacts to socioeconomics would be generally short-term and beneficial, no mitigation is proposed. There are communities in the project area for whom there are environmental justice concerns. However, the project will not disproportionately burden these communities. Thus, no EJ mitigation measures are proposed.

6.2.9 Property Values

One of the primary socioeconomic concerns of those residing near existing or proposed transmission lines is impacts to property values. There are two primary concerns raised regarding the potential impact of a nearby high-voltage transmission line on property value:

- Concern or fear of possible health effects from electric or magnetic fields: While no conclusive evidence of the effects of EMF on health exists, it is recognized that people's concerns about this issue can influence their decisions related to purchase of property.

- The potential noise and visual distinction of the transmission line: The visual profile of transmission lines structures and wires may decrease the perceived aesthetic quality of property. The transmission facility would not generate noise above the state noise standards and is not considered an issue.

In 2010, a literature review examined 17 studies on the relationship between transmission lines and property values. The results of this literature review can be summarized as follows:[33]

- Over time, there is a consistent pattern with about half of the studies finding negative property value effects and half finding none.
- When effects have been found, they tend to be small; almost always less than 10 percent and usually in the range of 3 percent to 6 percent.
- Where effects are found, they decay rapidly as distance to the lines increases and usually disappear at about 200 feet to 300 feet.
- Two studies investigating the behavior of the effect over time find that, where there are effects, they tended to dissipate over time.[34]

6.2.9.1 Impacts

Impacts to property values, if they occur, are expected to be incremental since the proposed route largely follows existing transmission line ROW, and impacts from construction would be incremental (i.e. taller structures or larger lines instead of new construction), Impacts to property values are also expected to decay over time and fall off rapidly with distance; therefore, impacts are anticipated to be localized. However, each landowner has a unique relationship and sense of value associated with their property. Thus, a landowner's assessment of potential impacts to their property's value is often a deeply personal comparison of the property before and after a project is constructed. These judgements do not necessarily influence the market value of a property, since appraisers assess a property's value by looking at the property after a project is constructed. Moreover, potential market participants likely see the property independent of the changes brought about by a project; therefore, they do not take the before and after into account the same way a current landowner might. Staff acknowledges this section does not and cannot consider or address the fear and anxiety felt by landowners when facing the potential for negative impacts to their property's value.[35]

6.2.9.2 Mitigation

Impacts to property values can be mitigated by reducing aesthetic impacts and encumbrances to future land use. Co-locating the HVTL with existing infrastructure might reduce aesthetic impacts and potential land use conflicts. Property value impacts can also be mitigated through inclusion of specific conditions

[33] The Effects of Transmission Lines on Property Values: A Literature Review, Journal of Real Estate Literature, 2010: http://www.real-analytics.com/Transmission%20Lines%20Lit%20Review.pdf

[34] Chalmers and Voorvaart (2009).

[35] This paragraph is based, in part, on the following: Chalmers, James, High Voltage Transmission Lines and Residential Property Values in New England PowerPoint Presentation, (October 30, 2019), https://www.nhmunicipal.org/sites/default/files/uploads/Annual_Conference/2019/Sessions/Wednesday/market_effects_of_utility_rows_presentation-1045am.pdf ; Department of Commerce, Rights-of-way and Easements for Energy Facility Construction and Operation, (August 5, 2014), https://mn.gov/Commerce/energyfacilities/.

in easement agreements with landowners along the ROW. These agreements are outside the scope of this EA.

6.2.10 Public Services and Infrastructure

Private landowners in the project area utilize services provided by Swift County, various townships, as well as the City of Appleton, Town of Holloway, Town of Danvers, and City of Benson. Services include water, sewage, and waste collection. The residents also have access to other utility services by various providers, including telephone, electricity, natural gas, cable and satellite television, and internet. Additional services include fire, ambulance, police, street maintenance, public transportation, parks and recreation, and public libraries. Additionally, the Appleton Municipal Airport and Benson Municipal Airport (Veterans Field) are located in the project area.

There are existing transmission lines within the project area, many of which will be replaced by the Project. Other existing utilities such as gas/oil pipelines and electric distribution lines, and site improvements, such as septic systems and wells, will be identified during survey activities.

The proposed route will parallel and/or intersect with several city, township, county, and state-managed roads and highways as described in **Table 6.2.10-1**.

Table 6.2.10-1: Highways or Roads Crossed or Parallel to the Proposed Alignment

Highway / Road Name	Jurisdiction[36]	Parallel / Intersects	Annual Average Daily Traffic[37]
State Highway 7	MnDOT	Parallel/Intersect	1,719
3rd St W	Appleton	Intersect	N/A
2nd Ave N	Appleton	Parallel/Intersect	N/A
2nd St W	Appleton	Intersect	16
70th St SW	Appleton Township	Intersect	N/A
60th St SW/County Road 54/ County Highway 36	County	Parallel/Intersect	110
Highway 119	MnDOT	Intersect	269
210th Ave SW	Shible Township	Intersect	N/A
200th Ave SW/County Highway 11	County	Intersect	69
190th Ave SW	Moyer Township	Intersect	N/A
Highway 59	Federal	Intersect	1,627
160th Ave SW/County Highway 9	County	Intersect	1,000

36 Swift County. Undated. General County Wide Map Viewer. Available online at: Interactive Maps - Swift County, MN Accessed July 2025.

37 MnDOT. Undated. Traffic Mapping Application. Available online at: https://www.arcgis.com/apps/webappviewer/index.html?id=7b3be07daed84e7fa170a91059ce63bb. Accessed July 2025.

Highway / Road Name	Jurisdiction[36]	Parallel / Intersects	Annual Average Daily Traffic[37]
50th St SW/County Highway 38	County	Intersect	43
150th Ave SW	Moyer Township	Parallel/Intersect	N/A
40th St SW	Moyer Township	Parallel	109
140th Ave SW	Moyer Township	Intersect	20
130th Ave SW/County Highway 38	County	Intersect	20
120th Ave SW	Marysland Township	Intersect	8
110th Ave SW	Marysland Township	Intersect	22
100th Ave SW	Marysland Township	Intersect	4
90th Ave SW/County Highway 17	County	Intersect	390
80th Ave SW/County Highway 67/14	County	Parallel/Intersect	50
30th St SW	Six Mile Grove Township	Parallel/Intersect	31
70th Ave SW	Six Mile Grove Township	Intersect	31
60th Ave SW/County Road 73	County	Intersect	31
20th St SW/County Road 75	County	Parallel	27
30th Ave SW	Six Mile Grove Township	Parallel/Intersect	N/A
Highway 12	Federal	Parallel/Intersect	2,135
25th Ave NW/Country Road 3	County	Parallel	1,500
20th St NW/County Highway 20	County	Intersect	1,900
22nd St	Benson	Parallel/Intersect	N/A
Kansas Ave	Benson	Intersect	N/A
Pacific Ave	Benson	Parallel/Intersect	N/A

The Applicants have initiated coordination with MnDOT, Swift County, and the cities crossed by the proposed route regarding the Project.

6.2.10.1 Impacts

Impacts to the Appleton Municipal Airport and Benson Municipal Airport are not anticipated. The Applicants indicate a filing with the FAA will be required for the project; however, given the height and location of the transmission line structures, impacts to aviation services are not anticipated.

The Applicants will coordinate project construction schedules, including any outages, to avoid and/or minimize disruptions to public services in the area. Based on the location of other existing utilities and site improvements that are identified during survey activities, the project will be designed to meet or exceed required clearances and structure locations. No structures will be placed on existing utilities, including pipelines. Similarly, because the project is primarily proposed to be routed in existing utility and road ROW, the Applicants do not anticipate impacts to site improvements such as wells or septic systems.

Temporary access for construction of the project will occur along the 100-foot-wide ROW to the extent practicable. Temporary and infrequent traffic impacts associated with equipment/material delivery and worker transportation will occur. Local roads in the vicinity of the project may experience some increased traffic during construction. Stringing the conductors and shield wire across roads can be accomplished with minimal traffic impacts. Typically, a pulling rope will be carried across the road, which will then be pulled overhead. Temporary structures may be installed inside or outside of road ROW to ensure pulling lines, shield wire, or conductors have sufficient clearance over roads.

To ensure that any short-term and infrequent traffic impacts are minimized, the Applicants will coordinate with all affected road authorities and, to the extent practicable, schedule large material/equipment deliveries to avoid periods when traffic volumes are high.

6.2.10.2 Mitigation

The Applicants will work with the applicable towns and townships where substation relocation and upgrades are proposed to determine potential impacts to public services and transportation. Because the majority of the proposed route will follow existing utility and road ROW, no impacts to public services are anticipated and, therefore, no mitigation is proposed.

The Applicants or their contractors will work with MnDOT through its application process for a Utility Accommodation Permit in MnDOT ROW and comply with all permit conditions. Applicable licenses where the line impacts county and local roads will also be obtained and complied with.

When appropriate, pilot vehicles will accompany the movement of heavy equipment. Traffic control barriers and warning devices will be used when appropriate. All necessary provisions will be made to conform to safety requirements for maintaining the flow of public traffic. Construction operations will be conducted to offer the least possible obstruction and inconvenience to the traveling public. The Applicants or their contractors will plan and execute delivery of heavy equipment in coordination with the appropriate road authorities and in a manner that would avoid traffic congestion and reduce likelihood of dangerous situations along local roadways.

The Applicants can mitigate the effects of the project to public services and infrastructure by taking the following actions:

- Coordinating electrical service outages to minimize service impact to customers;
- Coordinating with road authorities for transporting oversize loads and using pilot vehicles to accompany oversize loads and heavy equipment;
- Coordinating lane or road closures with local jurisdiction and emergency services.

- Coordinating with applicable towns and townships where substation relocation and upgrades are proposed to ensure no impacts to public services;
- Scheduling equipment deliveries to avoid peak traffic;
- Submitting final pole locations and heights to the FAA using Form 7460-1, Notice of Proposed Construction or Alteration, for their analysis of airspace obstruction; and

In addition, Special Condition 6.6 has been included in the draft Route Permit to mitigate effects to the State Highway System that could potentially result from the project. This condition requires that the Applicants:

- Understand and follow MnDOT's policies, manuals, and guidance documents;
- Maintain MnDOT clearance requirements and clear zones;
- Accommodate active transportation and pedestrian facilities;
- Give MnDOT specialists opportunity to participate in pre-construction meetings related to MnDOT facilities; and
- Coordinate with MnDOT for transportation of oversize loads and other required permits.

Implementation of Special Condition 6.6 would reduce project impacts to the State Highway System.

6.2.11 Hazardous Materials

Construction projects typically use hazardous materials for equipment fueling, degreasers, solvents, and lubricants. Hazardous materials, if not properly handled, have the potential to contaminate surface or groundwater, primarily during construction, when several pieces of equipment are in daily use.

6.2.11.1 Impacts

Typical construction activities like those proposed for the project utilize hazardous materials such as fuels, hydraulic oil, lubricants, and cleaning solvents. These materials have the potential to spill or leak from equipment; however, the low volume of hazardous materials that would be used during construction make it unlikely that soil or groundwater would be significantly affected by construction activities. The most likely incidents involving these hazardous materials are associated with minor spills or drips from vehicles or equipment. Impacts from such incidents would be avoided by thoroughly cleaning up minor spills as soon as they occur, and cleanup materials disposed of through a facility licensed to handle the waste.

6.2.11.2 Mitigation

The Commission's Route Permit includes Standard Condition 5.3.20, Pollution and Hazardous Wastes, to reduce the potential for the project to pollute the environment through the Permittee taking the following actions:

- Taking appropriate precautions and complying with laws applicable to the generation, storage, transportation, clean up, and disposal of all wastes generated during construction and restoration.

Although a spill prevention control and countermeasure plan may not be required for the project, the Applicants could mitigate potential effects due to the use and handling of hazardous materials by incorporating hazardous material best management practices typically found in stormwater permit documents into its construction plans, such as:

- Providing designated locations and employing protective measures for storage of hazardous materials during construction;
- Establishing on-site notification protocol and response for encountering contaminated soil or groundwater; and
- Establishing spill and cleanup requirements for any incidental spills or other potential releases of hazardous materials.

6.3 Public Health and Safety

Impacts to human health and safety are assessed by looking at four main issues: general construction safety, electric and magnetic fields (EMF), stray voltage, and induced voltage. The sections that follow evaluate how the project may impact human health and safety and how these impacts may be mitigated.

6.3.1 General Construction Safety

The project will be designed in compliance with local, state, NESC, and the Applicants' standards regarding clearance to the ground, clearance to crossing utilities, strength of materials, and ROW widths. Construction crews and/or contract crews will comply with local, state, and NESC standards regarding installation of facilities and standard construction practices. The Applicant's established safety procedures, as well as industry safety procedures, will be followed during and after installation of the transmission line, including clear signage during all construction activities. See **Section 6** for detailed discussions on construction practices and safety.

6.3.2 Electric and Magnetic Fields

Electric and magnetic fields (EMF) are invisible forces that result from the presence of electricity. EMF occurs naturally and is caused by weather or the geomagnetic field. Human-made EMF is caused by all electrical devices and is found wherever people use electricity. Both electric field and magnetic field strength decrease rapidly as the distance from the source increases. As it pertains to the Project, the term "EMF" refers to the extremely low frequency (ELF) decoupled EF and magnetic fields (MFs) that are present around any electrical device or conductor and can occur indoors or outdoors. EFs are the result of electric charge, or voltage, on a conductor. The intensity of an EF is related to the magnitude of the voltage on the conductor. MFs are the result of the flow of electricity, or current, traveling through a conductor. The intensity of a magnetic field is related to magnitude of the current flow through the conductor. EF and MF can be found in association with transmission lines, local distribution lines, substation transformers, household electrical wiring, and common household appliances.

6.3.2.1 Electric Fields

Voltage on a wire produces an EF in the area surrounding the wire. The voltage on the conductors of a transmission line generates an EF extending from the energized conductors. The intensity of transmission line EFs is measured in kilovolts per meter (kV/m), and the magnitude of the EF rapidly decreases with distance from the transmission line conductors. The presence of trees, buildings, or

other solid structures in the path of the field also significantly reduces the magnitude of the EF. Because the magnitude of the voltage on a transmission line is near-constant (ideally within ±10 percent of nominal), the magnitude of the EF will be near-constant.

Although there is no state or federal standard for transmission line EF exposures, the EQB developed a standard of a maximum EF limit of 8 kV/m at one meter (3.28 feet) above ground; this standard has been regularly applied by the Commission.[38]

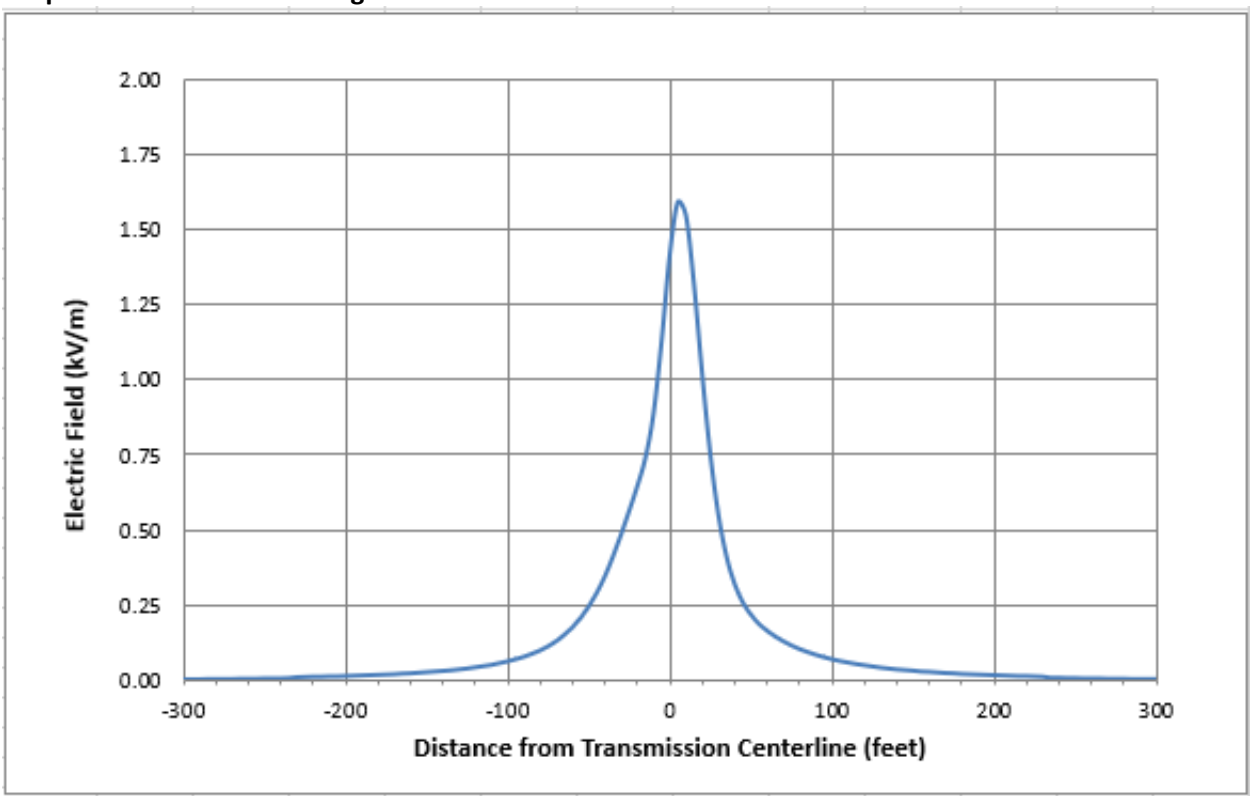
The Applicants have calculated the approximate EF for the Project's transmission configuration and estimates the peak magnitude of EF density to be well below the EQB standard at approximately 1.59 kV/m and 2.68 kV/m underneath the conductors one meter above ground for the proposed single circuit and double circuit transmission lines, respectively. **Table 6.3.2.1-1** summarizes the EFs calculated for the proposed single and double circuit transmission lines. These EF calculations are also shown graphically in **Graphic 6.3.2.1-1** and **Graphic 6.3.2.1-2**.

Table 6.3.2.1-1: Calculated Electric Fields (kV/m) for Proposed Alignment (One meter (3.28 feet) above ground)

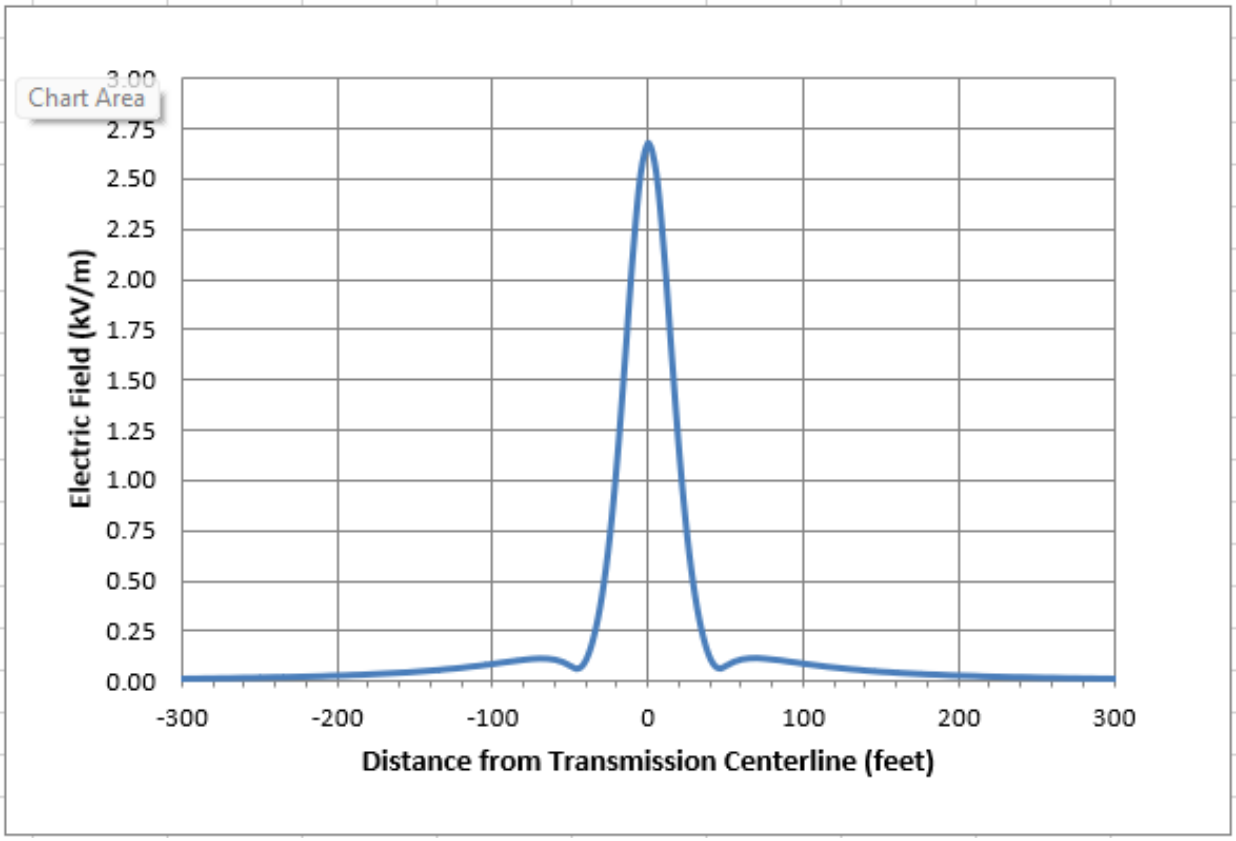
Operating Voltage (kV)	Max Operating Voltage (kV)	Electric Field (kV/m) at Distance (ft) from Proposed Alignment										
		-300	-200	-100	-50	-25	Max	25	50	100	200	300
115 kV Single Circuit	126.5	0.01	0.02	0.07	0.22	0.76	1.59	0.57	0.25	0.06	0.02	0.00
115 kV Double Circuit	126.5	0.01	0.03	0.09	0.08	0.72	2.68	0.71	0.08	0.09	0.03	0.01

[38] In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota, Docket No. ET-2/TL-08-1474, Order Granting Route Permit (September 14, 2010).

Graphic 6.3.2.1-1: 115 kV Single Circuit Line Electric Field Profile



Graphic 6.3.2.1-2: 115 kV Double Circuit Line Electric Field Profile



6.3.2.2 Magnetic Fields

Current passing through any conductor, including a wire, produces a MF in the area around the wire. The current flowing through the conductors of a transmission line generates a MF that, in similar fashion to the EF, extends outward from the energized conductors. The intensity of the MF associated with a transmission line is proportional to the amount of current flowing through the line's conductors, and the magnitude of the MF rapidly decreases with the distance from the conductors. Unlike EFs, MFs are not significantly affected by the presence of trees, buildings, or other solid structures nearby. The value of the magnetic field density is expressed in the unit of gauss or milligauss (mG).

There are no federal or Minnesota exposure standards for MFs. Studies of the health effects from MFs conclude that the evidence of health risk is weak.[39] The general standard is one of prudent avoidance. MF levels associated with some common electric appliances are provided in **Table 6.3.2.2-1.**

Table 6.3.2.2-1: Magnetic Fields of Common Electric Appliances (mG)[40]

Appliance	Distance from Source		
	6 inches	1 foot	2 feet
Hair Dryer	300	1	--

[39] Minnesota Department of Health. 1997. *EMF White Paper on Electric and Magnetic Field* (EMF) Policy and Mitigation Options. 2002; National Research Council. *Possible Health Effects of Exposure to Residential Electric and Magnetic Fields*. www.niehs.nih.gov/health/topics/agents/emf/.

[40] USEPA. 1992. *EMF In Your Environment.* Magnetic Field Measurements of Everyday Electrical Devices. Office of Radiation and Indoor Air (6603J) 402-R-92-008. December 1992.

Appliance	Distance from Source		
	6 inches	1 foot	2 feet
Electric Shaver	100	20	--
Can Opener	600	150	20
Electric Stove	30	8	2
Television	NA	7	2
Portable Heater	100	20	4
Vacuum Cleaner	300	60	10
Copy Machine	90	20	7
Computer	14	5	2

Table 6.3.2.2-2 summarizes the MFs calculated for the proposed transmission line configuration with power flow at peak loading and at average loading for the single circuit and double circuit transmission lines. The maximum MF under expected peak demand conditions is 87.5 mG, which is similar or below typical household exposure levels as shown in **Table 6.3.2.2-1**.

Because the actual power flow on a transmission line could potentially vary throughout the day depending on electric demand, the actual MF level could also vary widely from hour to hour. In any case, the typical magnitude of the MF associated with the proposed transmission line is expected to be well below the calculated intensity at the expected peak loading.

Table 6.3.2.2-2: Calculated Magnetic Fields (mG) for Proposed Alignment Designs

Operating Voltage	Max Operating Voltage (kV)	Line Current (Amps)	Magnetic Field (mG) at Distance (ft) from Proposed Alignment										
			-300	-200	-100	-50	-25	Max	25	50	100	200	300
115 kV Peak Load Single Circuit	126.5	600	0.54	1.65	6.47	21.82	51.96	87.5	43.67	19.02	5.95	1.59	0.53
115 kV Average Load Single Circuit	126.5	299	0.27	0.82	3.22	10.87	25.89	43.60	21.76	9.48	2.97	0.79	0.26
115 kV Peak Load Double Circuit	126.5	416	0.01	0.03	0.35	3.11	12.87	37.55	17.25	5.55	1.17	0.21	0.08
115 kV Average Load Double Circuit	126.5	52	0.11	0.25	0.97	3.16	7.14	11.89	7.14	3.16	0.97	0.25	0.11

6.3.2.3 Impacts

Considerable research has been conducted since the 1970s to determine whether exposure to power-frequency, commonly referred to as ELF (60 hertz), EFs and MFs can cause biological responses and adverse health effects. The multitude of epidemiological and toxicological studies has shown, at most, a weak association (i.e., no statistically significant association) between ELF-MF exposure and health risks and no association between ELF-EF exposure and health risks.

In 1999, the National Institute of Environmental Health Sciences (NIEHS) issued its final report on "*Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields*" in response to the Energy Policy Act of 1992. In the report, the NIEHS concluded that the scientific evidence linking EMF exposures with health risks is weak and that this finding does not warrant aggressive regulatory concern. However, in light of the weak scientific evidence supporting some association between EMF and health effects and the fact that exposure to electricity is common in the United States, the NIEHS stated that passive regulatory action, such as providing public education on reducing exposures, is warranted.[41] Other studies have come to similar conclusions.[42]

Based on findings like those of the Working Group and NIEHS, the Commission has consistently found that "there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects."[43] This conclusion was further justified in the Route Permit proceedings for the Brookings Project. In the Brookings proposed route Permit proceedings, the Applicants and one of the intervening parties both provided expert evidence on the potential impacts of ELF-EF and ELF-MF, including the World Health Organization findings (2007). The ALJ in that proceeding evaluated written submissions and a day-and-a-half of testimony from the two expert witnesses. The ALJ concluded: "there is no demonstrated impact on human health and safety that is not adequately addressed by the existing State standards for [EF and MF] exposure."[44] The Commission adopted this finding on July 15, 2010.[45]

No impacts to public health and safety are anticipated as a result of the Project. The project will be designed in compliance with local, state, NESC, and the Applicants' standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and ROW widths.

The substations in the region are equipped with protective breakers and relays. The protective equipment is designed to de-energize the transmission line when needed. All substations are protected

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[41] NIEHS. 1999. NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. Prepared in Response to the 1992 Energy Policy Act (PL 102-486, Section 2118). NIH Publication No. 99-4493. Available online at: https://www.niehs.nih.gov/health/assets/docs_p_z/report_powerline_electric_mg_predates_508.pdf. Accessed July 2025.

[42] Minnesota Department of Health. 2002. A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options; World Health Organization. 2007. Environmental Health Criteria Volume No. 238 on Extremely Low Frequency Fields. Available online at: https://mn.gov/eera/web/project-file?legacyPath=/opt/documents/EMF%20White%20Paper%20-%20MN%20Workgroup%20Sep%202002.pdf. Accessed July 2025.

[43] See, for example, *In the Matter of the Application for a HVTL Route Permit for the Tower Transmission Line Project*, Docket No. ET-2, E015/TL-06-1624, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Minnesota Power and Great River Energy for the Tower Transmission Line projectand Associated Facilities (August 1, 2007).

[44] In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota, Docket No. ET-2/TL-08-1474, ALJ Findings of Fact, Conclusions and Recommendation at Finding 216 (April 22, 2010, and amended April 30, 2010).

[45] In the Matter of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota, Docket No. ET-2/TL-08-1474, Order Granting Route Permit (September 14, 2010).

by barbed-wire-topped fencing. Signage attached to the fence lists the owner, provides a telephone contact number, and warns about electrical hazards within the substation.

The Applicants will ensure that safety requirements are met during construction and operation of the facilities. Additionally, when crossing roads or railroads during stringing operations, guard structures will be utilized to eliminate traffic delays and provide safeguards for the public. With implementation of these safeguards and protective measures, no additional mitigation is proposed.

6.3.2.4 Mitigation

Electric and magnetic field strengths can be lowered through implementation of appropriate design measures and techniques, such as:

- Cancellation: The arrangement of transmission line conductors and shield wires to lower electric and magnetic field levels; and
- Distance: Increasing the distance between the transmission line and other conductors or conductive objects. Electric and magnetic field levels decrease rapidly with distance.

6.3.3 Stray Voltage

Electrical systems that deliver power to end-users and electrical systems within the end-user's business, home, farm, or other buildings are grounded to the earth for safety and reliability reasons. The grounding of these electrical systems results in a small amount of current flow through the earth. "Stray voltage" is a condition that can occur on the electric service entrances to structures from distribution lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings.

Transmission lines (like the Project) do not, by themselves, create stray voltage because they do not connect to businesses and residences. If a landowner has stray voltage concerns on their property, The applicants suggest they contact their electric service provider to discuss the situation with technical staff, including the possibility of an on-site investigation. No impacts are expected, and no mitigation is proposed.

6.3.4 Induced Voltage

When an EF reaches a nearby conductive object, such as a vehicle or a metal fence, it can induce a voltage on the object. The magnitude of this voltage is dependent on many factors, including the object's capacitance, shape, size, orientation and location, resistance with respect to ground, and the weather conditions. If the object is insulated or semi-insulated from the ground and a person touches it, a small current could pass through the person's body to the ground. This might be accompanied by a spark discharge and mild shock, similar to what can occur when a person walks across a carpet and touches an object or person.

The main concern with induced voltage is not the magnitude of the voltage induced, but the current that would flow through a person to the ground should the person touch the object. To ensure the safety of persons in the proximity of high voltage transmission lines, the NESC requires that any discharge be less than five milliAmperes root mean square (mA rms). The Applicants will work with those affected to mitigate any induced voltages to within NESC limit.

6.3.4.1 Impacts and mitigation

If a landowner has stray or induced voltage concerns on their property, they should contact their electric service provider to discuss the situation with technical staff, including the possibility of an on-site investigation.

Induction and its potential impacts can be mitigated through implementation of appropriate design measures and techniques, including the grounding of conductive objects in and along the transmission line ROW. Proper grounding is required by the NESC and a standard route permit condition (Section 5.4.1)

The project will be designed and constructed to minimize the potential for induction issues.

6.4 Land-Based Economies

High voltage transmission lines can impact land-based economies such as agriculture, tourism, forestry and mining. The extent to which a project may impact these economies is closely correlated with how much the project would impact lands earmarked and used by these industries.

6.4.1 Agriculture

According to the 2022 U.S. Department of Agriculture (USDA) Census of Agriculture,[46] Swift County has 708 individual farms with an average farm size of 530 acres and farmland covers approximately 374,933 acres (77%) of the county. The market value of agricultural products sold was over $453 million in 2022.

Agricultural lands are the most common land type within the proposed route (see **Figure 5**). Agricultural lands crossed by the project consist of properties used for pasture, hay, and cultivated crops. The proposed alignment will cross about 14.8 miles of agricultural land, or 197.0 acres (within the 100-foot-wide ROW). The project will allow for continued agricultural land use within the transmission line ROW; therefore, the transmission line is compatible with future and ongoing use as pasture, hay, or other crop cultivation.

There will be loss of production of up to 25 acres of agricultural land use if the Appleton, Moyer and/or Danvers substations are installed within areas used for agricultural use. Further, a minor amount of agricultural land will be taken out of production where the transmission poles are installed (five to eight feet in diameter per pole, see Section 6.2.1). The Applicants are currently working with landowners regarding substation locations, and will also coordinate with landowners regarding pole placement during development of the final design. Accordingly, there will be minor, but largely negligible, impacts to pasture, hay, and cultivated lands.

According to the USDA Organic Integrity Database,[47] Glacial Grain Spirits, LLC, where organic alcohols are crafted, is located within the proposed route north of the existing Benson Substation. The Applicants are not aware of any organic farms crossed by the proposed route. The closest registered apiary[48] is located approximately 3 miles northwest of the existing Benson substation.

[46] USDA. 2022. Swift County, Minnesota Census of Agriculture. Available online at: https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp27151.pdf. Accessed September 2024.

[47] USDA.. Organic Integrity Database. Available online at: https://organic.ams.usda.gov/integrity/. Accessed July 2025.

[48] Minnesota Department of Agriculture. Bee Check. Available online at: https://mn.beecheck.org/map. Accessed July 2025.

6.4.1.1 Impacts and Mitigation

Approximately 197 acres of agricultural land may be temporarily impacted from production during construction of the Project. Operation of equipment (e.g., backhoes, cranes, boom trucks) during construction in farm fields can cause rutting and soil compaction, particularly during springtime and otherwise wet conditions. Permanent impacts will occur where structures and substations are placed. if all possible substation rebuilds occur within areas used for agriculture, up to 25.0 acres of agricultural land will be permanently removed from production associated with the installation of new substations and pole structures

During scoping, concerns raised by members of the public during public meeting open houses included the potential for disruption to irrigators that may operate within the proposed route width. The applicants have indicated that they would coordinate with landowners during construction to ensure that operation of irrigators is not interrupted by construction or operation of the project.

The Applicants will work with landowners to minimize impacts to agricultural activities along the proposed route and will compensate landowners for any crop damage/loss and soil compaction that may occur during project activities. Areas disturbed will be repaired, restored, and left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion.
Specific mitigation measures to be implemented include:

- Local roads will be used as practicable for moving equipment and installing structures.
- Where local roads cannot be used, movement of crews and equipment will be limited to the ROW to the greatest extent possible, including access to the route. Contractors employed by the Applicants will limit movement on the ROW to minimize damage to grazing land or property. If movement outside of the ROW is necessary during construction, permission will be obtained, and any damage will be paid to the landowner.
- Construction will be scheduled during periods when agricultural activities will be minimally affected to the extent possible, or the landowner will be compensated accordingly.
- Ruts that are hazardous to agricultural operations will be repaired or compensation will be provided as an alternative if the landowner desires. Such ruts will be leveled, filled, and graded or otherwise eliminated in an approved manner. In the pasture area, compacted soils will be loosened and ruts will be leveled by scarifying, harrowing, discing, or by other approved methods. Damage to ditches, terraces, roads, and other features of the land will be corrected using approved methods and landowner-approved seeds or plants where necessary. The land and facilities will be restored as nearly as practicable to their original conditions.
- ROW easements will be purchased through negotiations with each landowner affected by the Project. Restoration or compensation will subsequently be made for reasonable crop damage or other property damages that occurs during construction or maintenance as negotiated.
- Fences, gates, and similar improvements that are removed or damaged will be promptly repaired or replaced.

Standard permit conditions in Commission route permits minimize agricultural impacts – e.g., Section 5.3.8 (Soil Erosion), 5.3.17 (Drainage Tiles). A special permit condition, 6.1, is recommended to minimize impacts to irrigation systems in the project area.

6.4.2 Tourism

Swift County partners with Western Minnesota Prairie Waters[49] which promotes tourism in the northern/western portion of the Minnesota River Valley including exploring prairies, meandering canoe routes, and ethnic and cultural heritage, festivals, art and recreational opportunities.

Minnesota has 35 state water trails with over 4,500 miles of paddling for tourists to enjoy.[50] The proposed alignment and ROW cross the Pomme de Terre River (a state water trail) and are located adjacent to, but do not cross, the MDNR-administered Pomme de Terre River and Larson Landing Public Water Access Site (see Section 6.6.6 **)**.

WMAs are tourist destinations as they provide recreation for hunters and trappers and wildlife watching opportunities.[51] The proposed alignment and ROW are located north of 30th Street SW, which is adjacent to, but does not cross, the Clair Rollings WMA (see Section 7.4.5, **Figure 7**). Otter Tail Power's existing 41.6 kV transmission line also occurs adjacent to this WMA. Additionally, the Lac qui Parle WMA is located approximately one mile southwest of City of Appleton (see Section 7.4.5).

Other recreational resources near the proposed route that may be enjoyed by tourists include local parks and recreational areas, snowmobile trails, and watercourses (see Section 7.4.5, **Figure 7)**.

6.4.2.1 Impacts

The proposed route, including proposed expansions and relocations of substations, avoids many of the areas that would be considered local tourist destinations, and the project would not preclude tourism activities or appreciably diminish the use or experience at tourist destinations. Although tree clearing or trimming may be required, because it would largely be within or adjacent to existing ROW, the project is not anticipated to affect wildlife viewing or recreational opportunities.

As discussed in Section 6.2.10, to ensure that any short-term and infrequent traffic impacts are minimized, the Applicants will coordinate with all affected road authorities and, to the extent practicable, schedule large material/equipment deliveries to avoid periods when traffic volumes are high.

The Applicants may need to temporarily close or reroute access to trails and/or access to some parks and/or recreational areas whose access is along the proposed alignment and ROW during construction activities.

The Applicants do not anticipate impacts on tourism associated with the Lac qui Parle WMA due to the Project's distance from these features; therefore, no mitigation is proposed.

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[49] Western Minnesota Prairie Waters. 2024. About. Available online at: https://prairiewaters.com/about-us/our-organization/. Accessed July 2025.

[50] MDNR. 2024. Minnesota State Water Trails. Available online at: https://www.dnr.state.mn.us/watertrails/index.html. Accessed September 2024.

[51] MDNR. 2024. Wildlife Management Areas. Available online at: https://www.dnr.state.mn.us/wmas/index.html. Accessed September 2024.

6.4.3 Forestry

The Applicants will clear or trim approximately 9.9 acres of trees within the 100-foot-wide ROW for the project **(Figure 11**). Trees are primarily located on private residential and city-owned properties. No commercial forestry operations were identified within the proposed route.

6.4.3.1 Impacts and Mitigation

The ROW will need to be cleared and maintained for the safe and reliable operation of the Project. Mitigation measures for potential impacts to forest resources will be as follows:

- Compensation for the removal of vegetation in the ROW will be offered to landowners during easement negotiations.
- Landowners will be given the option to keep any portions of the trees (e.g., timber, branches, chips, shreds) cut within the easement area.

However, since the project will be largely located within an existing utility ROW and/or parallel to road ROWs, minimal incremental impacts are expected from the construction and maintenance of the Project. No impacts to forestry resources are anticipated.

6.4.4 Mining

According to the Swift County Aggregate Resource Mapping Program,[52] there is a high potential for aggregate resources in the project area, principally occurring along U.S. Highway 59 between Appleton and Holloway. Prospects and field observations are located adjacent to or crossed by the proposed route. Additionally, the proposed route crosses access to one existing active gravel pit along 60th Street SW (see **Figure 11**). The Applicants will work with landowners as needed regarding any future proposed mining operations and will ensure the project does not preclude access to the existing gravel pit.

6.4.4.1 Impacts and Mitigation

As the project will not result in impacts to active mining activities, no mitigation is proposed.

6.5 Archeological and Historic Resources

Cultural resources, including archaeological and historic artifacts and features, contribute to the record of human occupation and alteration of the landscape. Archaeological resources include historic and prehistoric artifacts, structural ruins, or earthworks, and are often partially or completely below ground. Historic resources include extant structures, such as buildings and bridges, as well as districts and landscapes. Traditional cultural properties are also considered historic or cultural resources that reflect cultural or religious importance.

6.5.1.1 Impacts

Merjent, Inc. (Merjent) conducted a cultural resource literature review for features within a half-mile of the proposed alignment (Merjent Study Area). This literature review and Merjent's evaluation of the possible effects of the proposed project on archaeological and historic properties in the project area was

[52]Swift County. 2022. Aggregate Resources: https://www.swiftcounty.com/vertical/sites/%7BCB23E7E9-8CD6-437F-AE42-22084996955A%7D/uploads/Swift_County_Sand_and_Gravel_Potential(1).pdf Accessed July 2025.

provided to the Minnesota SHPO in a letter dated October 22, 2024.[53,54] The results of the literature review are summarized below.

According to the review, there are no archaeological sites within the proposed route. There is one site within the Merjent Study Area that is outside of the proposed route. This site (21SWc) is an alpha site, meaning that it was identified by historic documentation and has not been field-verified by a professional archaeologist. This site is described as a habitation site on the Chippewa River, which was reported by several Benson residents, but has possibly been covered by dredge spoil.

Ninety historic buildings and structures are located within the Merjent Study Area, seven of which occur within the proposed route. These structures include the following:

1. The Chicago Milwaukee and St. Paul Railway Company/Chicago Milwaukee St. Paul and Pacific Railroad Company: Hastings and Dakota Division Mainline was constructed between 1872 and 1880 and follows Highway 212 from Minneapolis to Ortonville. The Route Width, but no permanent project components, overlap a brief segment of this property, which is co-located with existing utilities, and is intersected by an existing transmission line. The project will not result in an appreciable change in viewshed.
2. The proposed route parallels Trunk Highway 7 (aka State Highway 7 SW) for approximately 0.5 mile. The proposed alignment also intersects Trunk Highway 7 at 215th Ave SW. Trunk Highway 7 was constructed in 1921 and stretches from Trunk Highway 28 in Beardsley to Trunk Highway 100 in St. Louis Park.
3. The proposed alignment intersects Trunk Highway 59 (i.e., U.S. Highway 59) at intersection with 60th St SW.
4. A historic structure described as an outbuilding associated with other nearby farmstead-related structures occurs within the proposed route west of the City of Benson. This structure has not been evaluated for the National Registry of Historic Places (NRHP); however, according to aerial photographs, all three structures have been razed and are no longer located at this location.
5. The proposed route parallels Trunk Highway 12 (i.e. U.S. Highway 12) for approximately 0.5 mile and the proposed alignment intersects Trunk Highway 12 twice. Trunk Highway 12 was constructed in 1921 and stretches from Lake St. Croix in Lakeland to the Minnesota-South Dakota border near Ortonville.
6. Trunk Highway 9 occurs within the proposed route. Trunk Highway 9 was constructed in 1921 and stretches from Kandiyohi County north to Wilkin County.
7. A historic structure described as a single-family dwelling constructed in 1890 near the City of Benson is located within the proposed route. This structure has not been evaluated for the NRHP; however, according to aerial photographs, this structure was located in the railway ROW and has been razed and is no longer located at this location.

[53] Appleton to Benson Joint Application Appendix K- Agency Correspondence- eDockets No. 202412-213349-19

[54] The maps provided to the SHPO are not included in the correspondence provided in **Appendix K** because they include sensitive cultural resource data protected by the Archaeological Resources Protection Act of 1979 (16 USC 470hh, as amended), and National Park Service and Related Programs (54 USC 300101, formerly known as the National Historic Preservation Act, 16 United States Code 470-1).

The remaining 83 historic buildings and structures will not be impacted due to distance from the Project. These buildings and structures include additional transportation-related structures, farmsteads, homesteads, commercial buildings, and a variety of park-related structures. Three of these buildings are listed on the NRHP, and two are recommended as eligible for listing on the NRHP.

The Applicants requested feedback on the project from the 11 federally recognized Tribes with geography within Minnesota, the Minnesota Chippewa Tribe and the Minnesota Indian Affairs Council (MIAC) in its project notification letters sent on September 5, 2024. Letters were sent to the tribal historic preservation officers (THPOs) in addition to the executive leaders of Tribal governments.

A response from the Leech Lake Band of Ojibwe THPO confirmed that the Leech Lake Band of Ojibwe does not have any recorded historic properties within the project area. On October 23, 2024, the Applicants sent a notification to the THPOs associated with the 11 federal recognized Tribes to offer a copy of the literature review submitted to the SHPO. The Shakopee Mdewakanton Sioux Community THPO and the Upper Sioux Community THPO requested a copy, which was provided on October 23, 2024. The Shakopee Mdewakanton Sioux Community THPO responded that, because no burials were identified as being impacted by the proposed project and because an Unanticipated Discoveries Plan will be developed for the Project, the THPO has no concerns with the Project. The Applicants have indicated that they will continue to keep Tribes updated regarding the Project.

6.5.1.2 Mitigation

Standard condition Section 5.3.15 in the draft Route Permit applies to protection of archeological and historic resources. It requires the Permittee to:

- Avoid impacts to archeological and historic resources where possible and to mitigate impacts where avoidance is not possible.
- Train workers about the need to avoid cultural properties, how to identify cultural properties, and procedures to follow if undocumented cultural properties, including gravesites, are found during construction.
- If previously unidentified archaeological sites are found during construction, to stop construction and contact SHPO and the State Archaeologist to determine how best to proceed.
- If human remains are discovered, to stop ground disturbing activity and notify local law enforcement.

Additionally, the Applicants have indicated that they will Implement an Unanticipated Discoveries Plan If human remains are encountered during construction activities, which includes ceasing all ground disturbing activity, and immediate notification of local law enforcement per Minn. Stat. § 307.08.

6.6 Natural Resources

Impacts to the natural environment are assessed by looking at a variety of resources including air quality, geology and soils, water resources, flora, fauna, and rare and unique resources. Impacts of a transmission line project on these resources are associated with construction directly across or through a resource area. For example, water resource impacts primarily occur where the route requires a wetland or waterbody crossing. In some cases, however, routing in close proximity, even without a crossing, can affect natural resources. Wildlife near the construction area, for example, may be disturbed by noise from construction equipment.

The project would primarily be located within existing ROW. The sections that follow evaluate how the project may impact natural resources and how these impacts may be mitigated.

6.6.1 Air Quality

Air quality is a measure of how pollution-free the ambient air is and how healthy it is for humans, other animals, and plants. Emissions of air pollutants during construction and operation of new infrastructure can cause concern about degradation of air quality. Overall air quality in Minnesota has improved over the last 20 years, but current levels of air pollution still contribute to health impacts.[55]

The USEPA and state agencies operate a system of air quality monitoring stations. Data from these monitoring stations are compared to the National Ambient Air Quality Standards (NAAQS) to categorize the air quality of a particular area. Regions of the country that do not meet the NAAQS are designated as "nonattainment" areas. Some areas of the country do not have extensive air quality monitoring networks and are considered "unclassifiable." Unclassifiable regions are presumed to be in attainment with the NAAQS. The project area is listed as unclassifiable/attainment for all criteria pollutants.

6.6.1.1 Impacts

Impacts on air quality from construction and operation of the project would be low and primarily limited to the period of construction. Temporary and localized air quality impacts caused by construction vehicle emissions and fugitive dust from ROW clearing and construction are expected to occur. Construction activities will be performed with standard heavy equipment such as backhoes, cranes, boom trucks, and assorted small vehicles over the course of construction.

Table 6.6.1.1-1 summarizes the estimated potential emissions of criteria pollutants from construction activities for the Project. Construction emissions are based on typical counts of diesel-fueled construction equipment, expected hours of operation, and estimated vehicle miles traveled.

Table 6.6.1.1-1: Construction Emissions of Criteria Pollutants (tons)

Description	NOx	CO	VOC	SO2	PM10	PM2.5
Off-Road Engine Emissions	25.90	6.04	1.89	0.01	1.01	1.01
Unpaved Roads	-	-	-	-	1.67	0.17
Earthmoving	-	-	-	-	16.22	1.71
TOTAL	25.90	6.04	1.89	0.01	18.91	2.88

Notes:
NOx – nitrogen oxide
CO – carbon monoxide
VOC – volatile organic compounds
SO2 – sulfur dioxide
PM10 – particulate matter equal to or less than 10 microns in diameter
PM2.5 – fine particulate matter equal to or less than 2.5 microns in diameter

6.6.1.2 Mitigation

Temporary and localized air quality impacts caused by construction vehicle emissions and fugitive dust from ROW clearing and construction are expected to occur. Exhaust emissions from diesel equipment will vary during construction but will be minimal and temporary. The magnitude of emissions will be

[55] The State of Minnesota's Air Quality, January 2023 Report to the Legislature, https://www.pca.state.mn.us/sites/default/files/lraq1sy23.pdf.

influenced heavily by weather conditions and the specific construction activity taking place. Appropriate dust control measures will be implemented during construction, including but not limited to:

- Reduced speed limits on unpaved roads and water or other non-chloride-containing dust suppression applications as needed;
- Water application to ROW if fugitive dust occurs during dry weather;
- Street sweeping where soils are tracked onto paved roads; and
- If the ROW is wet during construction activities, vehicle tracking of soil from the ROW will be minimized by using tracking mats at access points.

At the completion of construction activities, all construction-related air impacts will cease. Additional requirements regarding the use of dust suppressants can be found in Special Condition 6.4, Dust Control.

6.6.2 Greenhouse Gases

Greenhouse gases (GHGs) are gaseous emissions that trap heat in the atmosphere and contribute to climate change. These emissions occur from natural processes and human activities. The most common GHGs emitted from human activities include carbon dioxide (CO2), methane (CH4), and nitrous oxide (N_2O). Greenhouse gas emissions are typically reported in carbon dioxide equivalents (CO2e) to account for the variation of global warming potential (GWP) of different gases to produce warming effects. As an example, CH4 is 27 times more potent than CO2 as a greenhouse gas, and N_2O is 273 times more potent than CO2 as a greenhouse gas.[56]

The State of Minnesota is taking significant action to reduce the amount of greenhouse gas emissions produced in the state. Minnesota has experienced a 23 percent reduction in greenhouse gas emissions across all industry sectors between 2005 and 2020.[57]

Construction of the project will result in temporary minor greenhouse gas emissions from fuel combustion in construction equipment, commuter vehicles, and delivery trucks. **Table 6.6.2-1** summarizes the estimated potential emissions of greenhouse gas from construction activities for the Project. Emissions are based on typical counts of diesel-fueled construction equipment, expected hours of operation, and estimated vehicle miles traveled.

Table 6.6.2-1: Preliminary Estimate: Greenhouse Gas Emissions from Construction

Description	CO_2 (Short Tons)	CH_4 (Short Tons)	N_2O (Short Tons)	CO_2e (Short Tons)
Off-Road Engine Emissions	1,129.59	0.05	0.01	1,133.47
Commuters and Delivery Vehicles	418.55	0.00	0.00	418.55
TOTAL	1,548.14	0.05	0.01	1,552.02

[56] https://www.epa.gov/ghgemissions/understanding-global-warming-potentials

[57] MPCA and DOC. 2024. Greenhouse gas emissions in Minnesota 2005-2020. Available online at: https://www.pca.state.mn.us/sites/default/files/lraq-2sy23.pdf. Accessed July 2025.

Description	CO_2 (Short Tons)	CH_4 (Short Tons)	N_2O (Short Tons)	CO_2e (Short Tons)
Notes: **CO2 – carbon dioxide** **CH4 – methane; 1 short ton CH4 = 25 short tons CO2e** **N2O – nitrous oxide; 1 short ton N2O = 298 short tons CO2e** **CO2e – carbon dioxide equivalent** **Source: 40 Code of Federal Regulations (CFR) 98 Table A-1**				

Sulfur hexafluoride (SF_6), a greenhouse gas, is used as an insulating material in substation breakers. Under normal operations, the SF_6 remains contained in the breakers and is not released to the atmosphere. More generally, operational emissions related to the project are not anticipated beyond minor and incidental vehicle emissions associated with project inspection and maintenance (see Section 6.5).

6.6.2.1 Impacts and Mitigation

Currently, there are no Minnesota-specific thresholds of significance for determining impacts of GHG emissions from an individual project on global climate change. In the absence of such a threshold, state regulations establish 100,000 tons per year (tpy) as the threshold to prepare an Environmental Assessment Worksheet to aid in determining if potential significant environmental effects might exist. Projects with GHG emissions below 100,000 tpy likely do not have the potential to result in significant GHG emissions.

The EPA's Greenhouse Gas Reporting Tool[58] shows emissions within Minnesota totaled 36,492,873 metric tons (40,872,018 tons) of carbon dioxide equivalent (CO_2e) in 2022. Accordingly, the preliminary estimate of project greenhouse gas emissions identified here would be negligible as compared to emissions in Minnesota.

During construction, vehicle emissions will be mitigated by limiting vehicle idling to only times when necessary.

The Applicants will monitor the SF_6 gas levels in the breakers as part of its routine monitoring of substation equipment. When gas losses are detected, the SF_6 will be extracted to a separate tank to allow the breaker to be repaired. Any gas collected from decommissioned breakers will be shipped offsite for recycling.

The project would have minimal impacts on GHG emissions in Minnesota, and as such, no mitigation is proposed.

6.6.3 Climate Change

Climate change refers to long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. But since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas.[59] Generally, Minnesota's climate already is changing and will continue to do so. Noticeable effects into the future include warmer periods during winter and at night, increased

[58] USEPA. Facility Level Information Greenhouse Gas Tool. Available online at: https://ghgdata.epa.gov/. Accessed July 2025.
[59] https://www.un.org/en/climatechange/what-is-climate-change

precipitation, heavier downpours, increased summer heat, and the potential for longer dry spells. From 1895 to 2024, Swift County has experienced an increase in temperature of 0.24 degrees Fahrenheit per decade and a decrease in precipitation of 0.35 inch per decade.

6.6.3.1 Impacts and Mitigation

Climate change could result in an increased risk of flooding in the project area, increased temperatures, extreme weather events such as high winds, excessive rainfall, and freezing rain. The project as proposed will be designed to withstand these changes and will increase reliability in the project area, as it is an upgrade to a system which presently exists. The Applicants assess risks to the reliable operation of its transmission system and are working to continue to provide a reliable electrical system. For example, Applicants' assessments have identified a higher potential for freezing rain in the project area. To mitigate damage from freezing rain, Applicants are planning to use twisted pair conductors, which are more resilient to damage that can occur when ice forms on the conductors.

6.6.4 Geology and Groundwater

6.6.4.1 Geology

Geology is the study of the structure, evolution and dynamics of the Earth and its natural mineral and energy resources. Geology is important for the exploration of minerals, understanding the stability of the subsurface, evaluating water resources, and the remediation of environmental hazards. Geological and hydrological systems often determine land use choices and is a factor in siting infrastructure.

The Minnesota River Prairie subsection[60] of the Ecological Classification indicates that glacial drift is generally 100 - 400 feet thick in the project area. Bedrock primarily consists of cretaceous shales, sandstones, and clays. The proposed route is generally located in topography with minimal elevation changes, which is consistent with a morainal landscape. The steepest elevation changes occur near river and stream crossings. Elevations range from 1,010 to 1,040 feet with the lower elevations located toward the southwest portion of the route and the higher elevations located toward the northeast of the route (see **Figure 8**).

6.6.4.1.1 Impacts

Impacts associated with geology and groundwater are typically associated with unstable rock formations, dewatering during construction, improper installation or abandonment of wells, or the introduction of a source of pollutants to an area identified for the protection of groundwater.

Few geological constraints on design, construction, or operation are anticipated in the project area. It is anticipated that each above ground structure will be buried by auguring a hole typically 10 to 25 feet deep and 3 to 5 feet in diameter, which will not impact subsurface geologic features. Concrete foundations may be required for large angles or for longer spans. The foundations are typically five to eight feet in diameter and 15 to 45 feet deep with one foot exposed above the existing ground level.

Concrete foundations will also be required for new and expanded substations but are not anticipated to impact subsurface geologic features.

6.6.4.1.2 Mitigation

[60] MDNR. Undated. Ecological Classification System: Prairie Parkland Province– North Central Glaciated Plains – Minnesota River Prairie Subsection.https://www.dnr.state.mn.us/ecs/251Ba/index.html . Accessed July 2025.

Construction of the project will not alter the geology along the routes; therefore, no mitigation is proposed.

6.6.4.2 Groundwater

Groundwater is water that exists beneath the land surface. Groundwater is the source of about 37 percent of the water that county and city water departments supply to households and businesses. It also provides drinking water for more than 90 percent of the rural population who do not get their water delivered to them from a county or city water department or private water company.

The MDNR divides the state into six groundwater provinces. The project is located in the Central Province (Province 4), which is defined by its buried sand aquifers and expansive surficial sand plains. These features are part of a thick layer of glacial sediment that overlays the bedrock. This province is characterized by abundant sand and gravel aquifers within the thick glacial deposits, while the deeper fractured crystalline bedrock exhibits poor aquifer properties and is of limited use as a water source.

The Minnesota Department of Health (MDH) enforces the federal Safe Drinking Water Act, including the National Primary Drinking Water Regulations created under the Safe Drinking Water Act.[61] These regulations are legally enforceable standards and treatment techniques that apply to public water systems to protect drinking and source water. As a result, Minnesota adopted the State Wellhead Protection (WHP) Rule 4720.5100-4720.5590 in 1997.[62] The MDH is responsible for administering the State WHP Program. Under the WHP Program, public water systems are required to develop and implement a plan that protects its drinking water source. WHPAs are approved surface and subsurface area surrounding a public water supply well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field.[63] DWSMAs contain the WHPA but are outlined by clear boundaries, like roads or property lines. The DWSMA is managed in a WHP plan, usually by a city.[64]

The eastern segment of the proposed route intersects the Benson WHPA (see **Figure 9**). The WHPA corresponds to the Benson DWSMA. The Benson DWSMA Vulnerability is Moderate where the DWSMA intersects the proposed route.[65]

The County Well Index (CWI) is a database that contains subsurface information for over 533,000 water wells drilled in Minnesota. The CWI is maintained by the Minnesota Geological Survey (MGS) in partnership with the MDH. The data are derived from well contractors' logs of geologic materials

[61] MDH. Undated. Laws and Rules. https://www.health.state.mn.us/communities/environment/water/rules/index.html. Accessed July 2025.

[62] MDH. Undated. Wellhead Protection. https://www.health.state.mn.us/communities/environment/water/rules/wellhead.html. Accessed July 2025.

[63] MDH. 2019. Wellhead Protection Areas. Available online at: https://gisdata.mn.gov/dataset/water-wellhead-protection-areas. Accessed July 2025.

[64] MDH. Undated. Source Water Protection Map Viewer. Available online at: https://www.health.state.mn.us/communities/environment/water/swp/mapviewer.html. Accessed July 2025.

[65] MDH. Undated. Source Water Protection Web Map Viewer. Available online at: https://mdh.maps.arcgis.com/apps/View/index.html?appid=8b0db73d3c95452fb45231900e977be4. Accessed August 21, 2024.

encountered during drilling and later interpreted by geologists at the MGS.[66] Wells supplying public water are not included in the CWI due to federal security requirements.[67]

The CWI indicates that there are eighteen wells located within the proposed route and three of those wells are within the proposed ROW. The wells are identified in **Table 6.6.4-1** and in **Figure 9**.

Table 6.6.4-1: CWI Wells within the Proposed Route

Unique ID	Within ROW	Surface Elevation (feet)	Static Water Elevation (feet)	Static Water Level (Depth to Water) (feet)	Status	Use
107368	N	1022	1002	20	Active	Irrigation
133020	Y	1032	1027	5	Active	Domestic
150962	N	1035	1015	20	Active	Industrial
214138	N	1033	1016	17	Active	Domestic
222320	N	1022	0	0	Unknown	Test Well
222323	N	1036.45	1033.15	3.3	Active	Observation Well
223976	N	1015	0	0	Active	Domestic
224003	N	1039	1013	26	Active	Irrigation
224015	N	1033	1018	15	Active	Domestic
272061	N	1022	0	0	Unknown	Irrigation
567313	N	1020	1006	14	Active	Irrigation
581586	N	1014	984	30	Active	Domestic
669072	N	1014	983	31	Active	Domestic
673438	N	1034	1024	10	Active	Environmental Bore Hole
677816	N	1030	1018	12	Active	Monitor Well
750146	Y	1033	1016	17	Active	Domestic
785952	N	1013	975	38	Active	Domestic
812410	Y	1034	1017	17	Active	Domestic

6.6.4.2.1 Impacts

Impacts to groundwater as a result of the project are not anticipated. The majority of the excavations associated with the structure foundations will range from 10 feet to 25 feet in depth; concrete foundations may extend up to 45 feet deep. All foundation materials will be non-hazardous. Any effects on water tables will be localized and temporary and will not affect hydrologic resources. The Applicants will conduct geotechnical investigations to help identify shallow depth to groundwater resource areas, which may require special foundation designs.

Dewatering activities are not expected for this Project, and any effects on water tables will be localized and short term and will not affect hydrologic resources. If test results from soil borings suggest that dewatering may be necessary, Applicants will apply for and obtain a Dewatering Permit from the MDNR.

Table 6.6.4-1 provides the list of currently known wells located within the proposed route based on the CWI. The Applicants will request well information from landowners once a final route is selected, and will coordinate with landowners regarding well access, as needed. The Applicants sent a letter to the MDH on September 5, 2024, introducing the project and inquiring about the WHPA and DWSMA. The MDH responded on October 4, 2024, indicating that no major issues were identified with the project and

[66] MGS. Undated. County Well Index. Available online at: https://cse.umn.edu/mgs/cwi. Accessed July 2025.

[67] MDH. 2024. Minnesota Well Index (MWI): Tips, record requests, and support – How to request records. Available online at: https://www.health.state.mn.us/communities/environment/water/mwi. Accessed July 2025.

to make note of the setback distances established in the Minnesota well code; the Applicants will comply with these setback distances. The MDH also advised the Applicants that spill response must be taken into consideration during construction and must be immediately addressed to ensure that water supply wells are protected.

6.6.4.2.2 Mitigation

To reduce the project's potential impacts on geology and groundwater, Special Condition 6.7 has been included in the draft Route Permit and is summarized as follows:

- Project staging shall occur 200 feet from city wells;
- Follow the Emergency Response Plans for the cities of Appleton and Benson in case of a spill;
- Prepare a contact list of well owners for wells located within 200 feet of the transmission line and provide to MDH for notification in the event of a spill or release of hazardous substance; and
- Locate the transmission lines a sufficient distance from existing wells to allow safe and legal access for maintenance, service, or sealing with a drill rig, or provide accommodation to well owners. This accommodation could include relocation of the well to provide similar chemistry and supply to the owner, and properly abandoning the impacted well.

Additional measures to reduce the project's potential to introduce contamination into the soil and groundwater can be found in **Section 6.2.11, Hazardous Materials**, and additional measures to reduce the project's effects to surface water can be found in **Section 6.6.6, Surface Water Resources**.

6.6.5 Soils

Soil is a mix of living and non-living material. Soil health is defined as "the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans." Healthy soil provides a multitude of benefits: clean air and water, bountiful crops and forests, productive grazing lands, diverse wildlife, and beautiful landscapes. Soil performs five essential functions:

- Regulating water
- Sustaining plant and animal life
- Filtering and buffering potential pollutants
- Nutrient cycling
- Providing physical stability and support

Most of the soils in this subsection are Udolls and Aquolls on relatively level topography, generally with 15 feet or less of local relief. Dry prairie soils (primarily Ustolls) are also present on level to gently rolling topography.

USDA Natural Resources Conservation Service (NRCS) STATSGO2 data were reviewed to describe soil resources in the project area. There are six soil association units that intersect the proposed route. These soil associations are listed in **Table 6.6.5-1** and shown in **Figure 8**.

Table 6.6.5-1: Soil Association Units in the project area

Soil Association[68]	General Description[69]	Acreage in proposed Route Width	Acreage in proposed ROW
Maddock-Egeland (s3520)	Maddock-Egeland association unit is characterized as very deep, well drained or somewhat excessively drained, rapidly permeable soils that formed in fine sands deposited by wind or waters, or 2) very deep, well drained soils formed in glaciofluvial deposits. Slopes range from 0 to 35 percent.	106.2	28.7
Marysland-Hecla-Arveson (s3523)	Marysland-Hecla-Arveson association unit is characterized as 1) very deep, poorly and very poorly drained soils that formed in glacial lacustrine, alluvium or outwash sediments, 2) very deep, moderately well drained soils formed in sandy sediments on lake plains and glacial outwash plains, or 3) in loamy glaciolacustrine or outwash sediments on glacial lake and outwash plains. Slopes range from 0 to 6 percent.	617.1	147.8
Spottswood-Sioux-Renshaw (s3518)	Spottswood-Sioux-Renshaw association unit is characterized as 1) very deep, somewhat poorly drained soils formed in loamy alluvium and the underlying stratified sand and gravel on glacial outwash plains, flood plains, and stream terraces, 2) excessively drained soils formed in sand and gravel on outwash plains, terraces and eskers, or 3) very deep, somewhat excessively drained soils formed in loamy sediments and the underlying sand and gravel on outwash plains and terraces. Slopes range from 0 to 40 percent.	506.6	83.7
Sverdrup-Shakopee-McDonaldsville (s3528)	Sverdrup-Shakopee-McDonaldsville association unit is characterized as 1) very deep, well drained soils that formed in glacial outwash deposits consisting of a loamy mantle and underlying sandy deposits, 2) very deep, poorly drained, soils that formed in clayey over sandy glaciolacustrine sediments, or 3) very deep, poorly drained, soils that formed in clayey and sandy glaciolacustrine sediments. Slopes range from 0 to 18 percent.	67.9	17.0
Tara-Parnell-Hamerly (s3519)	Tara-Parnell-Hamerly association unit is characterized as 1) very deep, moderately well drained soils that formed in 50 to 100 centimeters of glaciolacustrine sediments or loess and in the underlying till of Late Wisconsin Age, 2) very deep, very poorly drained and poorly drained soils that formed in water-sorted sediments from glacial drift in depressions, swales and drainageways on glacial moraines, or 3) very deep, somewhat poorly drained soils that formed in calcareous loamy till. Slope ranges from 0 to 3 percent.	131.0	24.9
Tara-Spicer-Doland-Colvin (s3522)	Tara-Spicer-Doland-Colvin association unit is characterized as 1) very deep, moderately well drained soils that formed in 50 to 100 centimeters of glaciolacustrine sediments or loess and in the underlying till of Late Wisconsin Age, 2) very deep, poorly and very poorly drained soils that formed in silty glacial lacustrine sediments or loess on glacial lake plains and loess-mantled uplands, or 3) well drained moderately permeable soils that formed in a silty mantle and in underlying loamy glacial till or entirely in the silty mantle, 4) very deep, poorly and very poorly drained, moderately to slowly permeable soils formed in silt loam and silty clay loam sediments. Slope ranges from 0 to 18 percent.	291.8	47.4

[68] USDA NRCS. 2016. Digital General Soil Map of the U.S. (STATSGO2): https://www.nrcs.usda.gov/resources/data-and-reports/description-of-statsgo2-database. Accessed September 2024.

[69] USDA NRCS. Undated. Official Soil Series Descriptions (OSD). https://www.nrcs.usda.gov/resources/data-and-reports/official-soil-series-descriptions-osd.Accessed July 2025.

The USDA NRCS Soil Survey Geographic Database[70] (SSURGO) contains information about soil as collected by the National Cooperative Soil Survey over the course of a century. SSURGO data were reviewed to identify high quality agricultural soils. As provided in **Table 6.6.5-2**, approximately 467 acres of Prime Farmland and 461 acres of Farmland of Statewide Importance were identified within the proposed route and approximately 94 acres of Prime Farmland and 71 acres of Farmland of Statewide Importance were identified within the ROW. This amounts to 27 percent and 27 percent, respectively, of the entire proposed route and 27 percent and 20 percent, respectively, of the ROW. However, permanent impacts will be less than the acres identified in this table because only those locations of transmission structure installation and substation relocation/improvement would permanently impact these types of soils.

Table 6.6.5-2: Acres of Prime Farmland and Farmland of Statewide Importance within the ROW and Proposed Route

Category	ROW		Proposed Route	
	Acres	Percentage	Acres	Percentage
Prime farmland	94.0	26.9	466.6	27.1
Farmland of statewide importance	70.5	20.2	461.0	26.8
Not prime farmland	28.4	8.1	146.0	8.5
Prime farmland if drained	156.7	44.8	647.0	37.6
Total	349.6	100.0%	1,720.6	100.0

6.6.5.1 Impacts

Impacts on soils are dependent, to some extent, on the conditions of the soil surface at the time of construction. Most impacts will be temporary and depend on conditions during construction and soil types. Surface soils will be disturbed by site clearing, grading, and excavation activities at structure locations, substation sites, pulling and tensioning sites, setup areas, and during the transport of crews, machinery, materials, and equipment over access routes (primarily along ROWs). During dry conditions, this disturbance will be temporary, minimal, and generally will be less invasive than typical agricultural practices such as plowing and tilling. Soil compaction may occur on access roads, and at other locations as a result of heavy equipment activity. Soil erosion may occur if surface vegetation is removed, especially on fine textured soils that occur on sloping topography.

Soil compaction within wetlands would be mitigated by construction during frozen conditions, use of low ground pressure equipment, and/or installation of construction mats. The Applicants will take measures to alleviate soil compaction where needed. Also, ground disturbance and soil exposure along the transmission line will be primarily limited to the structure locations, which will typically consist of augering a hole 10 to 25 feet deep and 3 to 5 feet in diameter for each structure. Larger and deeper holes will be required for large angles or for longer spans and for concrete foundations associated with substation relocations/improvements.

Erosion and sediment control BMPs will be utilized to minimize runoff during line construction. Such BMPs may include but are not limited to the installation of sediment barriers (e.g., silt fence, straw bales, bio-logs), filter socks, mulch, upslope diversions, and slope breakers. Exposed soils will be revegetated as soon as possible to minimize erosion.

[70] USDA NRCS. 2024. Soil Survey Geographic Database (SSURGO):https://www.nrcs.usda.gov/resources/data-and-reports/soil-survey-geographic-database-ssurgo. Accessed September 2024.

Since substation relocation and upgrades are expected to result in the disturbance of more than one acre of soils, the Applicants will obtain coverage under the Construction Stormwater General Permit and will prepare a Stormwater Pollution Prevention Plan.

6.6.5.2 Mitigation

The implementation of two standard conditions in the draft Route Permit would reduce the potential impacts to soils; these conditions are summarized below:

Section 5.3.8, Soil Erosion and Sediment Control

- Implement erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency Construction Stormwater Program;
- Obtain a National Pollutant Discharge Elimination System/State Disposal System Construction Stormwater Permit from the Minnesota Pollution Control Agency when required, and implement the conditions therein;
- Protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, and stabilizing slopes;
- Grade contours as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that facilitate re-vegetation and prevent erosion; and
- Return all areas disturbed during construction to pre-construction conditions.

Section 5.3.10, Vegetation Management

- Minimize the number of trees to be removed; and
- Preserve windbreaks, shelterbelts, living snow fences, and vegetation in areas such as trail and stream crossings.

Additional measures related to the potential for sediment and erosion control products to negatively affect wildlife can be found in **Section 6.6.8, Wildlife**.

6.6.6 Surface Water Resources

Surface water resources include surface water bodies, watercourses, and wetlands that supply water for drinking, irrigation and industrial uses, provide wildlife habitat, and serve as swimming and fishing resources for people. The extent of surface water resources (their amount and distribution) and their condition (physical, chemical, and biological attributes) are critical to ecosystems, human uses, and the overall function and sustainability of the hydrologic cycle. Calcareous fens, a particularly rare type of wetland, is discussed in **Section 5.6.9, Rare and Unique Resources**. The potential for soil and groundwater to enter surface water bodies is analyzed in **Section 5.6.4, Geology and Groundwater**, and **Section 5.6.5, Soils**. The project is within the Minnesota River–Headwaters, Pomme de Terre River, and Chippewa River Watersheds, located in the northwest portion of the Minnesota River Basin.[71]

Adjacent to many waterbodies are riparian areas and wetlands. Protection of existing wetlands is important for flood control and filtering of stormwater runoff, and water quality remains a significant

[71] MDNR. Undated. Minnesota's watershed basins. https://www.dnr.state.mn.us/watersheds/map.html. Accessed July 2025.

concern throughout the region.[72] Wetlands that are hydrologically connected to the nation's navigable rivers are federally protected under the Clean Water Act. In Minnesota, wetlands are also protected under the WCA.

A floodplain is any area subject to flooding from any source, such as rivers, streams, and lakes.[73] Natural floodplains provide flood risk reduction benefits by slowing runoff and storing flood water. Floodplains not only play a vital role in spawning habitat and refuge for aquatic biota, but also for nutrient removal and energy dissipation for river stability.

6.6.6.1 Lakes and Ponds

According to the USFWS National Wetlands Inventory (NWI),[74] there are no lakes or ponds that intersect the proposed route (see **Figure 10**). The closest pond is approximately 350 feet south of the proposed route and located in an agricultural field 0.4 mile west of the intersection of U.S. Highway 59 and the proposed route.

6.6.6.2 Rivers and Streams

The MDNR Hydrography Dataset[75] indicates that a total of 19 rivers and streams are located within the proposed route, described in **Table 6.6.6-2-1** and shown on **Figure 10**.

Table 6.6.6-2-1: Rivers/Streams Crossed by the Proposed Route

River/Stream Location	Name	Length Crossed by ROW (feet)	Notes
West of 200th Ave SW / 60th St SW	Pomme de Terre River	85	Public Waters Inventory (PWI) Watercourse, Impaired Stream, State Water Trail
West of County Road 9 / 60th St SW	Unnamed	1	Aerial imagery indicates that stream is mapped within an agricultural field and may no longer be present.
North of 60th St SW / proposed route	Unnamed	8	-
West of Burlington Northern Railroad / proposed route	Unnamed	0	Small bend of stream crosses into and then out of the proposed route.
Crosses 150th Ave SW and proposed route	Unnamed	20	-
East of 40th St SW / 150th Ave SW	Unnamed	75	Aerial imagery indicates mapped stream is realigned into agricultural ditches.
East of 40th St SW / 130th Ave SW	Unnamed	0	-

[72] https://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/cwcs/profiles/st_paul_baldwin_plains.pdf

[73] https://floodsciencecenter.org/products/elected-officials-flood-risk-guide/introduction/.

[74] USFWS. National Wetland Invetory. https://www.fws.gov/program/national-wetlands-inventory. Accessed July 2025.

[75] MDNR Division of Fish & Wildlife – Fisheries Unit. 2024. MDNR Hydrography Dataset. Available online at: https://gisdata.mn.gov/dataset/water-dnr-hydrography. Accessed July 2025.

River/Stream Location	Name	Length Crossed by ROW (feet)	Notes
East of 40th St SW / 130th Ave SW	Cottonwood Creek	15	PWI Watercourse
West of 40th St SW / 110th Ave SW	Unnamed	0	Small bend of stream crosses into and then out of the proposed route.
West of 40th St SW / 110th Ave SW	Unnamed	1	Aerial imagery indicates that stream is mapped within an agricultural field and may no longer be present.
West of 40th St SW / 100th Ave SW	Judicial Ditch 8	30	PWI Watercourse/Ditch, Impaired Stream
North of 30th St SW / 80th Ave SW	Judicial Ditch 8	0	Located adjacent to the Danvers Substation. Segment is not listed as a PWI or Impaired.
Crosses proposed route North of MDNR Wildlife Area	Unnamed	15	Aerial imagery indicates mapped stream is realigned into agricultural ditches.
West of 30th St SW / 45th Ave SW	Unnamed	5	Aerial imagery indicates mapped stream is realigned into agricultural ditches and may not be present. May run parallel to ROW for 0.21 miles as roadside ditch.
East of 30th St SW / 45th Ave SW	County Ditch 3	40	PWI Watercourse/Ditch, Impaired Stream
West of 20th St SW / 30th Ave SW	Unnamed	2	Aerial imagery indicates mapped stream is realigned into agricultural ditches and may not be present. May run parallel to ROW for 850 feet as roadside ditch.
North of USTH 12 / 25th Ave NW	Unnamed Drainage Ditch	20	-
North of 20th St NW	Unnamed Stream	0	Aerial imagery indicates that the stream may not be present due to historic industrial development
West of 22nd St / Kansas Ave	Chippewa River	0	PWI Watercourse, Impaired Stream, State Water Trail. Overlaps with the northwest boundary of the proposed route west of the Benson Municipal Substation.

Sources:
MDNR Division of Fish & Wildlife – Fisheries Unit. 2024. MDNR Hydrography Dataset. Available online at: https://gisdata.mn.gov/dataset/water-dnr-hydrography. Accessed July 2025.
USFWS. 2015. National Wetland Inventory. May 23. Available online at: https://gisdata.mn.gov/dataset/water-nat-wetlands-inv-2009-2014. Accessed July 2025.
MDNR. 2020. Public Waters (PW) Basin and Watercourse Delineations. Available online at: https://gisdata.mn.gov/dataset/water-mn-public-waters. Accessed July 2025.

The Proposed ROW crosses two BWSR administered RIM easements just west of the City of Benson along the Chippewa River. The northernmost easement is a Floodplain Easement located north of U.S.

Highway 12 and the other is a Riparian Easement south of U.S. Highway 12.[76] The proposed ROW runs parallel to the eastern boundary of both easements. The proposed alignment and associated ROW cross an additional Riparian Easement east of the town of Holloway along an intermittent Unnamed Stream. There is an additional easement located south of 30th St SW east of the Town of Danvers that occurs within the Route Width but is avoided by the proposed alignment and ROW.

The Riparian and Floodplain Restoration program secures easements along riparian areas that provide both improved wildlife habitat and water quality benefits. Targeted land for the program is existing row crop within a riparian area or a mapped floodplain.[77] Otter Tail Power's existing 41.6 kV transmission line occurs along the eastern boundary of the Riparian Easement east of the town of Holloway. Based on aerial photography, the current land use where the proposed alignment crosses the easements is unmaintained grassland with scattered woody vegetation. Mapped water resources are not currently located within the easements where they are intersected by the proposed alignment.

6.6.6.3 Public Waters

Public Waters are wetlands, basins, and watercourses of significant recreational or natural resource value in Minnesota, as defined in Minn. Stat. § 103G.005. The MDNR has regulatory jurisdiction over these waters.

MDNR PWI basins and wetlands (waterbodies) are not intersected by the proposed route, alignment, or associated ROW. However, four PWI watercourses are intersected by the proposed alignment and associated ROW and are identified in **Table 6.6.6-2-1**: Pomme de Terre River, Cottonwood Creek, Judicial Ditch 8, and County Ditch 3. The Chippewa River, a PWI watercourse, is also currently crossed by the proposed route, but not the proposed alignment or ROW.

6.6.6.4 Impaired Waters

Section 303(d) of the Federal Clean Water Act requires states to publish, every two years, a list of streams and lakes that are not meeting their designated uses because of various impairments. The list, known as the 303(d) list, is based on violations of water quality standards and listed waters are described as "impaired." In Minnesota, the MPCA has jurisdiction over determining 303(d) waters.

Four impaired watercourses[78] are crossed by the proposed route and three impaired watercourses are crossed by the proposed alignment and associated ROW, which are identified in **Table 6.6.6-2-1** and on **Figure 10**. The Pomme de Terre River is impaired for fecal coliform, mercury in fish tissue, turbidity, fishes bioassessments, and aquatic macroinvertebrate bioassessments. Judicial Ditch 8 is impaired for fishes bioassessment and County Ditch 3 is impaired for Escherichia coli (E. coli).

The Chippewa River is also crossed by the proposed route, but not the proposed alignment or ROW, and is impaired for E. coli, mercury in fish tissue, fishes bioassessments, and total suspended solids.

[76] BWSR. 2024. State Funded Conservation Easements (RIM Reserve). Available online at: https://gisdata.mn.gov/dataset/bdry-bwsr-rim-cons-easements. Accessed July 2025.

[77] BWSR. Undated. RIM Riparian and Floodplain Restoration. Available online at: https://bwsr.state.mn.us/rim-riparian-and-floodplain-restoration. Accessed September 2024.

[78] MPCA, 2025. Minnesota's Impaired Waters List. https://www.pca.state.mn.us/air-water-land-climate/minnesotas-impaired-waters-list. Accessed July, 2025

6.6.6.5 Wetlands

Wetlands are important resources for flood abatement, wildlife habitat, and water quality. Wetlands that are hydrologically connected to the nation's navigable rivers are protected federally under Section 404 of the Clean Water Act. In Minnesota, wetlands are also protected under the WCA.

Thirty-seven NWI wetlands intersect the proposed route. Thirteen of the wetlands are crossed by the 100-foot-wide ROW and eight are crossed by the proposed alignment. **Table 6.6.6.5-1** summarizes the mapped wetland communities intersected by the Project.

Table 6.6.6.5-1: Wetlands Crossed by the Project

NWI Wetland Community	Proposed Route Count / Acres	ROW Count / Acres	Alignment Count / Linear Feet
Palustrine Emergent	24 / 21.9 acres	11 / 3.2 acres	8 / 1,691 feet
Palustrine Forested	5 / 1.6 acres	1 / <0.1-acre	0.0 / 0.0
Palustrine Scrub-Shrub	10 / 5.8 acres	1 / <0.1-acre	0.0 / 0.0

6.6.6.6 Floodplains

The majority of the project occurs in Federal Emergency Management Agency (FEMA) Non-Special Flood Hazard Area designated as Zone X, which has 0.2 percent annual chance of a flood hazard or area of minimal flood hazard. However, the project also crosses Special Flood Hazard Areas, including: Zone A unmapped floodplain, Zone AE mapped flood fringe, and Zone AE mapped floodway. Zone A floodplain and Zone AE flood fringe areas are high-risk areas that will be inundated by the flood event having a one-percent chance of being equaled or exceeded in any given year. The one-percent annual chance flood is also referred to as the base flood or 100-year flood.

The Zone AE floodway is a regulatory floodway defined as the channel of a river or other watercourse and the adjacent land area that is reserved from encroachment in order to discharge the base flood without cumulatively increasing the water-surface elevation by more than a designated height. **Table 6.6.6.6-1** summarizes Special Flood Hazard Area (SFHA) crossings by the Project.

Table 6.6.6.6-1: Special Flood Hazard Areas Crossed by the Project

Special Flood Hazard Area Designation	Route Width (acres)	ROW Width (acres)
Zone A	22.8	3.1
Zone AE Floodway	11.5	2.0
Zone AE Flood Fringe	60.2	20.3
Total	94.5	25.4

Source: FEMA Flood Map Service Center. Undated. Available online at: https://msc.fema.gov/portal/search?AddressQuery=City%20of%20Appleton%2C%20MN. Accessed December 2024.

6.6.6.7 Impacts and Mitigation

Impacts to surface water resources typically include pollutants entering wetlands and waterbodies from stormwater runoff containing chemicals released onto urban hardscape, used in landscaping, or an excess of sediment from soil erosion. Developing floodplains or siting infrastructure in floodplains can present problems if flooding occurs, damaging infrastructure, homes, and businesses.

6.6.6.7.1 Lakes, Ponds, Rivers, and Streams

There are no lakes or ponds crossed by the proposed route.

The rivers and streams crossed by the proposed route can be spanned by the transmission line and no structures will be installed within those water resources. During construction, the Applicants will utilize erosion and sediment control BMPs (e.g., silt fencing) to mitigate the potential for sediment to reach receiving surface waters. The Applicants may need to install temporary bridges across some rivers and streams to allow access during construction and restoration. Equipment bridges will be designed to meet the requirements of the applicable agencies and local authorities. Bridges will be installed during clearing and will be removed as soon as possible during final restoration once the bridge is no longer required to complete and monitor restoration activities. Fording of waterbodies is prohibited (i.e., civil survey, potholing, or other equipment are not permitted to ford waterbodies prior to bridge placement).

On September 25, 2024, BWSR provided additional information regarding the RIM interests located within the Route Width.[79] BWSR confirmed that the proposed alignment (0.2 mile) and ROW (1.7 acres) cross the Riparian Easement located east of the town of Holloway, but only the ROW crosses the two RIM easements located southwest of the City of Benson (approximately 1.2 and 2.5 acres, respectively). BWSR indicated that vegetation maintenance must be consistent with the conservation plan associated with the easement and that siting of permanent structures within the easements should be avoided. Compensatory mitigation will be required for impacts to the easements. The Applicants will continue to coordinate with BWSR to avoid and/or mitigate impacts to these easements and to obtain the required authorization.

6.6.6.7.2 Public Waters

PWI basins and wetlands are not crossed by the proposed route; however, as stated above and identified in **Table 6.6.6-2-1**, four PWI watercourses are intersected by the proposed alignment and associated ROW. Additionally, a fifth PWI watercourse (the Pomme de Terre River) is intersected by the proposed route.

The Applicants may need to install temporary bridges to cross some of the PWI watercourses during construction and restoration. Equipment bridges will be designed to meet the requirements of the MDNR and other applicable permitting authorities. Bridges will be installed during clearing and will be removed as soon as possible during final restoration once the bridge is no longer required to complete and monitor restoration activities. The Applicants will also install sediment and erosion control BMPs (e.g., silt fencing) during construction to mitigate the potential for sediment to reach receiving PWI watercourses. The Applicants will coordinate with the MDNR to obtain the applicable licenses and/or leases for these crossings based on the final transmission line design.

6.6.6.7.3 Impaired Waters

As noted in **Table 6.6.6-2-1**, three impaired watercourses are crossed by the proposed alignment and associated ROW. The Applicants will avoid impacts to impaired waters by:

- Spanning the waterbodies and avoiding direct impacts to the bed and banks; and

[79]Appleton to Benson Joint Application Appendix K- Agency Correspondence- eDockets No. 202412-213349-19

- Installing erosion and sediment control BMPs to mitigate the potential to increase turbidity due to sedimentation from construction.

6.6.6.7.4 Wetlands

The proposed alignment crosses eight mapped wetlands, and the associated ROW crosses five additional wetlands (see **Table 6.6.6.5-1**). None of the crossed wetlands are classified as PWI wetlands.

Temporary impacts to wetlands may occur where temporary access or construction workspace is required, and/or where the 100-foot-wide permanent ROW occurs in non-woody vegetation wetland communities requiring vegetation clearing. Clearing in wetlands will be conducted during frozen conditions, using low ground pressure equipment and/or, or mats will be installed to minimize impacts to vegetation if frozen ground conditions are not sustained. Staging or stringing setup areas will not be placed within or adjacent to water resources to the extent practicable.

Permanent impacts to wetlands occur when structures or other permanent infrastructure are installed in wetlands, or when woody wetland vegetation communities occur within the permanent 100-foot-wide ROW where the Applicants will conduct regular vegetation maintenance to remove tall trees and shrubs from the ROW (i.e., permanent conversion).

Substation relocations and upgrades will not be sited in wetlands. As discussed in Section 3.3.1, the maximum span distance between structures is approximately 500 feet. Based on the current proposed alignment, only one wetland is over 500 feet long that may require structure installation within the wetland. During the final design process, the Applicants will minimize wetland impacts by placing the structures to span and avoid wetlands, to the extent practicable.
If unanticipated wetlands are discovered, and where it is not possible to span a wetland, several measures will be utilized to minimize impacts during construction:

- When feasible, construction will be scheduled during frozen ground conditions.
- When construction during frozen ground conditions is not feasible, construction mats and/or low ground pressure equipment will be used to protect wetland vegetation.
- Construction crews will attempt to access wetlands with the least amount of physical impact to the wetlands.

As discussed in Section 6.3, once construction of the project is completed, disturbed soil will be restored to previous conditions to the extent possible, and areas will be reseeded with vegetation similar to that which was removed with a seed mixture certified as free of noxious or invasive weeds (see the draft VMP provided in **Appendix E)**.

As discussed in Section 6.5, the Applicants will manage the ROW to remove vegetation that interferes with the operation and maintenance of the transmission line. Existing trees and tall shrubs will be removed throughout the entire ROW, including forested and some scrub-shrub wetlands. The Applicants will continue to manage the ROW to remove vegetation that interferes with the operation and maintenance of the transmission line; therefore, these forested and scrub-shrub wetlands will undergo permanent conversion to a different wetland vegetation community type within the ROW. As shown in **Table 6.6.6.5-1**, this is less than 0.1 acre based on the proposed alignment and associated 100-foot-wide ROW.

Standard Condition 5.3.9 in the draft Route Permit include requirements for minimizing impacts to wetlands, summarized as follows:

- Construction in wetland areas occur during frozen ground conditions to minimize impacts; if construction is not possible during winter, wooden or composite mats will be used to protect wetland vegetation; and
- Soil excavated from the wetlands and riparian areas be contained and managed in accordance with all applicable wetland permits.

6.6.6.7.5 Floodplains

The Applicants will not place structures within Zone AE floodways, and will avoid the placement of structures within Zone A and Zone AE flood fringe areas to the extent practicable. Infrastructure located within the floodplain will be flood proofed in accordance with State Building Code or elevated above the regulatory flood protection elevation.

6.6.7 Vegetation

Construction of transmission lines often requires the disturbance or removal of vegetation during construction. Additionally, vegetation may be impacted if invasive or non-native species are introduced to the ROW during construction or restoration, or by changes to habitat (e.g., soils, water flows) that adversely impact plant growth.

Plant communities can be generally characterized for the project area using the Ecological Classification System.[80] The system was developed by the MDNR and U.S. Forest Service for ecological mapping and landscape classification. The top three tiers of the system consist of Province, Section, and Subsection. The project falls in the Prairie Parkland Province, the North Central Glaciated Plains Section, and the Minnesota River Prairie subsection.

The Prairie Parkland Province "traverses western Minnesota, extending northwest into Manitoba, west into North Dakota and South Dakota, south into Iowa, Nebraska, Kansas, Oklahoma, and Missouri, and east into Illinois and Indiana." "Precipitation increases from about 18 inches (46 centimeters (cm)) annually in the north to 33 inches (84 cm) in the south. Low winter precipitation, short duration of snow cover, and desiccating westerly winds promote severe spring fire seasons that favor grassland over forest vegetation."[81] The land in this Province was heavily influenced by recent glaciation and is now occupied by the Minnesota River.

The North Central Glaciated Plains Section "is a level to rolling region of calcareous till deposited by the Des Moines lobe. This region is bisected by the deeply incised Minnesota River valley. The historic pattern of vegetation in this Section reflects features that affected the frequency and severity of fires. Level to rolling till plains, moraines, lake plains, and outwash plains covered much of the Section and supported mainly treeless fire-dependent communities, with upland prairie communities by far the most common, covering 82 percent of the Section. These landforms also supported smaller amounts of

[80] MDNR. Undated. Ecological Classification System. Available online at: https://www.dnr.state.mn.us/ecs/index.html. Accessed July 2025.

[81] MDNR. Undated. Ecological Classification System: Prairie Parkland. Available online at: https://www.dnr.state.mn.us/ecs/251/index.html. Accessed July 2025.

marsh, wetland prairie, and wet meadow communities. Rugged terrain and lands deeply dissected by rivers supported a mosaic of prairie and wooded communities."[82]

The Minnesota River Prairie subsectionfurther details flora of the project area. Pre-settlement vegetation communities was primarily tallgrass prairie, with many islands of wet prairie and "forests of silver maple, elm, cottonwood, and willow grew on floodplains along the Minnesota River and other streams." [83] The current vegetation and land use is primarily agricultural. Upland prairies are common throughout; however, remnant tallgrass prairies are rare.

6.6.7.1 Impacts

Construction and operation of the project may cause short-term and long-term impacts on vegetation. During construction, vegetation may be impacted if invasive or non-native species are introduced into the ROW during construction or restoration, or by changes in soil or stormwater runoff that adversely impacts plant growth. Standard conditions are included in the draft Route Permit to reduce impacts associated with invasive species and noxious weeds.

Long-term impacts would primarily result from tree trimming and removal in the ROW. The applicants anticipate removal of approximately 10.0 acres of trees within the ROW for the project. Maintenance of the ROW must meet electrical safety standards, therefore woody vegetation that is removed from the ROW is unlikely to be replaced. The draft Route Permit includes a standard condition to minimize tree removal.

Compliance with the Route Permit would minimize short- and long-term impacts to vegetation resulting from the project.

6.6.7.2 Mitigation

The implementation of three standard conditions in the draft Route Permit would reduce the potential impacts to vegetation, and are summarized below:

Section 5.3.10, Vegetation Management:

- Minimize the number of trees to be removed; and
- Leave existing low growing species in the ROW undisturbed

Section 5.3.12, Invasive Species:

- Employ best management practices to avoid introducing and spreading invasive species on areas disturbed by construction; and
- Develop an Invasive Species Prevention Plan.

Section 5.3.13, Noxious Weeds:

- Take all reasonable precautions against the spread of noxious weeds during all phases of construction; and

[82] MDNR. Undated. Ecological Classification System: Prairie Parkland: North Central Glaciated Plains Section. Available online at: https://www.dnr.state.mn.us/ecs/251B/index.html. Accessed July 2025

[83] MDNR. Undated. Ecological Classification System: Prairie Parkland – North Central Glaciated Plains – Minnesota River Prairie Subsection. Available online at: https://www.dnr.state.mn.us/ecs/251Ba/index.html. Accessed July 2025.

- Select site-appropriate seed and certified to be free of noxious weeds.

To integrate the standard conditions, and to consolidate feedback from interested state agencies regarding vegetation management into one document, special condition 6.9 has been included in the draft Route Permit for the applicants to prepare a Vegetation Management Plan for the project. A draft VMP was included in the applicants' application, and will be reviewed by the Vegetation Management Plan Working Group based on the permitted project and associated permit conditions.

- Section 6.9, Vegetation Management Plan: The Permittee shall develop a Vegetation Management Plan in coordination with the Vegetation Management Plan Working Group, incorporate requirements from MDNR and BWSR, provide a sequence for the management methods proposed, and for monitoring the growth of vegetation.

6.6.8 Wildlife

Impacts to wildlife can occur during construction and operation. Impacts on wildlife are assessed by evaluating the vegetation cover and habitat in the ROW. Impacts to sensitive wildlife habitat and known occurrences of sensitive wildlife species are analyzed in **Section 6.6.9, Rare and Unique Resources**.

The project is located in the MDNR Nongame Wildlife – South Region.[84] The South Region includes the Minnesota River Valley, which is a migratory corridor for songbirds, raptors, shorebirds, and waterbirds. The South Region provides habitat for non-game species, including Henslow's sparrow, Blanding's turtle, lined snake, and Blanchard's cricket frogs. Mammal species include mice, voles, and squirrels. Invertebrates may include the Dakota skipper, regal fritillary, and the rusty-patched bumble bee.

The proposed alignment and ROW are located north of 30th Street SW, which is adjacent to, but does not cross, the Clair Rollings WMA. This WMA may support game species including deer, small game, forest upland birds, pheasants, waterfowl, and turkey.[85]

As presented on **Figure 7**, the western portion of the proposed route overlaps with the Lac qui Parle - Big Stone Important Bird Area (IBA). This IBA has diverse habitats including prairie grasslands (i.e., un-disturbed and restored), floodplain, deciduous forests with riparian habitats, and a variety of wetlands, large lakes and smaller waterbodies including prairie potholes. This IBA supports the largest concentration of Canada geese and other waterfowl and hosts the largest American White Pelican breeding colony.[86]

6.6.8.1 Impacts

During construction, there is a potential for erosion and sediment control products to negatively affect wildlife. The MDNR recommends that erosion control blankets be limited to "bio-netting" or "natural netting" types to reduce the potential for entanglement with small animals, and specifically not products containing plastic mesh netting or other plastic components. Special Condition 6.5 has been

[84] MDNR. Undated. Nongame Wildlife – South Region. Available online at: https://www.dnr.state.mn.us/eco/nongame/south.html. Accessed July 2025.
[85] MDNR. 2024. Wildlife Management Areas – Clair Rollings WMA. Available online at: https://www.dnr.state.mn.us/wmas/detail_report.html?id=WMA0141000. Accessed July 2025.
[86] Audubon Minnesota. Undated. Minnesota Important Bird Areas. Lac qui Parle - Big Stone. Available online at: https://mn.audubon.org/node/4281. Accessed July 2025.

added to the draft Route Permit to reduce impacts to wildlife resulting from the use of erosion and sediment control products during construction.

Ground disturbing activities, particularly during construction, have the potential to produce dust when disturbed soil particles become entrained in the atmosphere. Dust from construction activities can be controlled using standard construction practices such as watering of exposed surfaces, covering of disturbed areas, reduced speed limits, and the use of chemical dust suppressants. Dust suppressants containing chloride are persistent in the environment, and can accumulate to levels toxic to plants and wildlife. Special Condition 6.4 has been added to the draft Route Permit to prohibit the use of chloride-containing dust suppressants during construction and operation.

Animals depend on the daily cycle of light and dark for behaviors such as hunting, migrating, sleeping, and protection from predators. In addition to the undesirable effects of upward facing lighting, the hue of lights can also affect wildlife. LED lighting has become increasingly popular due to its efficiency and long lifespan. However, these bright lights tend to emit blue light, which can be harmful to birds, insects, and fish. The MDNR recommends that any projects using LED luminaries follow the MnDOT Approved Products for luminaries, which limits the uplight rating to zero. A nominal color temperature below 2700K is preferable for wildlife, and selecting products that have the lowest number for backlight and glare. Special Condition 6.3 has been added to the draft Route Permit to reduce impacts to wildlife resulting from lighting at the substations.

There is minimal potential for the displacement of wildlife and loss of habitat from construction of the Project. Wildlife that inhabits the project area could be temporarily displaced during construction activities. Individuals that use forested habitat within the project area may be permanently displaced; however, because the project follows existing utility and road ROWs, tree clearing will be minimized. The distance that animals will be displaced will depend on the species. Additionally, these animals will be typical of those found in agricultural settings, will likely be able to find similar habitat nearby and, therefore, should not incur population level effects due to construction.

Raptors, waterfowl, and other bird species may be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission lines. Waterfowl are typically more susceptible to transmission line collision, especially if the transmission line is placed between agricultural fields that serve as feeding areas, or between wetlands and open water, which serve as resting areas. Project design and construction will be done in accordance with Avian Power Line Interaction Committee (APLIC) guidelines. Any eagle or other migratory bird nests incidentally observed during or reported during the land acquisition process will be reported to the USFWS and the Applicants will adhere to guidance provided.

6.6.8.2 Mitigation

Special conditions have been included in the draft Route Permit to minimize impacts to wildlife:

- Section 6.3, Facility Lighting: To reduce harm to birds, insects, and other animals, the Permittee shall utilize downlit and shielded lighting. Lighting utilized shall minimize blue hue.
- Section 6.4, Dust Control: The Permittee is prohibited from using dust control products containing calcium chloride or magnesium chloride during construction and operation.
- Section 6.5, Wildlife-friendly Erosion Control: To protect wildlife from impacts due to erosion control products, the Permittee shall use erosion control blankets limited to “bio-netting” or

"natural netting" types, and shall specifically not use products containing plastic mesh netting or other plastic components, including hydro-mulch products that may contain small synthetic (plastic) fibers to aid in its matrix strength.

6.6.9 Rare and Unique Resources

Rare and unique resources include assemblages of species or habitat that are designated for special care and conservation by state and federal agencies because loss of habitat and because small or shrinking populations are cause for concern.

6.6.9.1 Federally Listed Species

Rare and unique resources at the federal level are typically evaluated and protected by the USFWS. Project applicants can access information about plants and wildlife protected by federal law through the Information for Planning and Consultation (IPaC) tool developed and maintained by the USFWS. In addition, the USFWS administers the National Wildlife Refuge System, a diverse network of lands and waters dedicated to conserving America's rich fish and wildlife heritage.[87]

The Applicants reviewed the USFWS IPaC website[88] for a list of federally threatened and endangered species, candidate species, and designated critical habitat that may be present within the project area. Based on the official species list provided by the USFWS,[89] three species federally listed under Endangered Species Act (ESA), one species proposed for listing, and one candidate species have been previously documented within the vicinity of the proposed route (see **Table 6.6.9-1**). No federally designated critical habitat is present within the proposed route.

Table 6.6.9-1: Federal Species within the project area

Common Name	Scientific Name	Federal Status
Northern long-eared bat	*Myotis septentrionalis*	Endangered
Dakota skipper	*Hesperia dacotae*	Threatened
Monarch butterfly	*Danaus plexippus*	Proposed Threatened
Western Regal Fritillary	*Argynnis idalia occidentalis*	Proposed Threatened

Northern Long-eared Bat

The range of the northern long-eared bat (NLEB) stretches across much of the eastern and midwestern United States. During summer, the bats roost singly or in colonies under bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places such as caves and mines. This species is thought to be opportunistic in selecting roosts, using tree species based on the tree's ability to retain bark or provide cavities or crevices. It has also been found, rarely, roosting in structures such as barns and sheds. In winter, NLEBs use caves and mines as hibernacula.[90]

Suitable habitat for the northern long-eared bat is present within the proposed route.

Dakota Skipper

[87] https://www.fws.gov/program/national-wildlife-refuge-system

[88] USFWS. Undated. Information for Planning and Consultation (IPaC) Website. Available online at: https://ecos.fws.gov/ipac/. Accessed July 2025 and October 2024.

[89] Appleton to Benson Joint Application Appendix K- Agency Correspondence- eDockets No. 202412-213349-19

[90] USFWS. Undated. FWS Focus: Northern Long-eared Bat (*Myotis septentrionalis*). Available online at: https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis. Accessed July 2025.

Dakota skippers are endemic to high-quality, mixed, tallgrass prairies. The Dakota skipper is limited to two types of prairies, one is a moist bluestem prairie that contains three wildflower species: wood lily (*Lilium philadelphicum*), harebell (*Campanula rotundifolia*) and smooth camas (*Zygadenus elegans*). The other prairie is dry and typically found on ridges and hillsides with the dominant species consisting of bluestem and needle grass, and purple coneflower (*Echinacea angustifolia*). These habitat types are typically found in unbroken grasslands; however, Dakota skippers can be found on re-established sites or sites that have been previously plowed.[91]

Midwest Natural Resources conducted a desktop and field-based habitat assessment to identify areas of potential Dakota skipper habitat. Based on the field-based habitat assessment, suitable habitat for the Dakota skipper is not present within the proposed route.

Monarch Butterfly

The monarch butterfly is a large butterfly with an approximately 3- to 4-inch wingspan and characterized by bright orange coloring on the wings, with distinctive black borders and veining. The species can be found in a wide variety of habitats including prairies, grasslands, urban gardens, road ditches, and agricultural fields, provided a supply of nectaring plants are available for adult foraging and milkweed plants are present for laying eggs and as a food source for caterpillars.[92]

On December 12, 2024, the USFWS issued a Species Status Assessment and a proposed rule to list the monarch butterfly as a threatened species and designate critical habitat under the ESA. While the species is proposed as threatened, proposed species do not receive the full protections of the ESA until the listing is finalized. A final rule will likely be published within 12 months of the proposed rule and protections would be effective within 30 to 60 days or around January 2026. If the listing status of the monarch butterfly changes, the Applicants must consult with USFWS regarding any potential impacts to this species.

Suitable habitat for the monarch butterfly is present within the proposed route.

Western Regal Fritillary

The western regal fritillary (*Argynnis idalia occidentalia*) is a strong-flying, non-migratory butterfly with a wingspan up to four inches. The forewing is orange with black markings, while the hindwing is mostly black with a row of white spots across the middle. The spots on the outer margin of the hindwing is white in females and orange in males. The caterpillars are velvety black, yellow, or deep orange, with orange or red stripes, and yellow-white branching spines with black tips.[93]

This species is restricted to native tallgrass prairie habitats and was once commonly found in 32 states extending north in New England, south to Oklahoma, and west to Colorado. Regal fritillaries can range widely with females potentially traveling up to 100 miles searching for three main habitat components: violet hostplants for larvae, nectar plants for adults, and native grasses to provide protection throughout

[91] USFWS. Undated. Dakota skipper (Hesperia dacotae). Available online at: https://www.fws.gov/species/dakota-skipper-hesperia-dacotae. Accessed July 2025.

[92] USFWS. Undated. FWS Focus: Monarch Butterfly (*Danaus plexippus*). Available online at: https://www.fws.gov/species/monarch-butterfly-danaus-plexippus. Accessed July 2025.

[93] USFS. 2024. Regal Fritillary. Available online at: https://www.fws.gov/species/regal-fritillary-speyeria-idalia. Accessed October 2024

the life cycle. Adults can be found foraging in both upland and wet prairie habitats; however, habitat can only be considered suitable for all life stages if violet species are present to provide shelter and forage for larvae. The density of violets seems to correlate positively to number of butterflies within a given area. Habitat alteration has reduced the species' range and abundance.

On August 16, 2024, the USFWS issued a proposed rule to list the western regal fritillary as threatened under the ESA. While the western regal fritillary is proposed as threatened, proposed species do not receive the full protections of the ESA until the listing is finalized. A final rule will likely be published within 12 months of the proposed rule and protections would be effective within 30 to 60 days or around September 2025. If the listing status of the western regal fritillary changes, the Applicants must consult with USFWS regarding any potential impacts to this species.

Native tallgrass prairie habitats are not present within the proposed route; however, suitable larva habitat may be present.

6.6.9.1.1 Impacts and Mitigation

The project vicinity is largely agricultural, with some stands of trees and wetlands. This combination of altered and unaltered landscape has the potential to support rare and unique resources that may be adversely affected by the project.

Northern Long-eared Bat

In summer, the NLEB is often associated with forested habitats, where they make use of tree roosts, especially near water sources. The project would require the removal of 10.0 acres of trees. During the wetlands permitting process (see Section 5.6.6, Surface Water Resources), the USACE will consult with the USFWS regarding the potential effects to protected plants and wildlife that could result from the permitted activities, and protective measures to avoid impacts to these species may be required. Additionally, the MDNR monitors northern long-eared bat occurrence in the state, and recommends tree removal take place outside the pup rearing season when females are forming maternity roosting colonies and the pups cannot yet fly. To minimize impact to bats, the MDNR recommended that tree removal be avoided from June 1 through August 15. This has been included as Special Condition 6.8 in the draft Route Permit.

Dakota Skipper

Midwest Natural Resources conducted a desktop and field-based habitat assessment to identify areas of potential Dakota skipper habitat. Based on the field-based habitat assessment, suitable habitat for the Dakota skipper is not present within the proposed route. Since there is no suitable habitat for the Dakota skipper in the project area, no mitigation measures are proposed.

Monarch Butterfly

Suitable habitat for the monarch butterfly is present within the proposed route. Impacts to monarch butterflies would be reduced by minimizing disturbance of flowering plants during construction and, where property owners are amenable within the ROW, revegetating disturbed areas with flowering plants after construction.

Western Regal Fritillary

Suitable habitat for adult western regal fritillaries, namely native tallgrass prairie, is not present within the project area. However, suitable larval habitat (violets) may be present within the project area. While

this species is not currently listed under the ESA, if this is listed by the time of construction, the Applicants should consult with USFWS regarding potential impacts to the western regal fritillary.

6.6.9.1.2 Mitigation

Special conditions have been included in the draft Route Permit to minimize impacts to federally listed rare and unique resources:

- Section 6.8, Protection of Bats: Avoid tree removal from June 1 through August 15.

6.6.9.2 State-listed Species and Protected Resources

At the state level, the evaluation and protection of Minnesota's rare and unique resources is overseen by the MDNR through the identification and evaluation of native plant communities, native prairie, plants, wildlife, and unique wetlands such as calcareous fens. Native prairie is defined as land that has never been plowed where native prairie vegetation originating from the site currently predominates or, if disturbed, is predominantly covered with native prairie vegetation that originated from the site.[94] Calcareous fens are rare groundwater-fed wetlands that are sensitive to changes in water quality and quantity.

Information about rare and unique resources protected by the state can be found through (1) a review of Sites of Biodiversity Significance (SOBS) maps maintained by the Minnesota Biological Survey (MBS); and (2) requesting information from the Natural Heritage Information System (NHIS). Although these reviews do not represent a comprehensive survey, they provide information on the potential presence of rare and unique species and habitats.

Merjent, on behalf of the Applicants, submitted a formal Natural Heritage Review Request (2023-00817) on October 26, 2023, through the MDNR's Minnesota Conservation Explorer (MCE).[95] An official response was received on January 18, 2024. The Applicants will further consult with the MDNR on the resources identified in **Table 6.6.9.2-1** once a final alignment is available.

Table 6.6.9.2-1: State-listed Species Within the Project Area

Common Name	Scientific Name	State Status
Blanding's turtle	*Emydoidea blandingii*	Threatened
Elktoe	*Alasmidonta marginata*	Threatened
Round pigtoe	*Pleurobema sintoxia*	Special Concern
Black sandshell	*Ligumia recta*	Special Concern
Creek heelsplitter	*Lasmigona compressa*	Special Concern
Short-eared owl	*Asio flammeus*	Special Concern
Great plains toad	*Anaxyrus cognatus*	Special Concern

Blanding's Turtle

Wetland complexes and adjacent sandy uplands are necessary to support viable populations of Blanding's turtles; however, preference is for calm, shallow waters, including ponds and wetlands associated with rivers and streams with rich aquatic vegetation. In Minnesota, this species uses a wide

[94] Minn. Stat. 84.02 Subd. 5

[95] Appleton to Benson Joint Application Appendix K- Agency Correspondence- eDockets No. 202412-213349-19

variety of wetland types and riverine habitats.[96] In central Minnesota, ephemeral wetlands are used in spring and early summer, shrub wetlands and marshes are utilized throughout the summer, and deep, open marshes and pools serve as over-wintering sites. Blanding's turtles emerge from overwintering sites in late March to early April. Small, temporary wetlands are frequently used by Blanding's turtles in spring and early summer, when these habitats provide basking sites and mating opportunities. Nesting can occur up to a mile from the wetland in sparsely vegetated uplands with well-drained, sandy soils. As described in **Table 6.6.6.5-1**, there are wetlands within the proposed route. Wetlands associated with the Pomme de Terre River, Cottonwood Creek, and the Chippewa River may provide suitable habitat for Blanding's turtle.

Elktoe

Elktoe is a mussel species that was historically found in many rivers throughout Minnesota and is now largely restricted to the St. Croix River and some of its tributaries. Suitable habitat for the elktoe includes medium to large rivers with sand and gravel substrates and moderate to fast flow.[97]

The Pomme de Terre River and the Chippewa River may provide suitable habitat for the elktoe.

Round Pigtoe

The round pigtoe is a mussel species that was historically found in the Zumbro, Cannon, Minnesota, St. Croix, and parts of the Mississippi River; however, its distribution is now limited. The round pigtoe is typically found in medium to large rivers and they prefer fast currents with coarse sand and gravel.[98]

The Pomme de Terre River and the Chippewa River may provide suitable habitat for the round pigtoe.

Black Sandshell

The black sandshell was historically common in rivers throughout Minnesota. The black sandshell is still found in the St. Croix River and has recently been reported in other rivers in northern Minnesota. This species prefers riffles and runs in medium to large rivers dominated by sand and gravel.[99]

The Pomme de Terre River and the Chippewa River may provide suitable habitat for the black sandshell.

Creek Heelsplitter

The creek heelsplitter was previously widespread and prevalent in the Minnesota drainage north of St. Anthony Falls. Currently, it can be found in a number of rivers throughout Minnesota, but it is typically found in low numbers. The creek heelsplitter prefers creeks, small rivers, and upstream sections of

[96] MDNR, Division of Ecological and Water Resources. 2024. Rare Species Guide: Blanding's Turtle (*Emys blandingii*) [web application]. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=element Detail&selectedElement=ARAAD04010. Accessed July 2025.

[97] MDNR, Division of Ecological and Water Resources. 2024. Rare Species Guide: Elktoe (*Alasmidonta marginata)* [web application]. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIV02040. Accessed July 2025.

[98] MDNR, Division of Ecological and Water Resources. 2024. Rare Species Guide: Round Pigtoe (*Pleurobema coccineum)* [web application]. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIV35070. Accessed July 2025.

[99] MDNR, Division of Ecological and Water Resources. 2024. Rare Species Guide: Black Sandshell (*Ligumia recta)* [web application]. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIV26020. Accessed July 2025.

larger rivers. Within these rivers, it prefers sand, fine gravel, and mud substrates and typically colonizes downstream of riffles and small pools.[100]

The Pomme de Terre River and the Chippewa River may provide suitable habitat for the creek heelsplitter.

Short-eared Owl

The short-eared owl was a previously common and widespread summer resident in Minnesota. Currently, the short-eared owl is rare in the project area during the summer and is mostly found in the northwestern corner of Minnesota. Short-eared owls tend to nest on the ground in native grasslands and open peatlands but can also be found in grainfields. Outside of the nesting season, they can be found in open habitats, including native prairie, pasture, grasslands, wetlands, and peatlands. They prefer extensive tracts of habitat during the nesting season and will use open habitats during migration.[101]

Suitable nesting habitat for the short-eared owl may be present within the vicinity of the proposed route, and owls may use areas near the proposed route during migration.

Great Plains Toad

The Great Plains toad occurs in open grasslands and cultivated fields throughout western Minnesota. Their breeding habitat includes ephemeral shallow water-filled prairie depressions with little or no emergent vegetation or in flooded agricultural fields.[102]

Suitable habitat for the Great Plains toad is present within the proposed route.

Native Plant Communities

The proposed route will cross two Sites of Biodiversity Significance. The Holloway Railroad Prairie is categorized as a "below" Site of Biodiversity Significance and is adjacent to U.S. Highway 59 and Burlington Northern Railroad. The Benson Prairie Site is categorized as a "moderate" Site of Biodiversity Significance and is located adjacent to County Road 3. The Bension Prairie Site of Biodiversity Significance includes one Native Plant Community (NPC), which is a wet prairie (WPs54b). This NPC is also considered a MDNR Native Prairie.

6.6.9.2.1 Impacts and Mitigation

Blanding's Turtle

Suitable habitat for the Blanding's turtle may be present within the proposed route. The MDNR has proposed protective measures to reduce the potential to affect Blanding's turtle by project activities. The Applicants must prepare a Blanding's Turtle Avoidance Plan and have it approved by the MDNR as

[100] MDNR, Division of Ecological and Water Resources. 2024. Rare Species Guide: Creek Heelsplitter (*Lasmigona compressa)* [web application]. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IMBIV22020. Accessed July 2025.

[101] MDNR, Division of Ecological and Water Resources. 2024. Rare Species Guide: Short-eared Owl (*Asio flammeus)* [web application]. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNSB13040#:~:text=Short%2Deared%20Owls%20will%20also,species%20in%20Minnesota%20in%201984. Accessed July 2025.

[102] MDNR, Division of Ecological and Water Resources. 2024. Rare Species Guide: Great Plains Toad (*Anaxyrus cognatus)* [web application]. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AAABB01050. Accessed July 2025.

outlined in Special Condition 6.2 in the draft Route Permit. General requirements that would be addressed in this plan are listed below.

- Avoid wetland and aquatic impacts during hibernation season between September 15th and April 15th;
- Use wildlife friendly erosion control;
- Hydro-mulch should not contain any materials with synthetic plastic;
- Check construction areas for turtles before the use of heavy equipment, as well as ;
    - pass out the Blanding's turtle flyer;
    - monitor for turtles during construction; and
    - move turtles that are in harm's way.

Elktoe, Round Pigtoe, Black Sandshell, and Creek Heelsplitter

Elktoe, Round pigtoe, black sandshell, and creek heelsplitter are freshwater mussels. Suitable habitat for elktoe, round pigtoe, black sandshell, and creek heelsplitter may be present within the Chippewa River and Pomme de Terre River. No impacts to the bed or banks of these waterbodies are anticipated. The Applicants will avoid placement of structures within the bed or banks of the Pomme de Terre River, which will avoid direct impacts to the mussel species. Further, the Applicants will maintain effective erosion and sediment control BMPs near these waterbodies to prevent indirect impacts to these mussel species.

Short-eared owl

Suitable nesting habitat for the short-eared owl may be present within the vicinity of the proposed route. In accordance with MDNR recommendations and the Migratory Bird Treaty Act, the Applicants will minimize disturbance to nesting habitat (grasslands, marshes, and peatlands) during the nesting season from May 1 through June 30. If a nesting owl is identified, minimization and avoidance measures may include implementation of a buffer around the active nest and/or a biological monitor until the nest is determined to be inactive.

Great Plains Toad

Suitable habitat for the Great Plains toad may be present within the proposed route. In accordance with MDNR recommendations, the Applicants will limit the use of erosion control mesh to wildlife-friendly materials.

Native Plant Communities

The proposed alignment and associated 100-foot-wide ROW will cross approximately 165 feet of the Holloway Railroad Prairie Site of Biodiversity Significance. The Applicants commit to avoiding structure placement within this vegetation community.

The proposed alignment and associated ROW traverses approximately 2,900 feet of the Benson Prairie Site of Biodiversity Significance; therefore, structure placement within this area cannot be avoided; however, in accordance with the recommendations provided by the MDNR, the Applicants have co-located the proposed alignment with an existing road ROW to limit disturbance.

The ROW also traverses approximately 300 feet of a Southern Wet Prairie NPC located within the Benson Prairie Site of Biodiversity Significance located north of the BNSF Railway along County Road 3. The Applicants commit to avoiding structure placement within this NPC .

The Applicants will implement the following avoidance and mitigation measures recommended by the MDNR to mitigate impacts to these NPCs:

- Confine construction activities to the existing road ROWs, to the extent practicable;
- Operate within already-disturbed areas;
- Minimize vehicular disturbance in the area (allow only vehicles necessary for the proposed work);
- Prohibit parking of equipment or stockpiling of supplies in the area;
- Prohibit placement of spoil within the area;
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species;
- If possible, conduct construction activities during frozen conditions;
- Install effective erosion and sediment control BMPs;
- Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible; and
- Use only weed-free mulches, topsoil and seed mixes as outlined in Permit Condition 5.3.13.

7 Section SEVEN: Cumulative Potential Effects and Unavoidable Impacts

This section analyzes the effects of impacts that could occur from the proposed project in conjunction with other projects in the area, commonly referred to as cumulative impacts. This section also identifies actions that could occur in the future as a result of the project (associated actions), and summarizes impacts that cannot be avoided.

7.1 Cumulative Potential Effects

Cumulative potential effects result when impacts from the proposed project are combined with impacts associated with past, present, or reasonably foreseeable future actions within the area. Analysis of cumulative potential effects accounts for the possibility that the minor impacts of many separate actions could be significant. considers resources that are expected to be affected by the proposed project and assesses past, present, and reasonably foreseeable future actions to identify any geographic or temporal overlap in impacts on these resources.

When making the determination as to what is "reasonably likely to occur," EIP considers whether any applications for permits have been filed with units of local government or whether detailed plans and specifications have been prepared for the project, among other considerations. A project is not required to be permitted to be reasonably likely to occur.

Past actions are those actions and their associated impacts that occurred within or influenced the geographic region of influence of each resource and have shaped the current affected environment of the project. For the purposes of this EA, actions that have occurred in the past and associated impacts are now part of the existing environment and are included in **Section Six, Affected Environment, Potential Impacts, and Mitigation**.

In addition to temporal factors, the potential for cumulative impacts also depends on spatial factors within the environment, which can vary for the resources evaluated in this EA. For example, the geographic area of consideration for cumulative impacts could be limited to the discrete area of disturbance for vegetation resources but also include a wider radius for other resources, such as air quality or wildlife.

The sole future project identified in the area at this time is the Big Stone South to Alexandria High Voltage Transmission Line[103]. Routing alternatives for this project pass north of the city of Appleton and parallel to Highway 12.

The cumulative effects of the project, in combination with the above-listed future projects, would be minimal, given the relatively small size of the project, the required coordination that the Applicants conduct with local agencies, the low human and environmental impact of the proposed Project, and the Project's components being largely contained within existing ROW.

[103] eDockets- Big Stone South to Alexandria HVTL project(22-538)

7.2 Unavoidable Impacts

Resource impacts are unavoidable when an impact cannot be avoided even with mitigation strategies. Transmission lines are infrastructure projects that have unavoidable adverse human and environmental impacts. These potential impacts and the possible ways to mitigate against them were discussed above. However, even with mitigation strategies, certain impacts cannot be avoided.

Unavoidable adverse impacts associated with construction of the project include:

- Aesthetic (i.e., visual) impacts;
- Short-term traffic delays and fugitive dust on roadways;
- Temporary and localized air quality impacts;
- Conversion of forested land to cleared ROW;
- Short-term disruption of recreational activities;
- Soil compaction and erosion;
- Vegetative clearing, habitat loss; and
- Temporary disturbance and displacement of wildlife.

Unavoidable adverse impacts associated with the operation of the project include:

- On-going maintenance of woody vegetation (tree trimming and removal).
- Visual impacts
- Interference with AM radio signals
- Individual wildlife impacts from habitat reduction and avian collisions.

7.3 Irreversible and Irretrievable Resource Commitments

Resource commitments are irreversible when it is impossible or very difficult to redirect that resource to a different future use; an irretrievable commitment of resources means the resource is not recoverable for later use by future generations.

Irreversible impacts include wetland conversion, and the emissions of air pollutants and greenhouse gas into the atmosphere.

The project will require only minimal commitments of resources that are irreversible and irretrievable. Irreversible commitments of resources are those that result from the use or destruction of a specific resource that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments are those that result from the loss in value of a resource that cannot be restored after the action. For the Project, those commitments are primarily related to construction. Construction resources will include aggregate resources, concrete, steel, and hydrocarbon fuel. During construction, vehicles necessary for these activities will be deployed on site and will need to travel to and from the construction area, consuming hydrocarbon fuels. Other resources will be used in structure construction, structure placement, and other construction activities.

Appendices