GREAT RIVER ENERGY, OTTER TAIL POWER COMPANY, WESTERN MINNESOTA MUNICIPAL POWER AGENCY, AGRALITE ELECTRIC COOPERATIVE, & CITY OF BENSON

JOINT APPLICATION TO THE
MINNESOTA PUBLIC UTILITIES COMMISSION
FOR A CERTIFICATE OF NEED AND A ROUTE PERMIT FOR THE

APPLETON TO BENSON TRANSMISSION LINE PROJECT IN SWIFT COUNTY, MN

DOCKET NOS.
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December 2024

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1.0 INTRODUCTION

Great River Energy, Otter Tail Power Company (Otter Tail Power), Western Minnesota Municipal Power Agency (Western Minnesota) through its agent Missouri River Energy Services (MRES), Agralite Electric Cooperative (Agralite), and the City of Benson (together, the Applicants) submit this joint application for a Certificate of Need and Route Permit (Application) to the Minnesota Public Utilities Commission (Commission or MPUC) to construct approximately 29 miles of new 115-kilovolt (kV) high voltage transmission line (HVTL) from the City of Appleton to the City of Benson in Swift County, Minnesota, referred to as the Appleton to Benson Transmission Line Project (Project).

As shown in the **Figure 1-1**, the Project will include upgrading, rebuilding or reconductoring, and/or constructing new transmission lines between the following substations: Appleton, Shible Lake, Moyer, Danvers, Benson, and Benson Municipal Substations. The Shible Lake, Benson, and Benson Municipal Substations are existing substations that will be modified and/or expanded to accommodate the Project's 115-kV connection. The Project also includes the construction of new Appleton substations.[2] The Moyer and Danvers Substations will be expanded or relocated to accommodate connection to the Project. As a result of the Project, certain existing facilities will be decommissioned, as described further throughout this Application.

1.1 Applicants Organization and System Background

The Project will be owned by the entities identified in the following subsections. Additional details on infrastructure ownership are provided in Sections 3.1 and 3.2.

1.1.1 Great River Energy

Great River Energy is a not-for-profit wholesale electric power cooperative based in Maple Grove, Minnesota. Great River Energy provides electricity and related services to approximately 1.7 million people through its 27 member-owner cooperatives and customers. Through its member-owners, Great River Energy serves two-thirds of Minnesota geographically and parts of Wisconsin. This includes Agralite, a distribution cooperative serving some of the area in which the Project will be located, and transmission customers. Great River Energy's electric system is interconnected directly with neighboring suppliers and is a member of the Midwest Reliability Organization and Midcontinent Independent System Operator (MISO).

Great River Energy and its cooperatives' mission is to provide safe, reliable, competitively priced energy to those served. Great River Energy owns over 4,300 miles of transmission line (69 kV or higher) in Minnesota, North Dakota, South Dakota, and Wisconsin. Great River Energy carefully designs and maintains a portfolio of power generation facilities and transmission resources to

[2] There is an existing co-located Appleton Transmission and Distribution Substation, but it is not sufficient to accommodate the facilities required for the Project, as discussed in more detail in Section 3.2.

deliver reliable and affordable wholesale electricity to the regional electricity market and member-owner and customer cooperatives.

The contact for Great River Energy is:

Mark Strohfus
Project Manager, Transmission Permitting
12300 Elm Creek Blvd.
Maple Grove, MN 55369
(763) 445-5210
MStrohfus@GREnergy.com

1.1.2 Otter Tail Power Company

Otter Tail Power Company 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. Otter Tail Power wholly or jointly owns approximately 6,000 miles of transmission lines and approximately 1,100 megawatts (MW) of generation capacity in these three states and is a transmission-owning member of MISO.

The contact for Otter Tail Power Company is:

Dean Pawlowski
Principal Engineer
215 Cascade Street
Fergus Falls, MN 56537
(218) 739-8947
dpawlowski@otpco.com

1.1.3 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 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.

The contact for Western Municipal Power Agency is:

Brian Zavesky
Senior Transmission Engineer
3724 W. Avera Drive
Sioux Falls, SD 57108
(605) 338-4042

brian.zavesky@mrenergy.com

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. Agralite has present membership of more than 5,400 consumers, along with over 2,400 miles of distribution lines in service and 19 substations.

The contact for Agralite Electric Cooperative is:

Tom Hoffman
Operations & Engineering
320 East Highway 12
PO Box 228
Benson, MN 56215
(320) 843-4150
Thoffman@agralite.com

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. The City of Benson has five Caterpillar generators with a total generating capacity of 10 MW, 36 miles of distribution lines in service, one substation, and one 1.25-mile 115-kV transmission line.

The contact for the City of Benson is:

Val Alsaker
City Clerk
1410 Kansas Avenue
Benson, MN 56215
(320) 887-0036
Staff@bensonmn.org

1.2 Project Contact

The contact for the Project and this Application is:

Mark Strohfus
Great River Energy
Project Manager, Transmission Permitting
12300 Elm Creek Blvd.
Maple Grove, MN 55369
(763) 445-5210
MStrohfus@GREnergy.com

1.3 Proposed Project and Location

The Project includes the installation of approximately 29 miles of 115-kV transmission line in Swift County. The Project is discussed in more detail in **Chapter 3**. The purpose and need of the Project are discussed in detail in **Chapter 4**.

The Project will include two route segments. The first Proposed Route segment will follow an approximately 27-mile route starting near the Western Minnesota-owned Appleton Substation in the City of Appleton and extend northeast connecting to the Great River Energy-owned Benson Substation, near the City of Benson. This route segment and end point substation will connect with the following substations [3]:

1. A new Appleton Transmission Substation (owned by Western Minnesota)
2. A new Appleton Distribution Substation, with a 115-kV connection to the new Appleton Transmission Substation (owned by Otter Tail Power)
3. Existing Shible Lake Substation (owned by Agralite)
4. Existing or new Moyer Substation (owned by Agralite)
5. Existing or new Danvers Substation (owned by Otter Tail Power)
6. Existing Benson Transmission Substation (owned by Great River Energy)

The second Proposed Route segment will be a new approximately 1.7-mile 115-kV transmission line. It will extend westerly from the Benson Municipal Utilities-owned Benson Substation in the City of Benson bounding both sides of the Burlington Northern and Santa Fe Railway (BNSF) tracks including the City of Benson's existing 115-kV line. The Proposed Route will then turn south on 22nd Street for approximately 0.2 mile before turning west for approximately 0.1 mile. The Proposed Route will then extend approximately 0.5 mile on the back side of some industrial

[3] Otter Tail Power's Holloway Substation is currently connected to its existing Moyer to Danvers 41.6-kV transmission line and will not be interconnected to the proposed new 115-kV line.

lots. Finally, the Proposed Route will extend approximately 0.25 mile west where it will interconnect with Great River Energy's existing AG-BK 115-kV transmission line.

As a result of this Project, the Applicants will decommission the existing Appleton Transmission and Distribution Substation[4] because the existing location cannot accommodate the necessary expansion for the Project. Three potential locations for the new Appleton substations have been identified in the vicinity of the existing substation (see Section 3.2). Agralite also proposes to relocate or expand the Moyer Substation[5] in the vicinity of the existing substation and conduct modifications at the Shible Lake Substation. Otter Tail Power will either relocate or expand the existing Danvers Substation to allow for the 115-kV connection.[6] Finally, the City of Benson will expand the Benson Municipal Substation.[7]

The 27-mile segment will involve upgrading approximately 18.3 miles of existing 41.6-kV transmission lines to 115-kV, rebuilding or reconductoring of 1.0 mile of an existing 115-kV transmission line, and constructing 7.8 miles of new 115-kV line, as follows:

1 Constructing approximately 0.2 to 0.7 mile of new 115-kV transmission line from the new Appleton Transmission Substation along State Highway 7.

2 Upgrading approximately 2.1 miles of the Great River Energy 41.6-kV AG-SLT[8] transmission line to 115-kV between the Appleton Substation and Shible Lake Substation.

3 Constructing approximately 6.8 miles of new 115-kV from Shible Lake Substation to the Moyer Substation.

4 Upgrading approximately 10.0 miles of Otter Tail Power Company-owned Moyer to Danvers 41.6-kV transmission line to 115-kV.

5 Upgrading approximately 6.2 miles of Otter Tail Power Company-owned Danvers to Benson 41.6-kV transmission line to 115-kV between the Danvers Substation and the intersection of 30th Avenue and 10th St NW.

6 Constructing approximately 0.5 mile of new 115-kV transmission line and rebuilding or reconductoring approximately 1.0 mile of Great River Energy 115-kV AG-BK[9]

[4] Applicants describe the decommissioning activities to provide context in this Application, but the decommissioning activities are not included within the scope of the Project for which Applicants seek a Route Permit in this proceeding.

[5] If the Moyer Substation is relocated, the existing substation will be decommissioned.

[6] If the Danvers Substation is relocated, the existing substation will be decommissioned.

[7] As set forth in **Table 3.2-1**, the existing Shible Lake, Moyer, Danvers, and Benson Municipal Substations are distribution substations. As part of the Project, they will be modified to connect to the 115-kV transmission line. The Moyers and Danvers Substations will either be modified or relocated.

[8] "AG" represents Agralite's service territory, and "SLT" represents the Shible Lake Tap.

[9] "AG" represents Agralite's service territory, and "BK" represents Benson to Kerkhoven line.

transmission line between the intersection of 30th Avenue and 10th St NW and the Great River Energy Benson Transmission Substation.

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. Where the existing Benson Municipal 115-kV line follows the BNSF railroad tracks, the new 115-kV circuit may overtake that line and be constructed as a double circuit line, or the new line may be constructed as a separate circuit elsewhere within the Proposed Route. As part of this construction, approximately 0.7 mile of the existing AG-BK line will be removed, including the Chippewa River crossing. Cumulatively, the Project will involve the construction of approximately 29[10] miles of 115-kV transmission lines.

The Applicants will primarily use single-pole wood structures. Typical structure heights will range from 50 to 100 feet above ground and spans between structures will generally range from 300 to 500 feet. Final design will determine the span and distances and need for specialty structures. Construction of the transmission line will generally occur within a 100-foot-wide right-of-way (ROW) easement that the Applicants will obtain to construct and operate the transmission line.

The Project Route Width (or Proposed Route) is a larger area that is inclusive of the Proposed Alignment (aka centerline) and the connections to the substations. The Applicants request a Route Width of 400 feet (200 feet on either side of the Proposed Alignment) for most of the Project.[11] Varied route widths are requested in certain locations, as discussed in Section 3.1.3.

The Proposed Route 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, and in the Township, Ranges, and Sections as shown in **Table 1-1**.

Table 1-1. Townships, Ranges, and Sections Crossed by the Project Route Width

Township	Range	Sections
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

[10] Variations on the total length of transmission line for the Project may occur based on the final alignment and due to rounding.

[11] The requested route width is not coextensive with the Certificate of Need notice area, as shown on **Figure 3-1**.

Township	Range	Sections
122N	40W	36

The Proposed Alignment, Proposed Route, and substations, including substation improvements, are shown on **Figure 1-1**. **Appendix A** contains a series of aerial maps depicting the Proposed Alignment, 100-foot-wide ROW, Proposed Route, and substation locations.

1.4 Project Need and Purpose

The Project is needed 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 single (N-1) contingency, which is expected to meet the demand for electricity for decades to come. Additional discussion of the Project's need is provided in **Chapter 4** of this Application.

1.5 Potential Environmental Impacts

The Applicants analyzed the potential environmental effects of the proposed Project. Generally, Project effects are anticipated to be temporary and/or minor. Approximately 67 percent of the Project length involves upgrades, rebuilding or reconductoring of existing transmission lines, and 68 percent of the Project is also co-located[12] with roads. No homeowners will be displaced by the Project. All land impacted during construction will be restored to the extent possible, and landowners will be compensated for any damages due to construction, operations, or structure and conductor placement.

Environmental Justice (EJ) communities are crossed by the Proposed Route. These communities may temporarily experience increased traffic and demand for public services during construction activities; however, Project benefits include maintaining reliable electrical services to these communities and a temporary increase in local business revenue.

The routing of the Project minimizes potential tree removal but may require the permanent removal of approximately 9.9 cumulative acres of trees within the ROW. The Project ROW will cross a total of 13 wetlands; however, all but one wetland crossing is less than 500 feet long. Therefore, the Applicants anticipate avoiding placing structures within wetlands in most cases.

The Applicants will develop the final alignment based on the permitted route to further avoid and minimize impacts to environmental resources, in compliance with federal, state, and local regulations and in coordination with applicable federal, state, and local agencies.

Unavoidable impacts include a minor change in aesthetics associated with taller structures relative to the existing structures, temporary disruption of access to recreational activities during construction, and the presence of additional traffic during construction on the local roads. These

[12] Collocation is defined as any road or utility located within 50 feet either side of the Proposed Alignment.

and other potential environmental effects, as well as applicable avoidance and minimization measures, are described in more detail in **Chapter 7** of this Application.

The Department of Commerce (DOC), Energy Environmental Review and Analysis (DOC-EERA) will be responsible for environmental review of the Project. Applicants anticipate that DOC-EERA will prepare an Environmental Assessment (EA) that analyzes the Project's potential environmental impacts.[13]

1.6 Public Input and Involvement

The Applicants held open houses in the City of Appleton and the City of Benson, Minnesota, on November 1 and 2, 2023, respectively. Applicants' staff members were available to provide information to members of the public and answer questions concerning the Project. Large posters showing the existing/proposed transmission line alignment and pictures of what the structures will look like were also available for review.

Invitations to the meeting, including a Project fact sheet with maps, were mailed to documented landowners within and adjacent to the Proposed Route, as well as to representatives from regulatory agencies and local governments. Advertisements were also placed in the *Swift County Monitor-News*. Copies of these communications are provided in **Appendix B**.

The Applicants' technical representatives provided information about the Project and answered questions and/or responded to comments concerning:

- the reason for the Project;
- the process for permitting;
- tree/vegetation cutting or removal;
- easement requirements and acquisition; and
- Project timeline.

Further information regarding the Applicants' public outreach is provided in Section 8.1 of this Application.

The public will be afforded additional opportunities to participate and comment on the Project in accordance with Minnesota laws and regulations. This process is described in Section 2.3.1. The first opportunity for public involvement in the regulatory process is a public information and scoping meeting conducted by Commission staff and the DOC-EERA staff after the Commission's acceptance of this Application as complete.

[13] DOC-EERA staff will transition from the Department of Commerce to the Commission on July 1, 2025, but they will retain their role and responsibilities for the EA.

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2.0 REGULATORY PROCESS

2.1 Certificate of Need

Minnesota Statutes Section (Minn. Stat. §) 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."[14] The Applicants are requesting a Certificate of Need to be granted under Minn. Stat. § 216B.243.

The Commission has adopted rules for the consideration of applications for Certificates of Need at Minnesota Rules Chapter (Minn. R. Ch.) 7849. On July 29, 2024, the Applicants filed a Petition for Exemption under Minn. R. 7849.0200, subp. 6, requesting that they be exempt from certain filing requirements under Minn. R. Ch. 7849. The Commission approved the Petition, with modifications, in an order dated October 1, 2024 (Exemption Order). This Application contains the information required under Minn. R. Ch. 7849, as modified by the Commission in its Exemption Order. A copy of the Commission's Exemption Order is provided in **Appendix C**. A Certificate of Need completeness checklist is provided in **Appendix D** with cross references indicating where the information required by Minnesota statute and rules can be found in this Application.

2.2 Route Permit

Minn. Stat. § 216E.03, subdivision 2, provides that "[n]o person may construct a high voltage transmission line without a route permit from the commission." A HVTL is defined by Minn. Stat. § 216E.01, subd. 4, as "a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100-kV or more and is greater than 1,500 feet in length." Because the Project will consist of a 115-kV transmission line that is greater than 1,500 feet in length, a Route Permit from the Commission is required.

Minn. Stat. § 216E.04 provides for an Alternative Review Process for transmission lines between 100- and 200-kV; the Project is proposed as 115-kV and thus qualifies for alternative review. The permitting timeline for the Alternative Review Process is shorter than the timeline required for transmission lines over 200-kV. The Applicants notified the Commission on October 30, 2024, pursuant to Minn. R. 7850.2800, Subp. 2 of its intent to use the Alternative Review Process and file its Application under Minn. R. 7850.2800 to 7850.3900. A copy of the notification letter is provided in **Appendix E**.

The rules that apply to the review of Route Permit Applications are found in Minn. R. Ch. 7850. Minn. R. 7850.1900, subparts 2 and 3, set forth the information that must be included in a Route Permit Application. A Route Permit completeness checklist is provided in **Appendix F** with cross

[14] Minn. Stat. § 216B.2421, subd. 2(3) (2006).

references indicating where the information required by Minnesota statutes and rules can be found in this Application.

Under the Alternative Review Process, an Applicant is not required to propose any alternative routes but must disclose any other routes that were considered but rejected by the Applicant (Minn. Stat. § 216E.04, subd. 3). Further, an Environmental Impact Statement is not required under the Alternative Review Process. Instead, DOC-EERA is required to prepare an EA (Minn. Stat. § 216E.04, subd. 5). Unlike the full Route Permit process for higher voltage lines, a formal contested case hearing is not required (Minn. Stat. § 216E.04, subd. 6). The Alternative Review Process procedures are discussed below in Section 2.3.1. The regulatory process described in this section is the process that is followed to satisfy all the requirements under the Alternative Review Process Route Permit rules. *See* Minn. R. Ch. 7850.

2.2.1 Notice of Application

Consistent with the Notice Plan approved by the Commission on October 1, 2024, the Applicants provided pre-application notice of this Application by mail to landowners (*See* **Figure 8-1)**, local government officials, and Tribes and published notice in the *Swift County Monitor-News and Star Tribune*. A compliance filing documenting these notices will be eFiled in Docket 24-263.

In accordance with Minn. Stat. § 216E.04, subd. 4, and Minn. Stat. § 216E.03, subd. 4, within 15 days of filing this Application, the Applicants will mail a notice of the filing to each owner whose property is along the Project's Proposed Route, to those persons who have registered their names with the Commission and expressed an interest in large energy projects, and to the Tribal government and local government units whose jurisdictions are reasonably likely to be affected by the proposed Project. *See* **Figure 8-1.** In addition, the Applicants will publish notice that announces the filing of this Application in a local newspaper in each county where the Project is proposed. *See* Minn. Stat. § 216E.04, subd. 4; Minn. R. 7850.2100.

An electronic version of the Application will be available on eDockets in docket numbers *24-263* and *24-264* and on the DOC-EERA webpage. The Application will also be available at: Appleton to Benson 115-kV transmission line.

As required by Minn. R. Ch 7850.2100, subp. 2.C, the Applicants have prepared a Project mailing list that contains the information for all persons who own property adjacent to or within the Proposed Route (see **Appendix G**).

2.3 Request for Joint Certificate of Need and Route Permit Proceeding

Minn. Stat. § 216B.243, subd. 4 and Minn. R. 7849.1900, subp. 4, permit the Commission to hold joint proceedings for the Certificate of Need and Route Permit in circumstances where a joint hearing is feasible, more efficient, and may further the public interest.

The Applicants respectfully request that the Commission order a joint regulatory review process for the Certificate of Need and Route Permit applications. A joint public hearing is feasible and more efficient than two separate proceedings and will further the public interest by having both need and routing issues examined in a singular proceeding.

2.3.1 Environmental Review Process

Upon acceptance of an Application for a Route Permit as complete, DOC-EERA will conduct an environmental review of the Project, which requires preparation of an EA. *See* Minn. R. 7850.3700. The EA will contain information on the human and environmental impacts of the Project and addresses mitigation measures for all routes considered. The EA will also serve as the environmental report otherwise required under the Certificate of Need rules. *See* Minn. R. 7849.1900, subp. 1.

The process DOC-EERA must follow in preparing the EA is set forth in Minn. R. 7850.3700. This process requires DOC-EERA to schedule at least one scoping meeting and associated public comment period. The purpose of the meeting will be to provide information about the Project and permitting process, answer questions, and gather input regarding potential impacts and mitigative measures that should be studied in the EA. The meeting will also provide an opportunity to solicit potential route or route segment alternatives that mitigate impacts. The Applicants, DOC-EERA, and the Commission will have representatives available during the public meeting to answer questions and provide information for the public. The public meeting will be held within 60 days after the Application is accepted and deemed complete.

Once the scoping meeting has been held and after the public comment period closes, the Commissioner of the DOC will issue a scoping decision describing the issues and alternatives that will be evaluated in the EA. DOC-EERA will prepare the EA based on the scoping decision. Upon completion of the EA, DOC-EERA will publish notice of its availability in the *EQB Monitor*, a weekly publication of the Minnesota Environmental Quality Board (EQB) that can be accessed on the EQB webpage, https://www.eqb.state.mn.us/eqb-monitor. DOC-EERA will also send notice to persons who have placed their names on the Project mailing list. A copy of the EA will be available electronically through eDockets and the DOC-EERA webpage. The EA will become part of the record for consideration by the Commission.

2.3.2 Joint Process

After the EA is issued, a public hearing and associated public comment period will be held to again solicit public input and to create an administrative record. The Commission will select a person to preside at the hearing, which, in practice, is usually an administrative law judge (sometimes abbreviated as ALJ) from the Office of Administrative Hearings. The Commission will establish the procedures to be followed at the hearing. *See* Minn. R. 7850.3800.

Once the hearing is concluded, the ALJ will prepare a report based on the entire Certificate of Need and Route Permit record. After the report is issued, the matter will come to the Commission for a decision. During an open meeting, the Commission will deliberate and decide as to the Certificate of Need and Route for the Project, using the criteria set forth in Minn. Stat. §216B.243, subd. 3, Minn. R. 7849.0120, Minn. Stat. § 216E.03, subd. 7(b), and Minn. R. 7850.4100 to guide its decision.

A Certificate of Need must be issued within 12 months of submission of an application unless the Commission extends the time period for good cause. *See* Minn. Stat. § 216B.243, subd. 5. A Route Permit under the Alternative Review Process shall be issued six months after the Commission's

determination that the Application is complete. This timeframe may be extended up to three months for just cause or upon agreement by the Applicant. *See* Minn. Stat. § 216E.04, subd. 7.

2.4 Other Permits/Approvals

In addition to the Certificate of Need and Route Permit sought in this Application, several other permits, licenses, approvals, or consultations may be required to construct the Project, depending on the actual route selected and the conditions encountered during construction. A list of the local, state, and federal permits that may be required for this Project is provided in **Table 2-1**.

Table 2-1. 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)	Minnesota 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

2.4.1 Potential Federal Approvals / Consultations

2.4.1.1 Section 404 Permit Clean Water Act Permit

A Section 404 permit is required from the U.S. Army Corps of Engineers (USACE), St. Paul District if there are discharges of dredged or fill material into waters of the United States. Based on wetland mapping using MDNR National Wetland Inventory (NWI) data, the Project would have minimal impacts to wetlands. If wetlands are impacted by the final alignment, impacts are anticipated to be eligible for coverage under the Minnesota Utility Regional General Permit. The Applicants, in consultation with the USACE, St. Paul District, will seek coverage under the appropriate permit once design of the transmission line is complete. **Section 7.6.4** discusses the potential impacts to wetlands associated with the Proposed Route.

2.4.1.2 U.S. Fish and Wildlife Service Endangered Species Act and Migratory Bird Treaty Act

In accordance with the Endangered Species Act, the Applicants will assess whether the activity may affect any federally listed threatened, endangered, or proposed threatened and endangered species, designated critical habitat, or proposed critical habitat. The Applicants will coordinate with the USFWS once design of the transmission line is complete. **Section 7.6.7** discusses the potential impacts to federally listed threatened and endangered species associated with the Proposed Route.

The Migratory Bird Treaty Act prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the USFWS. Project design and construction will be done in accordance with Avian Power Line Interaction Committee 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. **Section 7.6.7** discusses the potential impacts to migratory bird species associated with the Proposed Route.

2.4.1.3 Federal Aviation Administration Part 7460 Airport Obstruction Evaluation

Title 14 Code of Federal Regulations (CFR) Part 77 requires that anyone building a structure near an airport report their intentions to the FAA. This requires a submission of FAA Form 7460, at which point the FAA will conduct an Obstruction Evaluation / Airport Airspace Analysis Process. **Section 7.2.7** discusses potential impacts to airports.

2.4.2 Potential State of Minnesota Approvals / Consultations

2.4.2.1 State Endangered Species Consultation

Minn. Stat § 84.0895 prohibits the take, import, transport, or selling of any portion of an endangered species or wild animal or plant. To determine if a project will impact a state listed threatened or endangered species, the Applicants will consult with the MDNR Natural Heritage and Nongame Research Program, which collects, manages, and interprets information about

nongame species. The results of initial consultation regarding the Proposed Route are provided in **Section 7.6.7**.

2.4.2.2 Historic, Archaeological, and Tribal Cultural Resources

The Minnesota Field Archaeology Act (Minn. Stat § 138.32-138.42) establishes the Office of the State Archaeologist (OSA); requires licenses to engage in archaeology on nonfederal public land; establishes ownership, custody, and use of objects and data recovered during survey; and requires state agencies to submit development plans to the OSA, SHPO, and the Minnesota Indian Affairs Council (MIAC) for review when there are known or suspected archaeological sites in the area.

Minnesota's Private Cemeteries Act (Minn. Stat § 307.08) affords all human burial grounds and remains older than 50 years and located outside of platted or identified cemeteries protection from unauthorized disturbance. This statute applies to burials on either public or private lands or waters and includes prehistoric Indian burial mounds as well as historic cemeteries.

The Applicants submitted a literature review of archaeological and historic properties in the Project area to the Minnesota SHPO in a letter dated October 22, 2024; SHPO response to this letter was received on November 26, 2024. Further, the Applicants requested feedback on the Project from the 11 federally recognized Tribes with geography within Minnesota and the MIAC in its Project notification letters sent in October 2024. Further details of initial consultation regarding the Proposed Route are provided in **Section 7.5**, and correspondence is provided in **Appendix K**.

2.4.2.3 Water Appropriation General Permit – Construction Dewatering

Minn. Stat. § 103G.265 requires the MDNR to manage water resources to ensure an adequate supply to meet long-range seasonal requirements for domestic, agricultural, fish and wildlife, recreational, power, navigation, and quality control purposes. A water use permit from the MDNR is required for all uses withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. Construction dewatering activities are sometimes required during the installation of transmission poles, as further discussed under **Section 7.6.4**.

2.4.2.4 License to Cross Public Waters

The MDNR Division of Lands and Minerals regulates utility crossings over, under, or across any State land or public water identified on the Public Waters and Wetlands Maps. A license to cross public waters is required under Minn. Stat. § 84.415 and Minn. R. Ch. 6135. As further discussed in **Section 7.6.4.4**, the Proposed Route crosses public water watercourses; therefore, a Utility License to Cross Public Waters will be required. No MDNR-administered public lands are crossed by the Proposed Route.

2.4.2.5 National Pollutant Discharge Elimination System Construction Stormwater General Permit

A NPDES permit from the MPCA is required for stormwater discharges associated with construction activities disturbing one or more acres. A requirement of the permit is to develop and implement a stormwater pollution prevention plan, which includes Best Management Practices

(BMPs) to minimize discharge of pollutants from the site. This permit will be acquired if construction of the Project will cause a disturbance of one or more acres.

2.4.2.6 Section 401 Water Quality Certification

A Section 401 certification is necessary to obtain a federal permit for a project to ensure that the federal government does not issue a permit or license for a project that will result in a violation of the state water quality standards set under the Clean Water Act in waters of the U.S. The federal agency cannot issue a permit until the MPCA has either certified that the project impacting waters of the U.S. will comply with state water quality standards, or waived its review of the project. As discussed above, the Project is likely to qualify for a USACE Section 404 Minnesota Utility Regional General Permit; the MPCA has already issued a Section 401 Certification associated with this permit.

2.4.2.7 Wetland Conservation Act

The BWSR administers the state Wetland Conservation Act. The Project may cause minimal impacts to wetlands, if any. If wetlands are impacted as part of this Project, the Applicants anticipate being eligible for the Exemption for Utilities in accordance with Minn. Stat. § 103G.2241, subd. 6, and Minn. R. 8420.0420, Subp. 6, which allows the utility exemption for installation, maintenance, repair, or replacement of lines if (a) the impacts have been avoided and minimized to the extent possible; and (b) the proposed project significantly modifies or alters less than one-half acre of wetlands. Further discussion on the potential impacts to wetlands associated with the Proposed Route are provided in **Section 7.6.4**.

2.4.2.8 Utility Accommodation on Trunk Highway Right of Way

A Utility Accommodation Permit is required by the MnDOT if utility lines will overhang or cross over a state highway or utility structures will be located within road ROW. The Project will intersect and/or overhang MnDOT jurisdictional road ROWs as further discussed in Section 7.2.7. The Applicants will apply for the permits once they have a final line design. Project construction work will not commence along these roads until the permits are issued. The Applicants have started coordinating with the MnDOT, as documented in the correspondence provided in **Appendix K**.

2.4.2.9 Miscellaneous Work Permit for Trunk Highways

A Miscellaneous Work Permit is required by the MnDOT for placement of temporary obstructions on the ROW (e.g., survey vehicles) and vegetation removal. After the Route Permit is issued, the Applicants will apply for this permit as applicable.

2.4.2.10 Oversize / Overweight

An Oversize and / or Overweight permit is required by MnDOT when a vehicle is transporting an oversize / overweight load on Minnesota roadways. If any transport load qualifies as oversize or overweight, the transportation contractor will apply for the appropriate permit.

2.4.3 Local Approvals

After the Commission approves a route and any appropriate design engineering is completed, the Applicants will work with LGUs to obtain any of the following approvals, if necessary.

2.4.3.1 Road Crossing/Driveway/Right-of-Way Permits

These permits may be required to clear, cross, or occupy county, township, or city road ROW. The Applicants will apply for these permits once the transmission line design is complete and acquire them prior to applicable construction activities.

2.4.3.2 Over-Width/Loads Permits

These permits may be required to move oversize or heavy loads on county, township, or city roads.

2.4.4 Other Approvals

2.4.4.1 BNSF Railway

The Proposed Route crosses the BNSF Railway at four locations; therefore, a Utility License Agreement will be required.

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3.0 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. 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 1-1**).

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 substations[15] 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 and substations are shown on **Figure 1-1**. **Appendix A** contains a series of aerial maps depicting the Proposed Alignment, 100-foot-wide ROW, Proposed Route, and substation locations.

3.1 Transmission Line

3.1.1 Proposed Route

This Application includes a Proposed Route that will follow and will upgrade existing 41.6-kV transmission lines, rebuild or reconduct 115-kV transmission lines, and construct new 115-kV transmission lines as described in **Table 3.1-1**. As described further, the alignment of the existing and new transmission lines in the vicinity of the new Appleton substations will be dependent upon the location selected for the new Appleton substations.

[15] The Project also includes the reconstruction of two 115-kV lines that connect to the current Appleton Substation. These lines will need to be modified to connect to the new Appleton substations. The final alignment of these relocations will be dependent upon the final location of the new Appleton substations, but both the substations and the alignments are anticipated to be within the Proposed Route identified in this Application. There is also an existing 41.6-kV line that connects to the current Appleton Substation that will connect to the new Appleton Distribution substation and converted to a lower voltage (12.47-kV).

Table 3.1-1. Proposed Route Description

Start Point	End Point	Total Length (miles)	Existing Line Name	Existing Line Voltage	Current Ownership	Ownership after Project Improvements	Improvement Description	Route Description	Appendix A Map Page
Appleton Substation	Shible Lake Substation	0.2-0.7	New	N/A	N/A	Great River Energy	Construction of new 115-kV line	The beginning of the route and the location of any existing lines that will be relocated because of the Project will be dependent upon the ultimate location of the new Appleton Substation.[1]	1
Appleton Substation	Shible Lake Substation	2.1	AG-SLT	41.6	Great River Energy	Great River Energy	Rebuild and upgrade from 41.6-kV to 115-kV	The route will run north for 2.1 miles along the 41.6-kV to the Shible Lake Substation.	1-4
Shible Lake Substation	Moyer Substation	6.8	New	N/A	N/A	Otter Tail Power	Construction of new 115-kV line	From the Shible Lake Substation, the route will extend east along 60th St SW for 6.8 miles to the to the existing Moyer Substation.[2]	4-9
Moyer Substation	Danvers Substation	9.9	Moyer to Danvers 41.6-kV Transmission Line	41.6	Otter Tail Power	Otter Tail Power	Rebuild and upgrade from 41.6-kV to 115-kV	From the existing Moyer Substation, the route will follow 150th Ave SW north for 2.0 miles to 40th St SW, then 7.0 miles east along 40th St SW to 80th Ave SW. The route will then extend approximately 1.0 mile north along 80th Ave SW to the new or modified Danvers Substation.	9-19

Start Point	End Point	Total Length (miles)	Existing Line Name	Existing Line Voltage	Current Ownership	Ownership after Project Improvements	Improvement Description	Route Description	Appendix A Map Page
Danvers Substation	30th Ave / 10th St NW (U.S. Highway 12) intersection (south of Dome Substation)	6.2	Danvers to Benson 41.6-kV Transmission Line	41.6	Otter Tail Power	Great River Energy	Rebild and upgrade from 41.6-kV to 115-kV	From the new or modified Danvers Substation, the route will follow 30th St SW east-northeast for approximately 3.5 miles where the road converts to 20th St SW. The route will continue another 1.7 miles northeast-east along 20th St SW to 30th Ave SW. From there, the route will turn north for 1.0 mile overtaking the Otter Tail Power Danvers to Benson 41.6-kV line along 30th Ave SW to 10th St NW (U.S. Highway 12), just south of the Agralite-owned Dome Substation.[3]	19-24
30th Ave / 10th St NW (U.S. Highway 12) intersection	Great River Energy 115-kV AG-BK line	0.5	New	N/A	N/A	Great River Energy	Construction of new 115-kV line	The Applicants will construct a new 0.5-mile 115-kV line east along 10th St NW (U.S. Highway 12) to interconnect to Great River Energy's existing AG-BK 115-kV line.	24
Great River Energy 115-kV AG-BK line	Benson Substation	1.0	AG-BK	115	Great River Energy	Great River Energy	Rebuild or reconductor of 115-kV line	The Applicants will rebuild or reconductor 1.0 mile of the AG-BK transmission line that will run north along County Road 3 to the Benson Substation.	24-26

Start Point	End Point	Total Length (miles)	Existing Line Name	Existing Line Voltage	Current Ownership	Ownership after Project Improvements	Improvement Description	Route Description	Appendix A Map Page
Great River Energy 115-kV AG-BK line	Benson Municipal Substation	1.7	New	N/A	Great River Energy	Great River Energy	Construction of new 115-kV line	The new line will extend 0.25 mile east of the connection point on the AG-BK line to the western edge of development associated with the City of Benson, and then run north for 0.5 mile along the western edge of the city. The route will then turn east for 630 feet to 22nd St, north along 22nd St for 930 feet, and then east-southeast between Pacific Ave and Atlantic Ave for 0.6 mile to the Benson Municipal Substation. The new 115-kV circuit may overtake the City of Benson's existing 115-kV line for the last 0.4 mile of the route, in which case both circuits may be reconstructed as a new double circuit line segment.	27-28

Notes:

[1] The Otter Tail Power's Appleton to Milan to Holloway 41.6-kV line will be converted to a 12.47-kV distribution feeder from the Appleton Distribution Substation east to the Milan Junction switch and then both south to Otter Tail Power's Milan Rural Substation and north to Otter Tail Power's Holloway Substation.

[2] The proposed new 115-kV line will not interconnect to Otter Tail Power's Holloway Substation.

[3] The proposed new 115-kV line will not interconnect to the Agralite Dome Substation.

As a result of this Project, the portion of Great River Energy's 115-kV AG-BK line from the intersection of U.S. Highway 12 and County Road 3 that runs 0.5 mile east across the Chippewa River and 0.2 mile south to the interconnection with the 115-kV line to the Benson Municipal Substation will no longer be required. Great River Energy will deactivate and remove the structures and lines associated with this segment **(see pages 26 and 27 of Appendix A)**. Decommissioning and removal of this line is generally anticipated to reduce aesthetic and vegetation impacts in this area, as the existing ROW will be allowed to revegetate.

As described above and shown in the route maps provided in **Appendix A**, 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.

3.1.2 Right-of-Way

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.

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

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.

3.1.3 Route Width

A "route" or "route width," referred to herein as the Proposed Route, is a corridor that is defined by the Commission in a route permit. The Proposed Route is wider than the ROW to provide flexibility in the Proposed Alignment and ROW placement to address human and environmental concerns and physical constraints (e.g., other utilities) that arise after the Route Permit has been issued.

Within this Application, the Applicants are generally requesting a 400-foot route width; however, the Applicants are 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. The route width areas are shown in **Figure 3-1** and are numbered with respect to the descriptions below. Detailed descriptions of each route width area and the requested widths are as follows:

1. Approximately 197 acres in the vicinity of the existing Appleton Substation to accommodate the siting of the new Appleton substations (see **page 1 of Appendix A**).

2. An approximate 9-acre Route Width around the Shible Lake Substation to accommodate potential modifications to the existing substation (see **page 4 of Appendix A**).

3. A 450-foot-wide Route Width near the existing Moyer Substation to accommodate potential modifications to the substation (see **pages 8 and 9 of Appendix A**).

4. 800-foot-wide route along the Proposed Route between 60th St SW and 40th St SW for potential siting of a new Moyer Substation (see **pages 9-12 of Appendix A**).

5. An approximate 78-acre route width near the Danvers Substation to accommodate modifications to the existing substation or a new potential substation (see **page 19 of Appendix A**).

6. Approximately 28.5 acres around the Benson Substation (see **page 26 of Appendix A**).

7. A 250-foot-wide route along BWSR Reinvest in Minnesota (RIM) easements located southwest of the City of Benson (see **pages 27 and 28 of Appendix A**)

8. 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 (see **page 28 of Appendix A**).

3.2 Substations

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 3.2-1** 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 3.2-1. Substations within Project Area and Summary of Improvements

Substation Name	Transmission / Distribution	Ownership	Project Improvements	Improvement Area (Acres)	Appendix A Map Page
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	1
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	1
Shible Lake	Distribution	Agralite	Connection to 115-kV transmission line; this substation will be expanded to accommodate the new service.	1	4
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	9
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	19
Benson Substation	Transmission and Distribution	Great River Energy	Connection to 115-kV transmission line.	0	26
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	28

3.2.1 Substation Siting Areas

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 applicable 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, 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 3.1.3 and shown on page 1 of the maps provided in **Appendix A** 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.

3.3 Engineering and Operational Design Considerations

3.3.1 Transmission Structure and Design Considerations

Potential structure designs and photographs are provided in **Diagrams 3-1** and **3-2**. Structure dimensions are provided in **Table 3.3-1**.

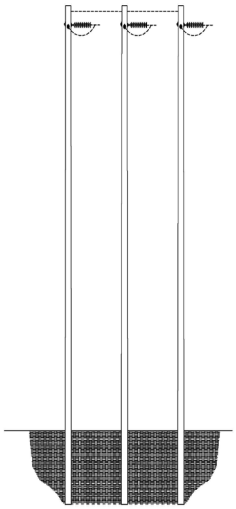
Table 3.3-1. Typical 115-kV Structure Dimensions

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

Diagram 3-1. Typical Transmission Structure Types

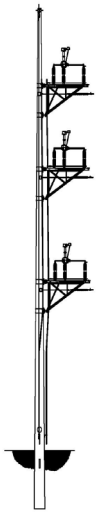
SINGLE CIRCUIT
HORIZONTAL POST

SINGLE CIRCUIT
BRACED POST

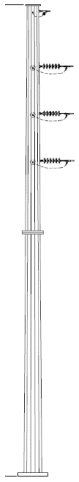


SINGLE CIRCUIT
3-POLE DEADEND

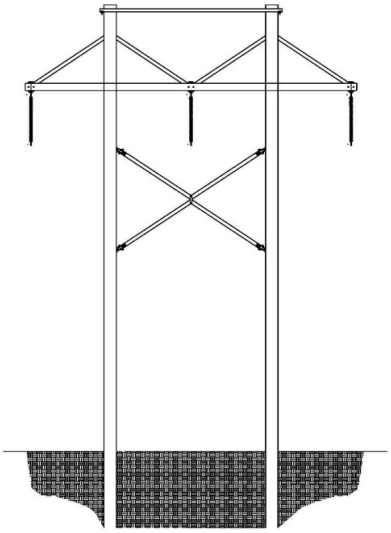
DOUBLE CIRCUIT
HORIZONTAL POST



3-WAY SWITCH
STRUCTURE

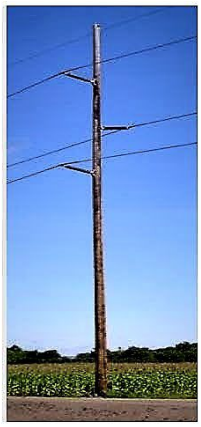


LAMINATE POLE
DEADEND



SINGLE CIRCUIT
H-FRAME

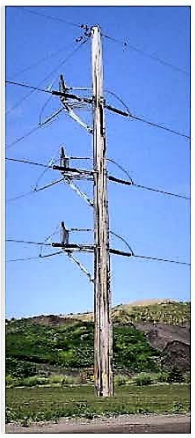
Diagram 3-2. Photos of Typical 115-kV Transmission Structures



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 National Electrical Safety Code (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.

3.3.2 Geotechnical Borings

As part of early transmission design work, the Applicants will need to complete preliminary survey work and may need to acquire some soil characteristics data. The Applicants will notify landowners in the event access for soil boring is required to determine soil suitability in areas where special transmission structure design may be required.[16]

3.3.3 Transmission Line Clearance Requirements

NESC sets minimum clearances of the conductors from structures adjacent to or within the ROW. NESC clearance requirements are summarized in **Table 3.3-2**. For a 115-kV transmission line like

[16] Survey work and geotechnical studies do not require that the Commission issue a route permit for this work to occur. Minn. R. 7850.1200, Subp. 5.

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 3.3-2**. 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.[17] The final line design will evaluate blowout based on actual span distances and the type of conductor being used.

Table 3.3-2. NESC Horizontal Clearance Requirements for 115-kV

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

3.3.4 Conductors

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.

3.3.5 Distribution Lines

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.

3.3.6 Service Life

The service life of a transmission line is 40 to 80 years.

3.3.7 Annual Availability

An average 115-kV transmission line is expected to be available approximately 99.9 percent of the year. The Applicants expect that this line will not be out of service for any extended period of time, other than the rare times when scheduled maintenance is required or when a natural event, such as a tornado, thunderstorm, or ice storm causes an outage.

3.3.8 Outages

All necessary transmission outages are coordinated in accordance with MISO requirements and procedures that are established and followed by all MISO members to meet personnel safety and

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

NESC transmission grid reliability requirements. Coordination is accomplished through well-defined outage scheduling procedures that utilize web-based tools, allow for study affirmation and ultimately approval of the submitted outage. Once approved, detailed switching orders are developed and shared with all parties involved using well-defined processes to ensure safety of personnel performing the work and transmission grid reliability. While distribution systems are not subject to MISO requirements, the Applicants will also coordinate outages with the appropriate distribution system provider.

3.3.9 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 further in **Chapter 4** of this Application, the Project is designed to be sufficient to serve this area for many years into the future.

3.3.10 Additional System Modifications

System modifications as a result of the Project are discussed throughout the Application. For example, where the Project will overtake existing 41.6-kV line owned by Otter Tail Power, the lines will be converted to a 12.47-kV distribution feeder. Likewise, approximately 0.7 mile of the existing AG-BK line will be removed, including the Chippewa River crossing.

3.4 Project Costs

There are several main components of the cost of constructing facilities, such as permitting, engineering and design, ROW, materials, land, and construction. Estimated costs for the facilities 100-kV and greater within this Application based on the Proposed Route are approximately $62 million (2024), which includes approximately $23 million for substation work and $40 million for transmission line work.[18]

3.4.1 Operation and Maintenance Costs

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.

3.4.2 Effect on Rates

The Commission's Certificate of Need rules require that an applicant provide the annual revenue requirements to recover the costs of a proposed project. Otter Tail Power's revenue requirements are included in **Appendix H**. For the remaining Applicants, the Commission approved the Applicants' exemption request, instead requiring Great River Energy to provide an explanation of how wholesale electricity costs are spread among the users of the transmission grid and the general financial effects of the Project on Great River Energy's member cooperatives. Likewise, the

[18] These cost estimates reflect facilities 100-kV or greater; the estimates do not include costs related to non-Commission-jurisdictional facilities.

Commission directed Western Minnesota to provide an explanation of the general financial effects of the Project on the MRES member municipal utilities.[19]

As a not-for-profit transmission and generation cooperative, Great River Energy's costs are allocated to Great River Energy's 27 member-owner distribution cooperatives based on a board approved formula rate methodology. This formula rate methodology allocates power supply and transmission costs by agreed-upon applicable billing determinants. Great River Energy's share of the Project will have an approximate rate impact of $1.5 million dollars on the annual transmission revenue requirement allocated to its 27 member-owners in the first year of operation. Each Great River Energy member-owner distribution cooperative develops their own rates based on individual costs, including allocated costs from Great River Energy, for their member-consumers via applicable customer rate class.

MRES as a Transmission Owner in MISO, develops transmission rates annually through the completion of its MISO Attachment O template and protocols. Attachment O includes Federal Energy Regulatory Commission approved formula rate templates used by MISO Transmission Owners to develop transmission rates. MISO uses these rates to establish zonal prices that MISO transmission customers pay when they use the transmission system and transmission service provided by MISO. As a joint action agency, MRES supplies supplemental wholesale power to 61-member municipal utilities in Iowa, Minnesota, North Dakota, and South Dakota and allocates transmission costs to subgroups of members based on transmission rates set by the MRES board. As a baseline reliability project, MRES's portion of the Project will have an approximate rate impact of $1.0 million in MISO revenue requirements in the first year of operation to the Otter Tail Power pricing zone in 2024 dollars. The Northern Cities Group comprises 12 members located in the Otter Tail and Minnesota Power Pricing Zones and share a common transmission rate from MRES. Since the revenue requirement for this Project will be recovered through the Otter Power Pricing Zone, this group of 12 members will help pay for this Project along with all other transmission customers in the zone. Each of the MRES members has their own retail rates for their retail customers which are set by their individual local utility boards/commissions/councils.

3.5 Project Schedule

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. Final construction schedule is dependent on multiple factors, including the receipt of all required permits. Construction may be commenced earlier than the schedule shown in Table 3.5-1 to the extent all required approvals and land rights are obtained. Prior to construction, the Applicants will obtain all necessary federal, state, and local permits; acquire relevant easements; and conduct pre-construction engineering and geotechnical testing. The start of construction will be dependent upon receipt of required permits and authorizations. Delays due

[19] Agralite is a member of Great River Energy, and the City of Benson is a member of Western Minnesota and MRES. Accordingly, information related to Agralite and the City of Benson is captured within the information provided by Great River Energy and Western Minnesota/MRES, respectively, and references herein to exemptions and alternate data being provided by Great River Energy and Western Minnesota/MRES include, respectively, Agralite and the City of Benson.

to weather, material delivery, and natural resource time of year restrictions may extend the construction timeline.

Table 3.5-1 summarizes the permitting schedule that will enable the Project to be in service by 2030.

Table 3.5-1. Anticipated Permitting Schedule

Certificate of Need / Route Permit Joint Application filed	December 2024
Scoping meeting	February 2025
Public hearing	August 2025
Commission meeting	November 2025
Written order issued	December 2025

3.6 Proposed Ownership

Table 3.1-1 identifies the ownership of Project components. There will be no change in substation ownership from what is outlined in **Table 3.2-1.**

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4.0 PROJECT PURPOSE AND NEED OVERVIEW

In 2020, Great River Energy, Otter Tail Power, MRES, and Xcel Energy completed a study to evaluate the shutdown of the 55 MW FibroMinn Energy Center near Benson, Minnesota. The FibroMinn plant had played a significant role in supplying power and regulating the reactive power need in the local area. The retirement created near-term load-serving reliability concerns. The *Benson Area Load Serving Study* (2020) (BAL Study), is included as **Appendix I**.

Since the 2020 BAL Study, several system modifications have been completed and updated forecasts have been made available. This planning study update (Update) as presented in this Chapter reanalyzed the load serving need in the area based on the topology changes as updated from the MISO Transmission Expansion Plan (MTEP) 2018 data series to the MTEP 2023 data series (see Section 4.4.1). The analysis supporting this Application as detailed below also incorporates the most recent load forecasts for the distribution substations (see Section 4.4.2).

The Update analyzed 29 distribution substations (Study Area), a subset of the original 68 distribution substations analyzed in the BAL Study. The BAL Study encompassed a wider area involving multiple sections but concluded that the key area to be addressed was the 29 distribution substations interconnected to the 115-kV system around Benson. This analysis confirms the need for additional load-serving support. In summary, this Update:

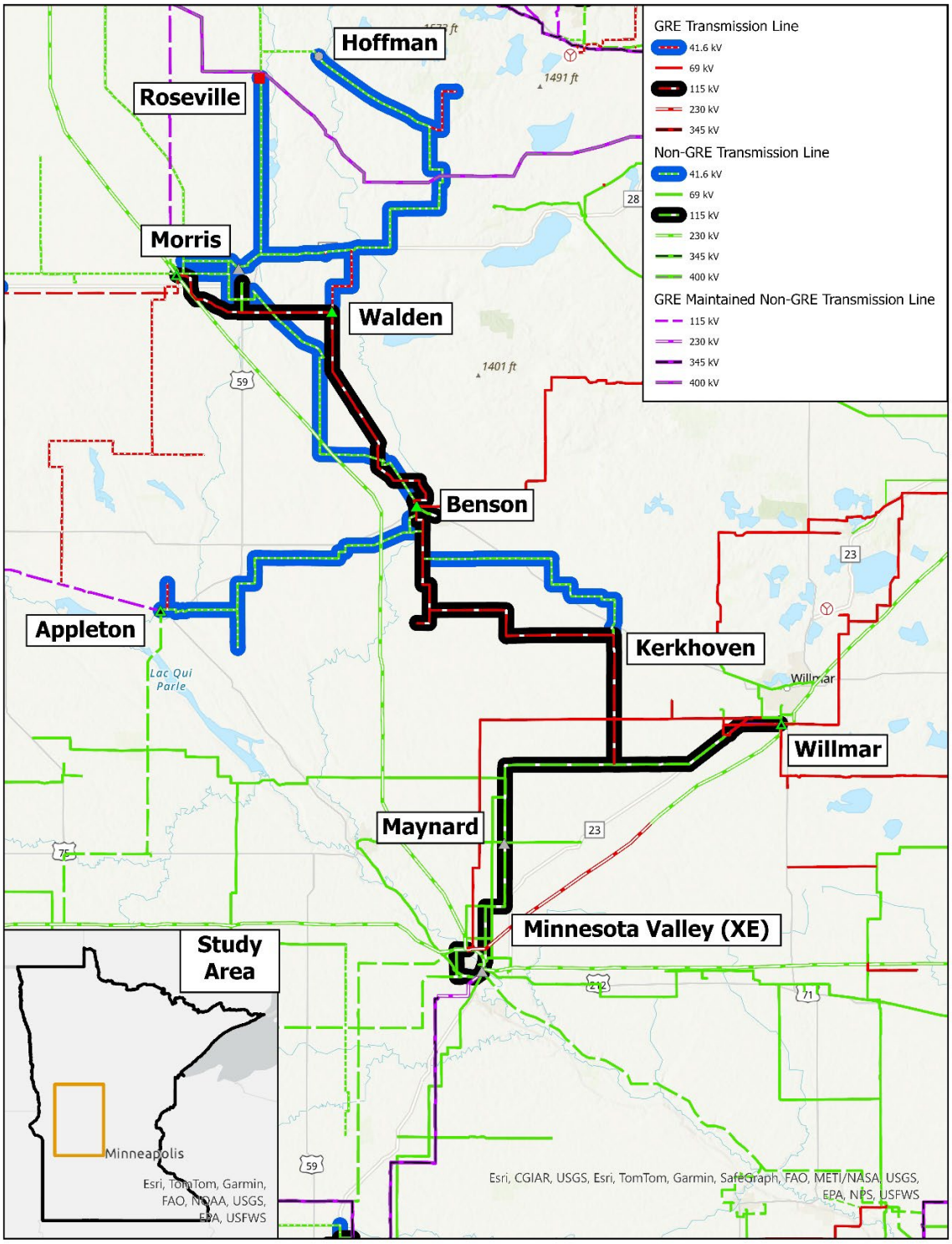
- Reaffirms the Project will be the best performing option to meet the identified needs.
- Determines that updated load forecasts predict higher growth rates, reinforcing the need for the Project.
- Affirms that the existing load cannot be reliably served without the Project.
- Demonstrates the Project will provide an additional 47 MW of system capacity under the worst single (N-1) contingency and an additional 77 MW capacity under the worst double (N-2) contingency.

Minn. R. 7849.0270 requires an applicant to provide detailed forecasting information in the Certificate of Need Application. The Commission granted the Applicants' exemption request to provide alternative data in the form of demand data supporting the ongoing need for the proposed Project in the affected load area, specifically: historic loading and system forecast growth rates; information on the reliability risks faced by not constructing the proposed Project; an explanation of how revenue requirement impacts will be relatively inconsequential; and a description of the forecast methodology and sources used to produce the alternative forecast information. The Commission granted a full exemption to Minn. R. 7849.0270, subps. 3-5. The following sections of the Application provide the alternative data approved by the Commission.

4.1 Study Area

The Study Area including the 29 distribution substations is shown in **Diagram 4-1** and includes a coordinated set of transmission lines to serve the area. Additional details are described below:

Diagram 4-1. Project Need Study Area



4.1.1 Morris-Willmar-Minnesota Valley 115-kV system

The 115-kV circuit, outlined in black in **Diagram 4-1**, extends from Morris Substation to Willmar and Minnesota Valley Substations. Power is supplied to this 115-kV circuit and other 69-kV circuits from 230-kV transformations at Morris, Willmar, and Minnesota Valley Substations, as shown in **Diagram 4-2, Diagram 4-3,** and **Diagram 4-4**, respectively, in Appendix O.

The distribution system load is then served from this 115-kV circuit via a 41.6-kV system, outlined in blue in **Diagram 4-1**.

The 115-/41.6-kV transformers that supply this system are at Morris, Walden, Benson, Kerkhoven and Appleton. The 41.6-kV system is further described in the following sections.

4.1.1.1 Walden 41.6-kV System

The 41.6-kV circuit from Walden extends to normally open points on the system at Hoffman and Roseville distribution Substations and covers Runestone Electric Association (REA) and Otter Tail load (see Appendix O, **Diagram 4-5**).

4.1.1.2 Benson 41.6-kV System

The Benson 41.6-kV system extends north to Morris, south towards Kerkhoven to a normally open point at Murdock Substation, and west toward Appleton to a normally open point at Moyer Substation. This system serves Agralite and Otter Tail loads (see Appendix O, **Diagrams 4-6, 4-7, and 4-8**).

4.1.1.3 Kerkhoven 41.6-kV System

The Kerkhoven 41.6-kV system covers just the Otter Tail Power Kerkhoven load before meeting the normally open point at Murdock Substation (see Appendix O, **Diagram 4-6**).

4.1.1.4 Appleton 41.6-kV System

The Appleton 41.6-kV circuit extends east towards Benson up to the normally open point at Moyer Substation and serves Agralite and Otter Tail Power loads **(**see Appendix O, **Diagram 4-7**).

4.1.1.5 Morris 41.6-kV System

This system extends west and south out of Morris and is outside of the Study Area as these loads are not impacted by the worst contingencies (i.e., outages), which are on the east side of Morris.

4.2 Model Development

4.2.1 Benchmark Models

The benchmark models used for the study were developed by MISO with input from MISO transmission owners through the annual MTEP process.

The BAL study (see **Appendix I**)- utilized the then current benchmark model for the 2028 summer peak from the MTEP 2018 model series. For the Update, the 2028 summer peak model from the MTEP 2023 model series was used.

MISO's MTEP 2023 model series now includes the Project. For the purposes of this Update, the line was removed from the model and replaced with the existing 41.6-kV line. The benchmark model has also been modified to include future planned load interconnections, such as Great River Energy's Swenoda and Dublin Distribution substations, and the retirement of Cashel Distribution Substation. Loads in the benchmark model were also updated with the forecasted peak load of the area. Section 4.2.1 details the relevant changes that were made to the benchmark models between the MTEP 2018 series and the MTEP 2023 series. Section 4.2.3 details the additional load modifications made to the MTEP 2023 series model for this study.

4.2.2 Benchmark Model Input

Many projects have been added to the MISO planning models in the four years since the original study. Only those projects that will have an impact on the Study Area are described in this section.

- Walden 115-/41.6-kV Transformer. The Walden transformer was replaced with a higher rated transformer with a load-tap changer. This is now part of the MTEP 2023 models. This improves the voltages on the 41.6-kV and 115kV system around Walden.
- Roseville Normally Open. The normally open switch at Roseville was originally located on the south side of the Roseville Substation and has subsequently been moved to the north side. This update adds this load onto the Walden transformer and contributes to the load in the Study Area.
- Willmar 230-/115-kV Transformer. In the BAL Study, this transformer was one of the proposed recommended facilities along with the Project. This transformer is now in-service and included in the benchmark models.
- Appleton-Benson 115-kV Transmission Line. As noted, this Project is now part of the MTEP 2023, summer 2028 benchmark model. For the purposes of this Updated Study, the line was removed, and the existing 41.6-kV returned in the benchmark case to compare the system before and after the 115-kV line is added.
- Load Updates. The Swenoda and Dublin loads are now included in the benchmark cases. The Cashel distribution substation has been removed.

4.2.3 Load Forecast

An updated load forecast using historical meter data from the last five years through the end of 2023 was used for this Update. The Benchmark MISO model was updated with these load forecasts. The Commission granted the Applicants' requested exemption to Minn. R. 7849.0280, subps. (B) through (I), which requires an applicant for a Certificate of Need provide information that describes the ability of the existing system to meet forecasted demand; in essence, load and

capability information. The following discussion contains information relevant to Minn. R. 7849.0280, Subp. (A).

Utilities that serve load in the transmission system Study Area provided the 2019 summer and winter peak data for the BAL Study using peak demands from the five years leading up to 2019. That data was then used to forecast the peak loads for 2028. The Study Area system peak included 115-kV and 41.6-kV transmission system connected loads that directly affect the performance of the 115-kV transmission system.

The BAL Study determined that the transmission system is summer peaking and only summer peaking loads were used for this Update. In this Update, as in the BAL Study, historical meter load data is used to forecast the summer peak for 2028.

In addition to updating the existing load forecasts, two new loads have been included in this Update that should be in-service by 2028: Darnen and Hodges Substations.

Compared to the original 2028 forecast based on 2019 peak loads, the 2028 forecast based on 2023 data is greater, in part due to the addition of these new loads. In the BAL Study, the peak load was 79 MW for the Study Area with a forecasted peak 2028 load of 87 MW. In contrast, the peak load based on 2023 data is 83 MW with a 2028 forecast of 99 MW in this update.

In Section 4.4.1, the original load forecasts using 2019 data are applied to the latest models to confirm the need is the same as in the original study, and recent changes to the system have not significantly affected that need.

Section 4.4.2 applies updated load assumptions from 2023 data to the latest models to show continued rationale beyond that which was originally predicted.

Table 4.2-1 presents both the historical meter peak load data and the 2028 forecasts. **Table 4.2-1** reflects an historical peak load of 86.34 MW and a forecasted peak load of 101.61 MW in 2028.

Table 4.2-1. Historical Meter Peak Load Data and 2028 Forecasts

Bus #	Name	Owner	2019-2023 Peak Load		2028 Summer Forecast		2033 Summer Forecast		Data Source
			MW	MVAr[a]	MW	MVAr	MW	MVAr	
Morris-Willmar-Minnesota Valley 115-kV									
615365	BENSON	GRE	14.01	2.84	15.11	3.07	16.30	3.31	GRE Member Owner
616006	HANCOCK	GRE	10.62	2.16	9.73*	1.98	10.95*	2.22	GRE Member Owner
616008	SWENODA	GRE	3.15	0.64	3.31	0.67	3.48	0.71	GRE Member Owner
620218	MORRIS OTP	OTP	7.52	1.73	8.40	1.70	8.83	1.80	OTP Data
658098	BENSON MUNI	MRES	8.30	2.20	8.30	2.20	8.30	2.20	Provided by MRES
616009	DUBLIN	GRE	2.98	0.61	3.13	0.64	3.29	0.67	GRE Member Owner
616014	HODGES	GRE	N/A**	N/A**	3.00*	0.61	3.00*	0.61	GRE Member Owner
616015	DARNEN	GRE	N/A**	N/A**	8.00	1.62	8.00	1.62	GRE Member Owner
Benson 41.6-kV									
616077	MOYER	GRE	2.87	0.58	3.17	0.64	3.50	0.71	GRE Member Owner

Bus #	Name	Owner	2019-2023 Peak Load		2028 Summer Forecast		2033 Summer Forecast		Data Source
			MW	MVAr[a]	MW	MVAr	MW	MVAr	
7461	CLONTARF	OTP	0.31	0.07	0.20	0.07	0.10	0.07	OTP Data
7459	DANVERS	OTP	0.28	0.07	0.31	0.08	0.31	0.08	OTP Data
7462	HANCOCK	OTP	1.20	0.24	1.31	0.26	1.31	0.26	OTP Data
616076	DOME	GRE	2.32	0.47	2.44	0.50	2.56	0.52	GRE Member Owner
7463	DEGRAFF	OTP	0.39	0.09	0.41	0.10	0.41	0.10	OTP Data
616080	KILDARE	GRE	3.22	0.65	3.38	0.69	3.56	0.72	GRE Member Owner
7464	MURDOCK	OTP	1.88	0.39	2.10	0.43	2.40	0.49	OTP Data
Kerkhoven 41.6-kV									
616073	KERKHOVEN	OTP	3.53	0.71	3.86	0.78	4.20	0.85	OTP Data
Appleton 41.6-kV									
616083	SHIBLE CPA	GRE	3.07	0.62	3.39	0.69	3.39	0.69	GRE Member Owner
658115	APPLETN9	OTP	5.54	1.12	5.80	1.18	6.10	1.24	OTP Data
7457	MILAN	OTP	1.10	0.17	1.10	0.17	1.10	0.17	OTP Data
7458	HOLLOWAY	OTP	2.29	0.46	2.20	0.45	2.40	0.49	OTP Data
Walden 41.6-kV									
619171	ROSEVILLE	GRE	2.06	0.42	2.28	0.46	2.39	0.46	GRE Member Owner
7445	HOFFMAN	OTP	1.64	0.37	1.79	0.41	1.95	0.40	OTP Data
7441	CYRUS	OTP	0.52	0.15	0.57	0.17	0.62	0.17	OTP Data
7442	FARWELL	OTP	0.14	0.03	0.15	0.03	0.16	0.03	OTP Data
7443	KENSINGTON	OTP	0.87	0.40	0.95	0.15	1.04	0.21	OTP Data
619162	HOLMES CITY	GRE	2.52	0.51	2.79	0.57	2.79	0.57	GRE Member Owner
619167	WHITE BEAR	GRE	1.69	0.34	1.87	0.38	1.87	0.38	GRE Member Owner
619169	FRAMNAS	GRE	2.32	0.47	2.56	0.52	2.56	0.52	GRE Member Owner
Total:			**86.34**	**18.51**	**101.61**	**21.22**	**106.87**	**22.27**	

Notes:
[a] megavolt-ampere reactive
*2 MW moved from Hancock to Hodges.
** New load, no meter data.

4.3 Study Methodology

Power System Simulator for Engineering (PSSE) version 35 was used to perform alternating current (AC) contingency analysis on each of the models described in Section 4.2.

4.3.1 Benchmark Contingencies

The following contingencies were analyzed for the steady state analysis part of the study:

- All North American Electric Reliability Corporation (NERC) TPL-001-5 Category[20] P0-P7 contingencies in the Study Area created for MTEP 2023.

[20] https://www.nerc.com/pa/Stand/Reliability%20Standards/TPL-001-5.pdf

- 69-kV single line contingencies in the Study Area.

In the context of NERC TPL-001-5, a contingency is the loss of one or more elements of a power system, such as a generator, transmission line, or circuit breaker. NERC defines categories for contingencies within the standard as: (1) P0 indicating no contingency; (2) P1 and P2, which are designated as single contingencies, also known as N-1; (3) P3 and P6, which are designated as multiple contingencies also known as N-2 (where one loss event proceeds another); and (4) P4, P5, and P7 are also designated as multiple contingencies, but where multiple loss events can happen simultaneously.

4.3.2 Monitored Elements

- Monitored Transformers. Transformers are monitored for flow violations based on "Rate 1" for system intact in the PSSE models and "Rate 2" for contingencies.
- Monitored Branches. All 230-kV, 115-kV, 69-kV, and 41.6-kV branches connecting monitored buses were monitored for flow violations based on normal ratings, "Rate 1" for system intact in the PSSE models and emergency ratings, "Rate 2" for contingencies.
- Monitored Buses. Planning criteria for all buses being analyzed for this study require that pre-contingent voltage be based on parameters provided in the model under normal limits, and post-contingent voltage be based on parameters provided in the model under emergency limits.

4.4 Study Results

4.4.1 BAL/Original Load Forecasts/MTEP 2023 Models

When the original load assumptions, with a peak of 87 MW (2028 forecast) were applied to the updated MTEP 2023 models with the updates described in Section 4.2.2, the same voltage issues are seen as in the BAL Study. NERC TPL-001-5 planning category contingencies were applied (P0-P7).

4.4.1.1 Low Voltage Violations

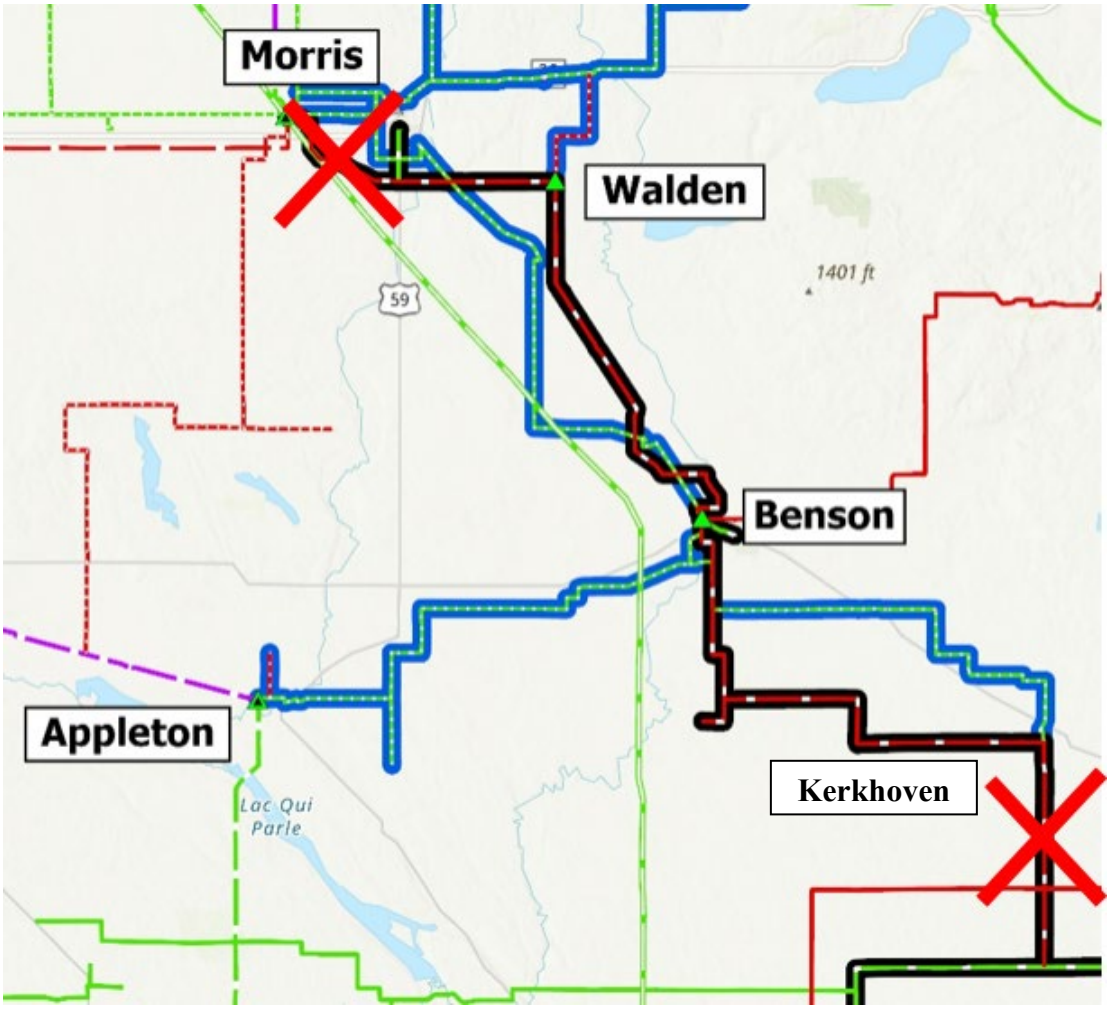
P1 and P2 contingency analysis on the study models showed several low voltages concerns on the transmission system. Among the critical contingencies to the 115-kV transmission system are the Morris to Morris Otter Tail 115-kV line outage and internal breaker fault at Minnesota Valley on breaker 5N60 (P23:115:XEL:5N60 MNV). These contingencies cause a low voltage problem on the 115-kV and 41.6-kV buses that are served from the Morris to Minnesota Valley 115-kV system.

Voltages are improved compared to the benchmark case in the BAL Study due to the addition of the Willmar 230-/115-kV transformer. However, they are still below low voltage criteria between Benson and Morris on the 115-kV system, as low as 88% of nominal voltage. Voltages on the 41.6-kV systems fed from Walden and Benson are as low as 85% of nominal voltage.

The worst-case category P6 contingencies, which is a multiple contingency involving the loss of a line followed by the loss of another line, will result in the loss of the 115-kV and 41.6-kV load and low voltage on remaining buses. An example is shown in **Diagram 4-9** where the loss of the Morris 115-kV to the north and the loss of the Kerkhoven junction line to the south will leave the 115-kV and 41.6-kV loads without a 115-kV source to serve them. The only remaining transmission source will be the 69-kV system at Benson, which will be insufficient to serve all the remaining load and will result in voltage collapse and loss of the entire system, up to approximately 101.6 MW of load before restoration (based on the updated 2028 forecast).

In May 2022, the loss of both lines occurred. The Benson to Kerkhoven 115-kV line was out of service and severe weather caused an outage of the Morris to Benson 115-kV transmission line. All the 115-kV, 69-kV, and 41.6-kV substations served from Benson were lost as well as all the 41.6-kV substations served from Walden. This resulted in the loss of nine Agralite substations and most of their load as well as four REA substations and ten Otter Tail Power substations. It took a day to restore service to all area substations. Had the proposed Project been in-service, it is likely that only the two substations served directly from the Morris to Benson line would have been affected and reconfiguration and restoration could have occurred more quickly.

Diagram 4-1. P6 outage



4.4.1.2 High Voltage Violations

In the BAL Study, there were no high voltage concerns within the Study Area Thermal Violations

In the BAL Study, there was an overload on the 69-kV system between Minnesota Valley and Maynard for the loss of Minnesota Valley to Maynard 115-kV line, due to throughflow. This issue was resolved by the addition of the Willmar 230-/115-kV transformer.

4.4.2 Updated Load Forecasts

When applying updated load forecasts, with a peak of 101.6 MW (2028 forecast) to the updated MTEP 2023 model, the same issues identified in the BAL Study worsened as described in this section. The main contribution to the approximate 14 MW increase in load was due to expected new industrial loads served by Agralite.

4.4.2.1 Low Voltage Violations

The voltage issues were still present with voltages even lower due to the introduction of new substation loads on the 115-kV and increased loading projections overall. Voltage was seen as low as 84 percent of nominal voltage on the 41.6-kV buses. The worst-case category P6 contingencies will still result in the loss of the 115-kV and 41.6-kV load and low voltage on remaining buses.

4.4.2.2 High Voltage Violations

The analysis did not show any high voltage concerns in the Study Area. Similarly, there had been no high voltage violations identified in the BAL Study.

4.4.2.3 Thermal Violations

A thermal violation that was not identified in the original analysis was observed with the updated load forecasts. For the most critical single-line outage of the Morris to Morris Otter Tail 115-kV line, Great River Energy's 10-mile 115-kV Kerkhoven to Kerkhoven Junction line segment overloaded, as seen highlighted red in **Appendix O, Diagram 4-10**. In the BAL Study, there was an overload on the 69-kV system between Minnesota Valley and Maynard for the loss of Minnesota Valley to Maynard 115-kV line, due to throughflow. This issue was resolved by the addition of the Willmar 230-/115-kV transformer.

4.4.2.4 Results Summary

The load serving capability of the system based in the BAL Study using 2019 load data was 54 MW under single contingency (N-1) conditions and 0 MW under multiple contingency (N-2) conditions.

The load serving capability of the system based on this updated study using 2023 load data and updated models is 65 MW under single contingency (N-1) conditions and 0 MW under multiple contingency (N-2) conditions.

4.4.3 Appleton-Benson 115-kV Project

To study the effects of the Project on the Study Area, the benchmark model developed as described in Section 4.2 was updated to remove the 41.6-kV system between Appleton-Benson and replace it with a 115-kV line which serves the same distribution substations that were previously served from the 41.6-kV line (see **Figure 1-1**).

4.4.3.1 Low Voltage Violations

All the voltage issues identified in Section 4.4.2 were no longer present with the addition of the Project. No other voltage violations were introduced. The worst-case category P6 contingencies no longer resulted in voltage collapse and loss of load.

4.4.3.2 High Voltage Violations

The analysis did not show any high voltage concerns in the Study Area caused by the addition of the Project.

4.4.3.3 Thermal Violations

All thermal violations were corrected after the addition of the Project and no other thermal violations were introduced.

4.5 Losses

Minn. R. 7849.0260 A(3) requires a Certificate of Need applicant to provide the expected losses "under projected maximum loading and under projected average loading in the length of the transmission line and at the terminals or substations." Minn. R. 7849.0260 C(6) requires similar information (efficiency of proposed system under maximum and average loading along the length of the line). The Commission approved the Applicants' exemption request for this data, instead allowing the Applicants to provide system losses information from Great River Energy, Otter Tail Power, and Western Minnesota in lieu of line-specific losses required by the rules. Loss analysis was performed to document the performance of the Project from a system loss reduction standpoint. Losses are the energy that is dissipated as heat due to the electrical resistance of the transmission lines and other transmission facilities. This loss is reduced at a higher operating voltage. The summer peak study model was used for this analysis. The benchmark case (no upgrades) was considered as a benchmark for loss comparison, presented in **Table 4.5-1**.

Table 4.5-1. Loss Comparison

Area	Losses before Project (MW)	Losses after Project (MW)	Project's Improvement (MW)
Otter Tail Power (620)	96.63	94.89	1.74
Great River Energy (615)	106.23	106.01	0.22
Xcel Energy (600)	214.75	213.58	1.17
All	417.61	414.48	3.13

The loss analysis comparison provided in **Table 4.5-1** shows the Project will provide a significant loss saving over the benchmark case. Most of the loss savings will be shared by Otter Tail Power, Great River Energy, and Xcel Energy. The addition of the Project resulted in 3.13 MW loss reduction over the benchmark case.

4.6 Results Summary

Study results showed that the existing transmission system cannot serve current or forecast load within the planning criteria.

The load serving capability of the system before the proposed Project is 65 MW in the defined Study Area under single contingency (N-1) conditions and 0 MW under N-2 conditions. This is insufficient to meet the existing load of 86.34 MW and forecast load of 101.61 MW in 2028.

After the addition of the Project, the load serving capability will be 112 MW under single contingency (N-1) conditions (an increase of 47 MW) and 77 MW under multiple contingency (N-2) conditions (an increase of 77 MW). The Project will also provide increased load serving capability to areas outside the immediate Study Area, such as 115-kV lines west out of Appleton towards Ortonville and the Morris to Canby 115-kV transmission system.

4.7 Project Alternatives

Alternatives were studied to confirm that the Project was the best performing project for the Study Area. Minn. Stat. § 216B.243, subd. 2(6) requires that when assessing need, the Commission evaluate "possible alternatives for satisfying the energy demand or transmission needs including but not limited to potential for increased efficiency and upgrading of existing energy generation and transmission facilities, load-management programs, and distributed generation." The Commission's rules also require an applicant for a Certificate of Need to discuss in an application a number of alternatives. Minn. R. 7849.0260 states:

Each application for a proposed large HVTL must include:

B. a discussion of the availability of alternatives to the facility, including but not limited to:

1. new generation of various technologies, sizes, and fuel types;
2. upgrading of existing transmission lines or existing generating facilities;
3. transmission lines with different design voltages or with different numbers, sizes, and types of conductors;
4. transmission lines with different terminals or substations;
5. double-circuiting of existing transmission lines;
6. if the proposed facility is for direct current (DC) (AC) transmission, an AC (DC) transmission line;
7. if the proposed facility is for overhead (underground) transmission, an underground (overhead) transmission line; and
8. any reasonable combinations of the alternatives listed in subitems (1) to (7).

Minn. R. 7849.0340 also requires an applicant to consider the option of not building the proposed facility. The Applicants' analysis of these alternatives is discussed in more detail in the following sections.

4.7.1 New Generation/Non Wires Alternatives

Applicants considered generation solutions, including new dispatchable generation, distributed generation, renewable generation, battery energy storage and conservation, and demand side management (DSM).

4.7.1.1 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 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) aeroderivative 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 and 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 Project will link two areas together and provide benefits in a larger geographic area on both ends of the transmission line.

Table 4.7-1. Estimated Emissions from 55 MW of Combustion Turbine Generation

Criteria Pollutants	Uncontrolled Emission Factor			Maximum Potential		Estimated Actual	
	Value	Units	Source [a]	lb/hr	tons/ year	lb/hr	tons/ year
VOC	0.02	lb/MMBtu	A	10.20	44.68	10.80	4.73
CO	0.0875	lb/MMBtu	A	44.63	195.49	47.25	20.70
NO_x	0.105	lb/MMBtu	A	53.56	234.59	56.70	24.83
PM_{10}	6.60E-03	lb/MMBtu	B	3.37	14.75	3.56	1.56
SO_2	0.001425	lb/MMBtu	B	0.73	3.18	0.77	0.34
Greenhouse Gases							
CO_2	110	lb/MMBtu	B	56,109	245,758	59,400	26,017
CH_4	8.60E-03	lb/MMBtu	B	4.39	19.21	4.64	2.03
N_2O	0.003	lb/MMBtu	B	1.53	6.70	1.62	0.71
CO_2e [b]	--	--	--	--	248,073	--	26,262
Hazardous Air Pollutants (HAPS)							
1,3-butadiene	3.40E-03	lb/MMBtu	B	1.73	7.60	1.84	0.80
Acetaldehyde	4.00E-05	lb/MMBtu	B	0.02	0.09	0.02	0.01
Acrolein	6.40E-06	lb/MMBtu	B	0.00	0.01	0.00	0.00
Benzene	1.20E-05	lb/MMBtu	B	0.01	0.03	0.01	0.00
Ethylbenzene	3.20E-05	lb/MMBtu	B	0.02	0.07	0.02	0.01
Formaldehyde	7.10E-04	lb/MMBtu	B	0.36	1.59	0.38	0.17
Naphthalene	1.30E-06	lb/MMBtu	B	0.00	0.00	0.00	0.00
PAH	2.20E-06	lb/MMBtu	B	0.00	0.00	0.00	0.00
Propylene Oxide	2.90E-05	lb/MMBtu	B	0.01	0.06	0.02	0.01
Toluene	1.30E-04	lb/MMBtu	B	0.07	0.29	0.07	0.03
Xylenes	6.40E-05	lb/MMBtu	B	0.03	0.14	0.03	0.02
Total HAPS	--	--	--	2.26	9.89	2.39	1.05

[a] Emission factor source: A = Vendor data via Acadia Bay Energy Co., LLC air permit application. B = AP-42 Chapter 3.1

[b] Calculated using global warming potentials from EPA's 2024 GHG Emission Factor Hub.
Note: Assumes full time operation with no startup or shutdown events
VOC – volatile organic compounds
CO – carbon monoxide
NO_x – nitrogen oxide
PM_{10} – particulate matter equal to or less than 10 microns in diameter
SO_2 – sulfur dioxide
CO_2 – carbon dioxide
CH_4 – methane
N_2O – nitrous oxide
CO_2e – carbon dioxide equivalent
PAH – polycyclic aromatic hydrocarbon

To develop an alternative generation solution for this Project, Great River Energy is relying on findings from the Energy Information Administration Annual Energy Outlook 2025 (AEO2025), Capital Cost and Performance Characteristics for Utility-Scale Electric Power Generating Technologies (see Case 3, **Table 3-1**). Case 3 comprises four aeroderivative dual-fuel combustion turbines in a simple-cycle configuration, with a nominal output of approximately 54 MW gross (52.75MW net) per turbine. The total cost assumptions include capital cost, interconnection costs, engineering, procurement, construction, and owner's costs. The resulting cost for this 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, Great River Energy will still proceed with using $1,606/kW as an approximation for this alternative generation solution. The final cost approximation is therefore $84.7M (52,700 kW x $1,606 per kW.)

In addition to the greater cost for a fossil-fueled generator, 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 which is putting pressure on the MISO interconnection process. 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 an alternative to the Project.

4.7.1.2 Distributed Generation

Applicants considered distributed generation 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 4.7.1.1), and likely at a greater cost if consisting of multiple smaller generators in diverse locations. Therefore, the addition of new fossil-fueled distributed generators is not a more reasonable and prudent alternative to the Project.

4.7.1.3 Renewable Generation

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

4.7.1.4 Battery Storage

The Applicants considered energy storage, both by itself and combined with new renewable generation, as an alternative to the Project. Energy storage, in this context, means a battery or some other 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 (MWh) 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 $304M. While a 40-year transmission life is used for estimates, it is recognized many transmission lines can last upwards of 80 years, so a comparable storage solution cost may be much more. Accordingly, a battery storage alternative was not further considered.

4.7.1.5 Demand Side Management and Conservation

The Applicants considered DSM and conservation as 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. As required by the Exemption Order, Great River Energy, Otter Tail Power, and Western Minnesota provide information on their conservation and energy-efficiency programs in **Appendix J**. 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 a more reasonable and prudent alternative to the Project.

4.7.2 Upgrading Existing Transmission Lines

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.

4.7.3 Different Voltages/Conductors

4.7.3.1 Different Voltages

The Applicants considered whether 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 and the associated additional cost is not justified by the need.

A lower voltage Appleton-Benson 41.6-kV alternative was also evaluated and dismissed. 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.

4.7.3.2 Different Conductors

The Applicants considered different conductors. Both single and twisted pair conductors were considered. The conductors selected 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 (see Section 3.3.4).

4.7.4 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 4.7-2**.

Table 4.7-2. 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

Study analysis shows that 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 high-side to provide increased capacity with lower losses.

4.7.5 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 would not improve reliability in the event of loss of a double-circuit transmission structure. . Due to the longer distance of the existing 115-kV circuit, from Morris to Benson and Benson to Willmar and Minnesota Valley, double circuiting these lines would also 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.

4.7.6 Direct Current Lines

High-voltage direct-current (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 reasonable alternative because of the limited line length and cost.

4.7.7 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 reasonable alternative to meet the need.

A common argument in favor of implementing underground lines is that they will minimize the human and environmental impacts above ground. However, there are human and environmental impacts both during and after construction of an underground transmission line. During both underground and overhead transmission line construction the ROW must be cleared of vegetation. For overhead transmission, excavation work is concentrated to line structure foundations; however, for underground transmission excavation work is along the entirety of the line. This results in increased impacts, especially in sensitive environmental areas. In addition, large areas for access roads capable of supporting heavy construction equipment, trenching activities, and cable installation are needed for underground transmission. After construction, the ROW needs to be maintained free of all woody vegetation to reduce soil moisture loss, since high-voltage underground conductors make use of soil moisture for conductor cooling. A permanent road must also be maintained along the ROW for maintenance and repair.

Due to the construction, maintenance, reliability, and cost drawbacks of high-voltage underground transmission lines, undergrounding is not a more reasonable and prudent alternative for the Project.

4.7.8 Combination of Alternatives

Applicants did not identify any combination of the above alternatives that could meet the Project need.

4.8 No Build Alternative/Consequence of Delay

Minn. R. 7849.0300 requires detailed information regarding the consequences of delay on three specific statistically based levels of demand and energy consumption. Similarly, Minn. R. 7849.0340 requires a discussion of the impact on existing generation and transmission facilities at the three levels of demand specified in Minn. R. 7849.0300 for the no-build alternative. The Commission granted the Applicants' requested exemption to Minn. R. 7849.0340, instead allowing them to provide data relevant to whether the system can meet peak demand. As detailed in Section 4.7, DSM and conservation, peaking generation additions, additional distributed generation, additional renewable generation, additional energy storage, additional reactive support resources, or existing system upgrades were not reasonable alternatives to the Project. Should the Project be delayed and/or 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.

4.9 Need Conclusion

The proposed Project is the most reasonable alternative to meet the identified load service needs. The Project will provide the necessary transmission system improvements to service current load and forecasted load for decades to come. The proposed Project addresses NERC standard reliability violations including contingency low voltage and thermal concerns on the 115-kV

system, addresses existing N-2 contingency voltage collapse on the 115-kV system, accommodates future load growth in the 41.6-kV and 115-kV transmission systems which is expected to reach a peak demand of 101.61 MW in 2028 and 106.87 MW in 2033, and reduces losses in the Study Area. Overall, the Project will provide an additional 47 MW of system capacity under the worst single (N-1) contingency and an additional 77 MW of capacity under the worst double (N-2) contingency.

4.10 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.

4.11 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.

4.12 Socially Beneficial Uses of Facility Output

The purpose of the Project is to maintain critical transmission reliability for the Applicants' customers in the Project region. The Project arises after the shutdown of the FibroMinn Energy Center near Benson, Minnesota. As detailed elsewhere in this Application, existing load cannot be reliably served without the addition of the Project, and updated load forecasts predict higher growth rates that further require the Project. The Project will continue to support reliable service in the area and ensure local homes and businesses can rely on the electric system for day-to-day needs.

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5.0 ROUTE SELECTION PROCESS

5.1 Route Development Process Summary

The Applicants used a multi-stage, interactive routing process to identify the Proposed Route[21] that focused on the use of existing transmission/distribution lines or other utility and transportation ROWs. This process was intended to identify a Proposed Route that meets the objectives of the Project along with minimizing impacts to the environment in conformance with Minnesota's routing considerations. The iterative process started with development of an initial area for evaluation for the Project, which included routes that would connect the substations identified in Sections 1.3 and 3.2.

This initial review resulted in a more detailed study of five potential routing options – one of which ultimately became the Proposed Route, and four of which were considered but ultimately rejected (see additional discussion in Section 5.2). All options benefitted from the presence of existing transmission lines, distribution lines, and road ROWs with which a potential route could co-locate. The Applicants presented an initial route at the November 1 and 2, 2023 open houses (see Chapter 8) and during meetings with agency stakeholders. Some additional refinements to the Proposed Route presented in this Application were made following these meetings and consultations with stakeholders.

5.1.1 Routing Factors

The factors to be considered by the Commission in designating a route for a HVTL are set forth in Minn. Stat. § 216E.03, subd. 7[22] and Minn. R. 7850.4100.

The Applicants used these statutory and rule routing criteria, routing experience, engineering considerations, and stakeholder feedback to develop the Proposed Route for the Project. The Applicants started with the identification of existing linear infrastructure in the vicinity of the existing substations, which offered existing ROWs along which a new transmission line might be constructed to minimize impacts to the natural and human environment. The Applicants then identified routing opportunities and constraints in these ROWs through further review and public engagement activities discussed in detail in **Chapter 8**.

Routing opportunities include existing linear infrastructure or other features (e.g., roads, transmission lines) along which siting a HVTL would be most compatible. Routing opportunities also facilitate Project development by minimizing impacts to identified resources. Minn. R. 7850.4100 requires the Commission to consider the use or paralleling of existing ROWs (e.g., transportation corridors, pipelines, electrical transmission lines). Examples of constraints include natural resources such as lakes; existing land uses such as residences and schools; federal, state,

[21] "Proposed Route" is defined in Section 1.3.

[22] Although the Applicants have applied for a Route Permit under the alternative review provisions of Minn. Stat. § 216E.04, Minn. Stat. § 216E.04, subd. 8 provides that the considerations of Minn. Stat. § 216E.03, subd. 7 will apply.

and locally designated environmental protection areas; critical habitats or sensitive natural resource areas; cultural resources such as national landmarks and archaeological sites; and public infrastructure such as airports and aeronautical and commercial telecom structures. The routing process aims to avoid and/or minimize constraints where practicable.

Technical and reliability considerations that could affect the routing process include specific engineering requirements, standards, and objectives associated with the design and construction of the Project. For example, there are circumstances where technical and maintenance objectives make certain line collocations unworkable. Other engineering objectives may include spacing for line entrances into a substation, minimizing the overall line length, ensuring adequate access for construction and inspections, minimizing the number of angles, minimizing the number of "special" structures, and considering the use of longer than average spans between structures. Landowner considerations including proximity to existing or planned structures, desired land use, residences, and center pivot irrigation systems were also important when developing the Project.

5.2 Route Alternatives Considered but Rejected

Minn. Stat. § 216E.04, subdivision 3, and Minn. R. 7850.3100 require an applicant to identify any alternative routes that were considered and rejected for the Project. The Project is needed to address low voltage concerns and enhance transmission reliability in the Project area. Accordingly, a Route Alternative (RA) was not considered viable if it did not interconnect to the substations identified in Sections 1.3 and 3.2 because it would not meet the Project need. The Applicants then studied five RAs (one of which was the Proposed Route) that would meet the purpose of the Project. **Table 5.2-1** compares the human and environmental features of the Proposed Route and the RAs. **Figure 5-1** shows each RA as compared to the Proposed Route.

Table 5.2-1. Comparison of Human and Environmental Features Crossed by the Proposed Route and Route Alternatives[1]

Resource / Characteristic	Proposed Route	RA1 (80th Ave SW)	RA2 (90th Ave SW)	RA3 (U.S. Highway 12)	RA4 (BNSF Railway)
Length (miles)	28.8	28.9	28.7	28.5	27.8
Location within Existing Transmission Line ROW (miles)	19.3	10.8	11.8	6.1	10.5
Percent Co-located with Road or Railroads[2]	68	78	78	59	50
Land Use Features / Utilities and Transportation					
Residences within 200 feet	36	34	34	50	51
Number of parcels crossed	106	97	97	91	91
Pipeline crossings	1	1	1	1	1
Railroad crossings	4	2	2	6	8
Road crossings	60	61	59	84	61
Airports within 5 miles	2	2	2	2	2
Agricultural land use crossed (miles)	14.8	13.3	13.2	6.9	9.8
Developed land use crossed (miles)	12.1	13.3	13.8	19.5	15.9
Forested land use crossed (miles)	0.5	0.4	0.4	0.6	0.6

Resource / Characteristic	Proposed Route	RA1 (80th Ave SW)	RA2 (90th Ave SW)	RA3 (U.S. Highway 12)	RA4 (BNSF Railway)
Tallgrass prairie land use crossed (miles)	1.4	1.3	1.3	1.5	1.6
MDNR Public Lands (Tracts Crossed)	0	0	0	3	3
BWSR Conservation Easements Crossed	3	2	2	3	3
U.S. Fish and Wildlife Waterfowl Production Area (WPA) Crossed	0	0	0	1	1
Recreation					
MDNR State Water Trails Crossings	1	1	1	1	1
Snowmobile Trail Crossings	6	5	5	13	13
Collocation[1] with snowmobile trails (feet)	14,615	8,609	8,609	32,733	36,711
Groundwater Features					
Drinking Water Supply Management Areas / Wellhead Protection Areas	1	1	1	1	1
Surface Water Features					
National Wetlands Inventory (number of crossings)	13	17	17	17	17
No. of wetland crossings greater than 500 feet	1	1	1	1	1
Public Water Basins / Shallow Lakes (number of crossings)	0	0	0	1	1
Waterbodies/Ditches (number of crossings)	13	11	11	13	14
MDNR Public Water Watercourses (number of crossings)	4	4	4	4	4
Impaired Waterbodies (2022 303d List)	3	3	3	2	3
Rare and Sensitive Resources					
Potential for USFWS federally protected species	4	4	4	4	4
Potential for state-listed species[3]	4	4	4	4	4
Important Bird Area (IBA)	1	1	1	1	1
Minnesota Biological Survey Sites of Biodiversity Significance (number of sites)	2	2	2	3	3
Potentially Undisturbed Lands (Virgin Sod) (number of tracts)	4	4	4	5	5

Notes:

1 To provide a reasonable comparison between the Proposed Route and Route Alternatives, resource impacts were assessed based on "miles crossed" by the Proposed Alignment or Route Alternatives.

2 Collocation is defined as any utility or road located within 50 feet either side of the Proposed Alignment based on the proposed ROW width.

3 State-listed species include endangered or threatened species identified in Minn. R. Ch. 6134.

5.3 Alignments Evaluated within 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.

Table 5.3-1 provides a comparison of the relevant human and environmental features crossed by the alignment alternatives in this area.

Table 5.3-1. Comparison of Human and Environmental Features Crossed by the Alignment Alternatives in the City of Benson[1]

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[2]	100%	97%	90%
Percent co-located with railroads[2]	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

Notes:

1 To provide a reasonable comparison between the Proposed Route and Route Alternatives, resource impacts were assessed based on "miles crossed" by the Proposed Alignment or Route Alternatives.

2 Collocation is defined as any utility or road located within 50 feet either side of the proposed alignment based on the proposed ROW width.

All three alignments would occur within the Benson Wellhead Protection Area (WHPA) / Drinking Water Supply Management Area (DWSMA).

As illustrated in **Table 5.3-1**, Alignment 1 would be located closer to houses along the southwest side of Pacific Avenue, therefore crossing more parcels. Although all three alignments would be within 200 feet of a similar number of houses, Alignment 1 would be about 40 to 60 feet closer to

houses than Alignment 2 (see **Table 5.3-2**) and would result in more tree clearing impacts. Alignment 3 would occur along the northeast side of the BNSF Railway along a parkway maintained by the City of Benson. The distance from the centerline of Alignment 3 to nearby residences is greater than either Alignment 1 or 2 (see **Table 5.3-2**). Alignment 3 would require less tree clearing than Alignment 1 but more tree clearing than Alignment 2.

There are four unevaluated historic structures located along Atlantic Avenue that may be visually impacted by the installation of Alignment 3 along the northside of the BNSF Railway. Visual impacts to these structures would be reduced for Alignments 1 and 2 because the vegetation along the City of Benson parkway would serve as visual screening. Further, there is an existing transmission line and the BNSF Railway along Pacific Avenue where Alignments 1 and 2 would be installed.

Table 5.3-2. Distances of Residences from the Proposed Route and Alignment Alternatives in the City of Benson

Alternative Alignment	0-50 feet	50-100 feet	100-150 feet	150-200 feet	Total
Alignment 1	5	8	4	6	**23**
Alignment 2	0	7	7	6	**20**
Alignment 3	0	0	13	10	**23**

The Alignment 2 ROW would overhang the railroad ROW for approximately 0.4 mile; therefore, requiring a Utility License Agreement from the BNSF Railway and additional engineering studies and mitigation. The Applicants are concerned that the timeline to obtain a Utility License Agreement to parallel the railway may delay Project construction and in-service dates and could ultimately render this alignment infeasible. Further, the City of Benson's existing 115-kV line would need to be taken out of service to double-circuit the two lines. Alignment 3 would cross the BNSF Railway twice, which also requires a Utility License Agreement; however, perpendicular crossings generally have a shorter permitting timeline and require fewer studies and mitigation. In addition, the City of Benson also maintains sewer lines along this route, which would need to be avoided during structure placement, and the parkway serves as a visual screening between the railway and residents to the north.

5.4 Routing Conclusions

As is evident from **Table 5.2-1**, the Proposed Route and the RAs are generally comparable in terms of number of parcels crossed, land use, potential crossing of BWSR conservation easements, state water trail crossings, location within a DWSMA/WHPA (City of Benson), waterbody and public watercourse crossings, and potential impacts to federally and state protected species and habitats.

Although RA3 (U.S. Highway 12) and RA4 (BNSF Railway) are slightly shorter than the Proposed Route, these route alternatives appear to be the least environmentally preferred alternatives for the following reasons:

- less collocation with existing utility and transportation corridors relative to the other routes;
- more residences are within 200 feet of the routes;

- additional MDNR public lands would be crossed, which includes the Danvers Wildlife Management Area (WMA). This area also includes a public water basin/designated shallow lake;

- these alternatives would cross the USFWS Benson WPA; and

- a large portion of the Proposed Route would be co-located and occur parallel to Grant-in-Aid snowmobile trails relative to the other routes.

In addition, collocation with the BNSF Railway and/or U.S. Highway 12 poses additional congestion, constructability, access and/or maintenance issues. These two alternatives also have more road and/or railroad crossings than the other routes.

The Proposed Route, RA1 (80th Ave SW), and RA2 (90th Ave SW) are environmentally comparable alternatives; however, both RA1 and RA2 would utilize approximately 9 and 8 miles less, respectively, of existing transmission line corridor than the Proposed Route.

The Applicants are requesting a Route Permit for the Proposed Route because the Proposed Route best balances the Commission's routing criteria by using existing transmission line corridors for 67 percent of the route, and co-locating with road ROWs for 68 percent of the route, while minimizing environmental impacts where possible. The Proposed Route will result in fewer NWI wetland impacts and avoids impacts to MDNR-managed public lands. On February 23, 2024, the MDNR indicated their preference that the Applicants select a Proposed Route that follows the existing 41.6-kV transmission line to the extent possible, particularly between the Cities of Danvers and Benson to avoid the Danvers WMA and reduce potential natural resource impacts and tree clearing within the WMA (see **Appendix K**). The Applicants' Proposed Route satisfies these recommendations.

In the City of Benson, the Applicants incorporated Alignment 2 into the Proposed Route because it balances impacts to residences and limits tree-clearing. 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.

6.0 RIGHT-OF-WAY ACQUISITION, CONSTRUCTION, RESTORATION, OPERATIONS AND MAINTENANCE PROCEDURES

Design and construction of transmission lines occur through multiple stages including identification of existing ROWs; transmission line design; ROW acquisition; construction; restoration; and operation and maintenance. Each stage is discussed in further detail in the sections that follow.

6.1 Landowner Coordination and Right-of-Way Acquisition Procedures

The Applicants have initiated landowner outreach by providing information on the Project via letters mailed to potentially impacted landowners (see **Appendix G**), interested parties, Tribal Nations, and federal, state, and local governmental officials; publishing notices in area newspapers; and holding open house meetings (see **Chapter 8**). The Applicants will continue to engage with landowners throughout the permitting process to answer any questions they may have regarding the easement process or the Project.

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 land rights for the ROWs associated with 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 the ROW associated with approximately 8.5 miles of new 115-kV transmission line construction. Some new easements may be required 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.

During formal land rights acquisition, the Applicants will provide the landowners a transmission line easement document and offer of compensation, as well as information on the Project schedule, construction practices, vegetation removal, and damage settlement. Additional information may also be given to each landowner regarding preliminary structure placement (if available at that time), structure design or photos, and power line safety. The Applicants will respond to any comments or questions landowner may have including those with respect to the transmission line construction practices or operations of the Project.

In addition to permanent easements necessary for the construction, operation, and maintenance of the Project, agreements may be obtained from certain landowners for temporary construction or staging areas for storage of structures, vehicles, or other related items.

As part of early transmission design work, the Applicants may need to complete preliminary survey work and may need to acquire soil characteristics data. The Applicants will notify

landowners in the event access to their property for soil boring is necessary to determine soil suitability in areas where special transmission structure design may be required.[23]

If a mutually acceptable agreement cannot be reached through the Applicants' work with landowners, Minnesota law provides that the Applicants can use their rights of eminent domain to obtain the rights necessary for the Project. *See* Minn. Stat. §§ 222.36, 301B.02, and 308A.201, subd. 13. If necessary, the Applicants will commence a condemnation action, pursuant to Minn. Stat. Ch. 117, to obtain the necessary rights. Before the action is started, the Applicants typically obtain an appraisal and provide it to the landowner. The landowner also has certain rights of reimbursement to obtain its own appraisal. Within a condemnation action, the landowner has the ability to contest the condemnation action. If the Court determines that the Applicants may obtain the required easements through condemnation, then the Court will appoint an impartial panel of qualified valuation commissioners. Those commissioners will view the landowner's property and conduct a hearing at which the landowner and the Applicants will present their evidence about the fair market value impacts that the easements have on the property. The commissioners will then issue an award setting the amount of compensation. If a landowner or the Applicants are not satisfied with the award, either may file an appeal in which the just compensation will be set following a trial. If no appeal is filed, the Applicants will pay the amount of the award. At any point in the condemnation process, the landowner and the Applicants can reach a settlement and dismiss the action.

6.2 Construction Procedures

Construction of an overhead transmission line requires several sequential activities in a coordinated matter within the workspace. Currently, the Applicants plan to conduct the activities identified below generally in sequential order. Several of these activities may occur concurrently during the construction process, with more than one construction crew operating simultaneously at different locations, and with each crew passing through any given area at least once.

Construction for the transmission line will follow the Applicants' standard construction and mitigation best practices. Construction will typically occur as follows:

- collection of geotechnical data (e.g., soil borings) required for final design of the transmission line;
- surveying and staking;
- installation of erosion and sediment control BMPs prior to anticipated ground disturbance activities;
- mobilization and preparation of staging / laydown yards;
- road improvements or development to provide access to the ROW;

[23] Survey work and geotechnical studies do not require that the Commission issue a Route Permit for this work to occur. Minn. R. 7850.1200, subp. 5.

- clearing activities of the ROW;
- installation of construction mats in wetlands or other unstable soil areas, and installation of temporary bridges across waterways prior to construction along the ROW;
- temporary material staging in the Project area prior to construction installation;
- grading, excavation, and foundation installation;
- structure setting;
- wire stringing and clipping once there are enough structures set consecutively in a row to support a wire pull;
- removal of existing transmission circuits;
- cleanup and restoration of ROW; and
- demobilization and laydown yard cleanup.

Procedures to be used for construction of the transmission line are discussed below. Equipment used in the transmission line construction process will include boom trucks, skid steers, cranes, backhoes, and assorted small vehicles.

After land rights have been secured, and prior to any construction activities starting, landowners will be notified of the Project schedule and other related construction activities.

The Applicants will employ standard construction and mitigation practices, as well as industry specific BMPs. BMPs address ROW clearing, erecting transmission line structures, and stringing transmission lines. BMPs for each specific project are based on the proposed schedules for activities, prohibitions, maintenance guidelines, inspection procedures, and other practices. In some cases, these activities, such as schedules, will be modified to incorporate BMP installation that will assist in minimizing impacts to sensitive environments. Any contractors involved in construction of the transmission line will adhere to these BMP requirements.

All construction will 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.

6.2.1 Transmission Line Construction

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 MPCA NPDES Construction Stormwater General Permit (General Permit) (see **Table 2-1**). 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 vegetation will be cleared for the full width of the ROW. 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, if so desired. Otherwise, it will be removed and properly disposed of in accordance with agency requirements. If temporary removal or relocation of fences is necessary, installation of temporary or permanent gates will be coordinated with the landowner. Additional details regarding vegetation clearing are provided in the draft Vegetation Management Plan (VMP) (see **Appendix L**).

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.

6.2.2 Substation Construction

6.2.2.1 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.

6.2.2.2 New Substations

New substation construction activities are similar to what is done for an expanded substation. It commences 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.

6.2.2.3 Restoration Procedures

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 VMP, which further describes the restoration procedures that will be implemented (see **Appendix L**). 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 the Applicants' draft VMP provided in **Appendix L**.

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.

6.3 Construction Work Force Required

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.

6.4 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.

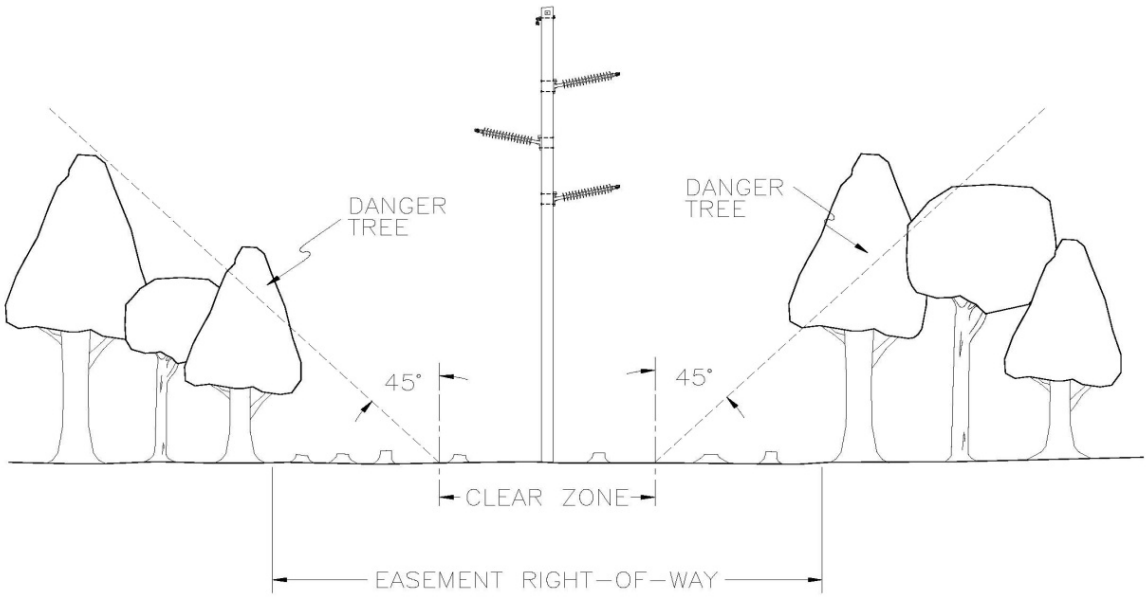
The ROW will be managed to remove vegetation that interferes with the operation and maintenance of the transmission line. Shrubs that will not interfere with the safe operation or accessing and traversing the ROW of the transmission line will be allowed to reestablish in the ROW. The Applicants will use an integrated VMP (see **Appendix L**) that generally incorporates a wire/border zone practice for ROW clearing and maintenance, unless another maintenance practice is required by applicable permit or approval.[24] 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

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

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 line (e.g., "danger trees") may be removed or trimmed to eliminate the hazard as shown in **Diagram 6-2**, 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.

Diagram 6-2. 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 L**).

7.0 ENVIRONMENTAL ANALYSIS

This portion of the Application provides a description of the human and environmental resources crossed by the Proposed Alignment, within the Proposed Route, or in the vicinity of the Project; potential impacts to these resources; and proposed mitigation measures.

7.1 Environmental Setting

The Project lies in the northwest portion of 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. The MDNR describes the Minnesota River Prairie Subsection as:

> *The boundaries of this subsection coincide with large till plains flanking the Minnesota River. The unit is bounded to the southwest by the Prairie Coteau. A series of end moraines define the eastern boundary, starting with the Alexandria Moraine to the northeast and ending with end moraines associated with the Des Moines lobe in the southeast. This subsection consists of a gently rolling ground moraine about 60 miles wide. The Minnesota River occupies a broad valley that splits the subsection in half. The valley was created by Glacial River Warren, which drained Glacial Lake Agassiz. Topography is level to gently rolling. The steepest topography of the subsection is along the Minnesota River and on the Big Stone Moraine, which has steep kames and broad slopes. Soils in this subsection are primarily 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. They occupy convex knobs on the landscape. 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.*[25]

The environmental setting of the Project area is predominantly agricultural fields, interspersed with isolated residential and agricultural developments. Scattered throughout are pockets of wooded areas and hydrologic features, including wetlands, streams, and ponds. Additional details regarding land use are provided in Sections 7.2.5 and 7.4, and water resources are described in Section 7.6.4.

Existing transmission lines are located within the Project 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 5-1**). The BNSF Railway extends from the City of Appleton to the City of Benson and there are many

[25] MDNR. Undated. Ecological Classification System: Prairie Parkland Province– North Central Glaciated Plains – Minnesota River Prairie Subsection. Available online at: https://www.dnr.state.mn.us/ecs/251Ba/index.html. Accessed August 2024.

state and county highways, and local roads throughout the Project area (Section 7.2.7). Residences, structures and businesses in proximity to the Project are described in Section 7.2.2, and existing public services and transportation infrastructure are detailed in Section 7.2.7.

The landscape and characteristics of the Project area are further described in the following subsections and are depicted in **Figures 7-1** through **7-7.** The characteristics of the Project area are typical of the surrounding areas and do not preclude development of this Project.

7.2 Human Settlement

7.2.1 Aesthetics

As discussed in Section 7.1, the environmental setting of the Project area is predominantly agricultural fields, interspersed with isolated residential and agricultural developments. The Project will not impact any designated scenic byways[26] or wild and scenic rivers[27].

Approximately 67 percent of the Project will be constructed within 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. For the portions of the Project that will upgrade, rebuild, and/or reconductor existing lines, the Project will replace 41.6-kV and 115-kV facilities.

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 Applicants will primarily use single-pole wood structures. Some tree clearing and trimming will be necessary within the Project's 100-foot-wide ROW (see Section 7.4.2 and **Appendix A**).

The Project will also construct new and/or expand/modify existing substations in the Project area. New substations are proposed in proximity to the existing substations and the existing substations would be decommissioned.

The Project upgrades and substation expansions/relocations will continue to be visible along the roadways and will appear similar to the existing 41.6- and 115-kV systems. The new Project infrastructure will be visible along the co-located roadways which may be perceived as a visual disruption. The visual effect will depend largely on the perceptions of the observers across these landscapes but will remain similar to current conditions. Although the Project upgrade areas already have existing transmission lines in the viewshed, the visual contrast added by the taller

[26] MnDOT. Undated. Minnesota Scenic Byways. Available online at: https://www.dot.state.mn.us/scenicbyways/. Accessed December 2024.

[27] MDNR. Undated. Wild and Scenic Rivers Program: Purpose and Regulatory Background. Available online at: https://www.dnr.state.mn.us/waters/watermgmt_section/wild_scenic/wild-scenic-purpose-regulatory-background.html. Accessed December 2024.

transmission structures and lines and associated tree clearing/trimming may also be perceived as a visual disruption.

7.2.1.1 Impacts and Mitigation

Because the Project will largely use existing transmission ROW, the Project will parallel existing road ROW (see Section 3.1.2), and will either upgrade existing substations or replace existing substations in proximity to the current locations; aesthetic impacts are anticipated to be minimal. That said, new infrastructure may increase visual impacts perceived by a viewer, in some locations. Additionally, the upgraded transmission line structures will be taller with larger insulators, which might also increase the visual impacts perceived by a viewer.

Where trees need to be cleared, the change to the landscape will typically result in a noticeable visual impact to receptors. The Proposed Route was developed in part to minimize the amount of tree clearing, which will help to minimize visual impacts (see Section 7.4.2 and **Appendix A**).

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.

- Considering that the Project largely occurs within existing transmission and road ROWs and will upgrade and replace existing substation infrastructure, and that the current landscape is predominately agricultural with limited forested areas, the Applicants do not anticipate that the Project will appreciably change the character of the existing viewshed.

7.2.2 Displacement

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 3.3-2**). 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 7.2-1 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.

Table 7.2-1. 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**

7.2.2.1 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 substation placement, transmission alignment adjustments and/or structure placement, as necessary.

7.2.3 Noise

There will be temporary noise associated with construction of the Project and from operation of the Project.

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 7.2-2** shows noise levels associated with common, everyday sources.

Table 7.2-2. Common Noise Sources and Levels

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

Established daytime and nighttime noise standards per Minn. R. 7030.0040 by Noise Area Classifications (NAC) are provided in **Table 7.2-3**. The standards are expressed as limiting levels of dBA within a one-hour period; L_{50} is the dBA not to be exceeded over 50 percent of the time (30 minutes) within an hour, while L_{10} is not to be exceeded over 10 percent of the time (6 minutes) within the hour.

Table 7.2-3. MPCA Noise Limits by Noise Area Classification (dBA)[28]

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.

7.2.3.1 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

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

transport of construction personnel and materials to and from the work area. Construction activities will be 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[29] and will only occur when equipment is operating. Upon completion of construction activities, noise associated with construction equipment will cease.

7.2.3.2 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.

7.2.3.3 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 electric fields (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 7.2-4**.

[29] 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.

Table 7.2-4. 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.

7.2.3.4 Impacts and Mitigation

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 applicable 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, and no mitigation is proposed.

7.2.4 Socioeconomics & Environmental Justice

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 7.2-5** (U.S. Census Bureau, 2022a, 2022b, 2022c, 2022e, 2022f, and 2023).

Table 7.2-5. Socioeconomic Characteristics within the Project Area[30]

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

[30] U.S. Census QuickFacts. Available online at: https://data.census.gov/. Accessed August 2024.

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:

1. 40 percent or more of the area's total population is nonwhite;

2. 35 percent or more of households in the area have an income that is at or below 200 percent of the federal poverty level;

3. 40 percent or more of the area's residents over the age of five have limited English proficiency; or

4. the area is located within Indian country, as defined in United State Code (USC), title 18, section 1151."[31]

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 7-1**. Swift County was used as a reference population for the census tracts.

The Applicants utilized MPCA's "Understanding Environmental Justice in Minnesota" web-based mapping tool by drawing the Proposed Route into the mapping tool to determine whether the Project intersects any census tracts with EJ populations based on the definitions above. It is important to note that MPCA's web-based tool accounts for a margin of error in determining EJ areas of concern.

Based on the data provided in MPCA's web-based mapping tool, two census tracts that intersect with the Proposed Route are considered EJ communities under the definition provided in Minn. Stat. 216B.1691, subd. 1(e). 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 7.2-6** (U.S. Census Bureau, 2022b, 2022c and 2022d).

[31] Although this statute does not prescribe requirements for a route permit application, Great River Energy employs this methodology here consistent with the methodology used by DOC-EERA in a recently issued EA. *See* Docket No. ET2/22-235.

Table 7.2-6. 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
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.

In addition, the Applicants also conducted this EJ analysis in accordance with the U.S. Environmental Protection Agency (USEPA) Federal Interagency Working Group on EJ (Working Group) and National Environmental Policy Act (NEPA) Committee's publication, Promising Practices for EJ Methodologies in NEPA Reviews (Promising Practices).

Using this methodology, the USEPA's Environmental Justice Screening Tool (EJScreen) was used as an initial step to gather information regarding minority and/or low-income populations; potential environmental quality issues; environmental and demographic indicators; and other important factors. The USEPA recommends that screening tools, such as EJScreen, be used for a "screening-level" look and a useful first step in understanding or highlighting locations that may require further review. EJScreen was used to evaluate the Proposed Route plus a 0.25-mile buffer. Using EJScreen, the communities in Proposed Route are estimated to have 6 percent people of color and 28 percent low income.

According to Promising Practices, minority populations are those groups that include American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Following the recommendations set forth in Promising Practices, the 50 percent and the meaningfully greater analysis methods was used to identify minority populations. Using this methodology, minority populations are defined where either (a) the aggregate minority population of the block groups in the affected area exceeds 50 percent; or (b) the aggregate minority population in the block group affected is 10 percent higher than the aggregate minority population percentage in the county. The guidance also directs low-income populations to be identified based on the annual statistical poverty thresholds from the U.S. Census Bureau. Using Promising Practices' low-income threshold criteria method, low-income populations are identified as block groups where the percent of low-income population in the identified block group is equal to or greater than that of the county. Swift County is the comparable reference community to ensure that all affected EJ communities are properly identified.

[32] MPCA, 2023. Understanding environmental justice in Minnesota. Available online at: https://mpca.maps.arcgis.com/apps/MapSeries/index.html?appid=f5bf57c8dac24404b7f8ef1717f57d00. Accessed August 2024.

Table 7.2-7 identifies the minority populations by race and ethnicity and low-income populations within the State of Minnesota, Swift County, and four U.S. Census block groups crossed by the Proposed Route. U.S. Census 2022 American Community Survey 5-Year Estimate Data File# B17017 and File# B03002 for the race, ethnicity, and poverty data were analyzed at the block group level (U.S. Census Bureau, 2022b and 2022e).

Table 7.2-7. Minority and Low-Income Populations within the Project area (USEPA methodology)

State/County/Census Block Group	% Total Minority [a]	% Below Poverty Level
State of Minnesota	22.3	9.4
Swift County	11.9	11.4
Census Tract 9602, Block Group 3	11.3	10.9
Census Tract 9603, Block Group 1	3.7	4.1
Census Tract 9604, Block Group 1	3.5	**17.6**
Census Tract 9604, Block Group 2	7.6	**14.6**

[a] "Minority" refers to people who reported their ethnicity and race as something other than non-Hispanic White
Note: EJ communities are indicated in red, bold type and grey shading.

As presented in **Table 7.2-7**, two block groups crossed by the Proposed Route are considered EJ communities using the USEPA methodology. Zero block groups out of four block groups crossed by the Proposed Route are considered minority EJ communities. Two block groups out of four block groups crossed by the Proposed Route are considered low-income EJ communities.

The existing Moyer Substation that is proposed to be moved or modified is located in Census Tract 9604, Block Group 1. The existing and new options for the new Appleton substations are located in Census Tract 9604, Block Group 2.

7.2.4.1 Impacts and Mitigation

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 7.2.7). 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 7.2.3). 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 7.3.5). 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.

Minor visual impacts to communities will occur with changes in substation locations, new transmission infrastructure, increased height of the structures, and some tree clearing and trimming. These changes are consistent with the current viewshed and less than significant impacts to visual resources are anticipated (see Section 7.2.1). No perceptible change in noise levels is expected for residents near the substations due to location changes or upgrades (see Section 7.2.3). 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.

Because impacts to socioeconomics will be generally short-term and beneficial, no mitigation is proposed.

7.2.5 Zoning and Land Use Compatibility

Land cover along the Proposed Route is primarily agriculture and developed land use (see **Table 7.2-8** and **Figure 7-2**).[33] Agricultural and forestry land uses are further discussed in Sections 7.4.1 and 7.4.2, respectively.

Table 7.2-8. Land Uses Crossed by the Project

Land Use	Route Width (acres)	ROW (acres)
Agricultural & Developed Vegetation	1,021.2	197.0
Developed & Other Human Use	547.1	128.0
Recently Disturbed or Modified	2.4	0.1
Forest & Woodland	28.4	5.2
Shrub & Herb Vegetation	119.6	19.2
Open Water	1.9	<0.1
Source: U.S. Geological Survey (USGS) Gap Analysis Program data (USGS, 2016).		

The land use specifically associated with new potential substations are as follows:

- Appleton Substations: The substations will be located and developed in open space.
- Moyer Substation: If a new Moyer Substation is constructed, it will be located in proximity to the existing substation within agricultural and/or developed land use.
- Danvers Substation: If a new Danvers Substation is constructed, it will be located in proximity to the existing substation within agricultural and/or developed land use.

These areas are included within the Route Width.

Zoning along the Proposed Route is primarily Agricultural Preservation District 1 (see **Figure 7-3)**[34]. The Proposed Route also traverses the following zoned municipal areas:

[33] 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 August 2024.

[34] 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.

- City of Appleton[35] – Within the City of Appleton, the Proposed Route crosses developed land zoned for industrial, heavy/medium land use (see **Figure 7-3**). 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 industrial 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 USGS Gap Analysis Program data (USGS, 2016) (see **Figure 7-2** and **Appendix A**). 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 (USGS, 2016) (see **Figure 7-2** and **Appendix A**). The Town of Danvers does not have a Comprehensive Plan.

- City of Benson[36] –According to the City of Benson's Comprehensive Plan, the Proposed Route crosses land zoned for commercial, public/semi-public, limited industrial, railroad ROW, and 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[37] (see **Appendix A**); however, the Proposed ROW only crosses three RIM easements, of which, one intersects the Proposed Alignment (see Section 7.6.4.3). 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[38]. 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 (see **Appendix K**). The Applicants will continue to coordinate with BWSR regarding these easements.

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[35] City of Appleton. 2018. Comprehensive Plan. Available online at: https://appletonmn.gov/vertical/sites/%7B4405B7C1-A469-4999-9BC5-EC3962355392%7D/uploads/Appleton_Comprehensive_Plan_Final_copy_April_2018.pdf. Accessed August 2024.

[36] 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 August 2024.

[37] 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.

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

7.2.5.1 Impacts and Mitigation

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. Impacts to agricultural and forestry land uses are further discussed in Sections 7.4.1 and 7.4.2, respectively.

7.2.6 Cultural Values

Cultural values include those perceived community beliefs or attitudes in a given area, which provide a framework for community unity.

7.2.6.1 Project Area History

Eastern Dakota people have been a part of Minnesota for centuries.[39] 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[40] 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[41] 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.

7.2.6.2 City of Appleton

In 1872, a group of men, mostly from Eastern America, Germany, and Scandinavia, organized a township called Phelps after Addison Phelps, a pioneer settler. Phelps later asked to change the name to Appleton after the city where he grew up (Appleton, Wisconsin). The township was formed on September 4, 1872. A petition was sent to the Minnesota State Legislature on December 25, 1880, asking for the formation of the Village of Appleton.

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[39] University of Minnesota. U.S.-Dakota War of 1862. College of Liberal Arts, Center for Holocaust and Genocide Studies. Undated. Available online at: https://cla.umn.edu/chgs/holocaust-genocide-education/resource-guides/us-dakota-war-1862#:~:text=The%20Dakota%20War%20of%201862,Native%20Americans%20across%20the%20state. Accessed August 2024.

[40] Swift County. 2024. History of Swift County. Available online at: https://www.swiftcounty.com/history. Accessed August 2024.

[41] Western Minnesota Prairie Waters. 2024. Available online at: https://prairiewaters.com/about-us/our-organization/. Accessed August 2024.

Appleton is the only town in the country with all its streets and avenues named after fallen war heroes[42]. 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[43].

7.2.6.3 City of Benson

Early development of Benson and the rest of Swift County 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 is currently home to approximately 3,480 residents in an area of approximately 3.2 square miles based on 2020 U.S. census data. Benson is the site of the Swift County History Museum, DeMarce Theatre, and Ambush Park.[44]

7.2.6.4 Impacts and Mitigation

Construction of the proposed Project is not expected to conflict with the cultural values of the area; therefore, no mitigation is proposed.

7.2.7 Public Services and Transportation

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.

As described in **Chapter 5**, there are existing transmission lines within the Project area (see **Figure 5-1**). 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.

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[42] City of Appleton. Undated. About Appleton. Available online at: https://appletonmn.gov/. Accessed August 2024.

[43] Explore Minnesota. 2024. Appleton Area Chamber of Commerce: Available online at: https://www.exploreminnesota.com/profile/appleton-area-chamber-commerce/2994#:~:text=Appleton%20is%20the%20home%20of,for%20all%20your%20outdoor%20activities. Accessed August 2024

[44] City of Benson, Minnesota. Undated. Available online at: Benson, Minnesota (bensonmn.org). Accessed October 2024.

The Proposed Route will parallel and/or intersect with several city, township, county, and state-managed roads and highways as described in **Table 7.2-9** and shown in the maps in **Appendix A**.

Table 7.2-9. Highways or Roads Crossed or Parallel to the Proposed Alignment

Highway / Road Name	Jurisdiction[45]	Parallel / Intersects	Traffic Volumes (SEQ # / Year) [46]
State Highway 7	MnDOT	Parallel/Intersect	1,719 5824/2023
3rd St W	Appleton	Intersect	N/A
2nd Ave N	Appleton	Parallel/Intersect	N/A
2nd St W	Appleton	Intersect	16 76178/2022
70th St SW	Appleton Township	Intersect	N/A
60th St SW/County Road 54/ County Highway 36	County	Parallel/Intersect	110 27550/2023
Highway 119	MnDOT	Intersect	269 5802/2021
210th Ave SW	Shible Township	Intersect	N/A
200th Ave SW/County Highway 11	County	Intersect	69 27551/2023
190th Ave SW	Moyer Township	Intersect	N/A
Highway 59	Federal	Intersect	1,627 5795/2022
160th Ave SW/County Highway 9	County	Intersect	1,000 27468/2017
50th St SW/County Highway 38	County	Intersect	43 34413/2023
150th Ave SW	Moyer Township	Parallel/Intersect	N/A
40th St SW	Moyer Township	Parallel	109 76630/2022
140th Ave SW	Moyer Township	Intersect	20 76177/2022
130th Ave SW/County Highway 38	County	Intersect	20 27549/2023
120th Ave SW	Marysland Township	Intersect	8 76126/2022
110th Ave SW	Marysland Township	Intersect	22 76629/2022
100th Ave SW	Marysland Township	Intersect	4 76094/2022

[45] Swift County. Undated. General County Wide Map Viewer. Available online at: Interactive Maps - Swift County, MN Accessed August 2024.

[46] MnDOT. Undated. Traffic Mapping Application. Available online at: https://www.arcgis.com/apps/webappviewer/index.html?id=7b3be07daed84e7fa170a91059ce63bb. Accessed August 2024.

Highway / Road Name	Jurisdiction[45]	Parallel / Intersects	Traffic Volumes (SEQ # / Year) [46]
90th Ave SW/County Highway 17	County	Intersect	390 27548/2023
80th Ave SW/County Highway 67/14	County	Parallel/Intersect	50 27546/2022
30th St SW	Six Mile Grove Township	Parallel/Intersect	31 76632/2022
70th Ave SW	Six Mile Grove Township	Intersect	31 77732/2022
60th Ave SW/County Road 73	County	Intersect	31 27544/2023
20th St SW/County Road 75	County	Parallel	27 45096/2023
30th Ave SW	Six Mile Grove Township	Parallel/Intersect	N/A
Highway 12	Federal	Parallel/Intersect	2,135 5833/2022
25th Ave NW/Country Road 3	County	Parallel	1,500 27486/2017
20th St NW/County Highway 20	County	Intersect	1,900 27485/2017
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. These initial communications are provided in **Appendix K**.

7.2.7.1 Impacts and Mitigation

The Applicants initiated the FAA Obstruction Evaluation / Airport Airspace Analysis Process by running the Notice Criteria Tool[47]. Using a maximum height of 120 feet, which includes a 20-foot buffer for cranes, filing with the FAA is required for both airports (see **Appendix K**). Because both airports are already near existing transmission infrastructure, impacts to aviation services are not expected.

The Applicants will coordinate Project construction schedules, including any outages, to avoid and/or minimize disruptions to service 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

[47] FAA Obstruction Evaluation. September 9, 2023. Notice Criteria Tool. Available online at: https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm. Accessed September 2024.

utilities, including pipelines. 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. 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. 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.

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. 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.

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.

7.3 Public Health and Safety

7.3.1 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 **Chapter 6** for detailed discussions on construction practices and safety.

7.3.2 Stray and Induced Voltage

"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 such as barns and milking parlors.

Transmission lines (like the Project) do not, by themselves, create stray voltage because they do not connect to businesses and residences.

7.3.2.1 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.

Transmission lines can also induce a current on a distribution circuit that is parallel and immediately under the transmission line. The Applicants are aware of this effect and take precautions in these situations to ensure safe work practices.

7.3.2.2 Impacts and Mitigation

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.

Induction and its potential impacts can be mitigated 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.
- Separation – Increasing the distance between the transmission line and other conductors or conductive objects. Electric and magnetic field levels decrease rapidly with distance.
- Grounding of non-energized conductors or conductive objects.

The Applicants will design and construct the Project to minimize the potential for induction issues.

7.3.3 Electronic Interference

Under certain conditions, the localized 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.

7.3.3.1 Impacts and Mitigation

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.

7.3.4 Electric and Magnetic Fields

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.

7.3.4.1 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.[48]

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 7.3-1** summarizes the EFs calculated for the proposed single and double circuit transmission lines. These EF calculations are also shown graphically in **Diagram 7-1** and **Diagram 7-2**.

Table 7.3-1. 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

[48] *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).

Diagram 7-1. 115-kV Single Circuit Line Electric Field Profile

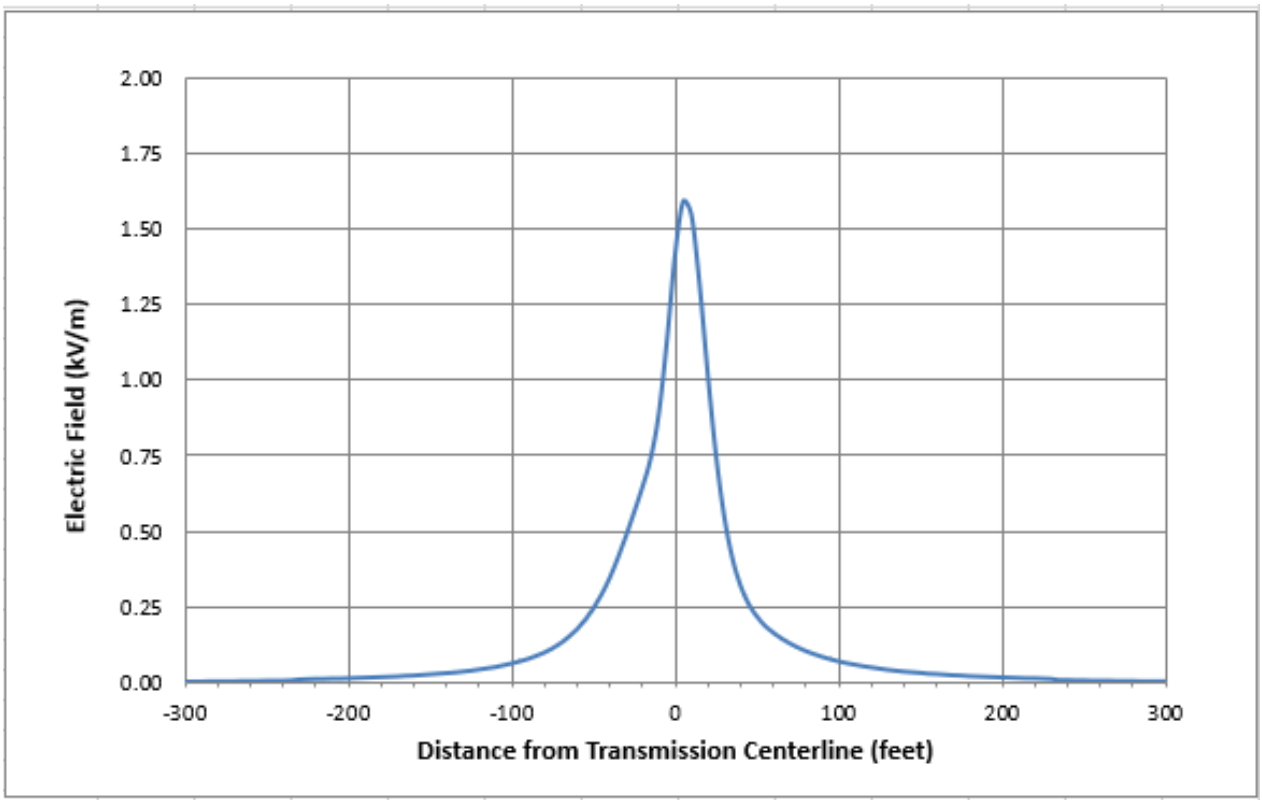
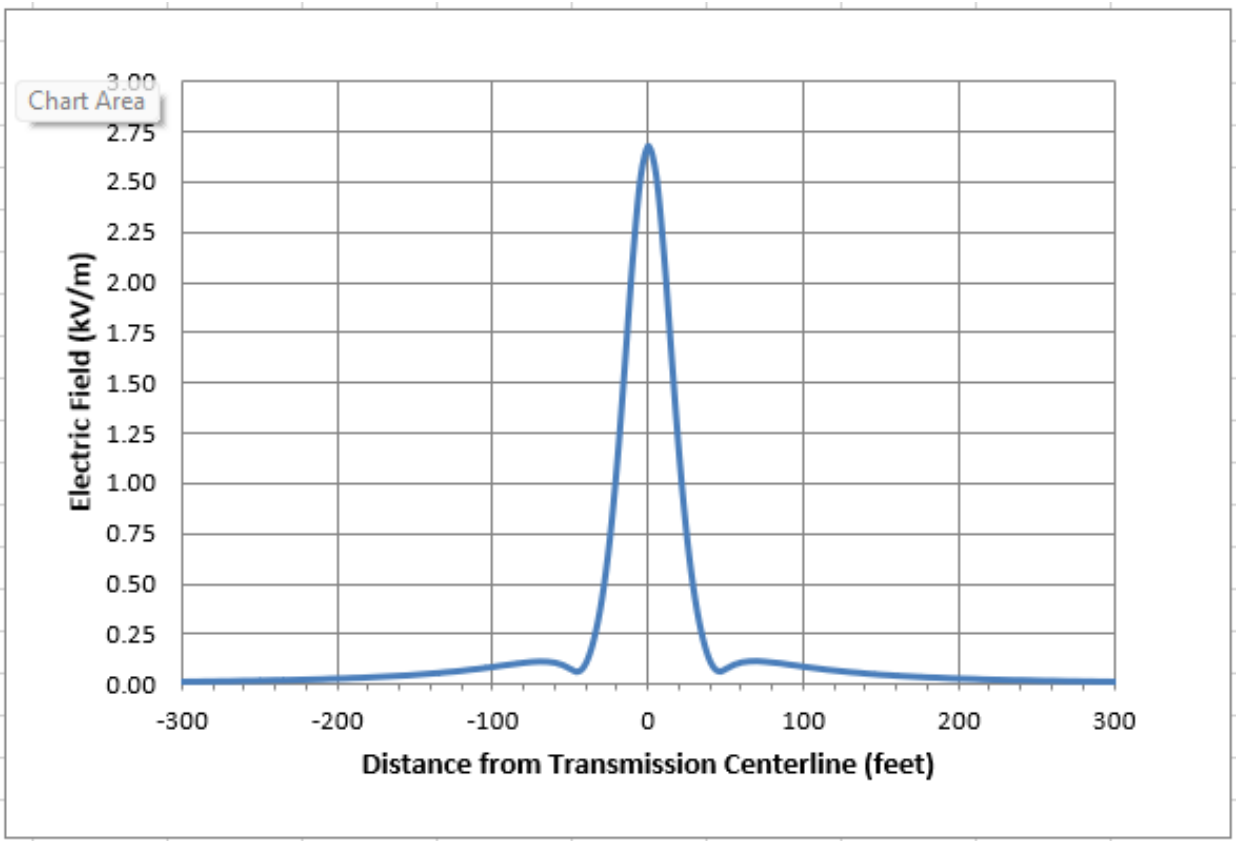


Diagram 7-2. 115-kV Double Circuit Line Electric Field Profile



7.3.4.2 Implantable Medical Devices

High intensity EMF can have adverse impacts on the operation of implantable medical devices (IMDs) such as pacemakers and defibrillators. While research has shown that the MFs associated with HVTLs do not reach levels at which they could cause interference with such devices, it is possible that the EFs associated with some HVTLs could reach levels high enough to induce sufficient body currents to cause interference.

Modern "bipolar" cardiac devices are much less susceptible to interactions with EFs. Manufacturers of pacemakers and other IMDs have indicated that EFs below 6-kV/m are unlikely to cause interactions affecting operation of most of their devices. **Table 7.3-1**, **Diagram 7-1**, and **Diagram 7-2** show that the EFs for the Project are well below levels at which modern bipolar devices are susceptible to interaction with the fields.

The older "unipolar" designs of cardiac devices are more susceptible to interference from EFs. Research from the early 1990s indicates that the earliest evidence of interference with these types of IMDs could occur in EFs ranging from 1.2 to 1.7-kV/m. For older style unipolar designs, the EFs do exceed levels that research from the 1990s has indicated may produce interference. However, research conducted in 2005 concluded that the risk of interference to unipolar cardiac devices from high voltage power lines in everyday life is small.

In the unlikely event that a pacemaker is impacted, the effect is typically a temporary asynchronous pacing (commonly referred to as reversion mode or fixed rate pacing). The pacemaker will return to its normal operation when the person moves away from the source of the interference.

7.3.4.3 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. The EQB and the Commission have recognized Florida (a 150-mG limit) and New York (a 200-mG limit) state standards. Both state standards are to be considered at the edge of ROW. Studies of the health effects from MFs conclude that the evidence of health risk is weak.[49] The general standard is one of prudent avoidance.

MF levels associated with some common electric appliances are provided in **Table 7.3-2.**

Table 7.3-2. Magnetic Fields of Common Electric Appliances (mG)[50]

Appliance	Distance from Source		
	6 inches	1 foot	2 feet
Hair Dryer	300	1	--
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 7.3-3 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 MF calculations are also shown graphically in **Diagram 7-3** and **Diagram 7-4.** 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 7.3-2**.

[49] 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/.

[50] 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.

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 7.3-3. 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

Diagram 7-3. 115-kV Single Circuit Line Magnetic Field Profile

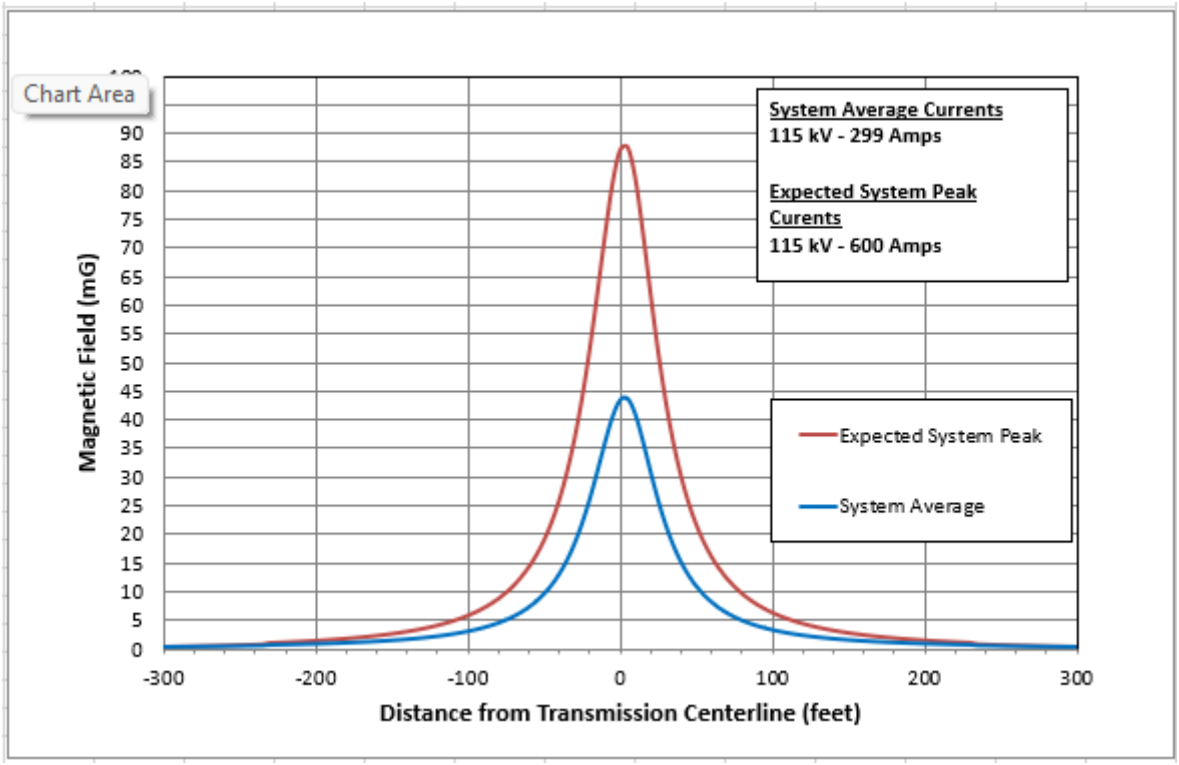
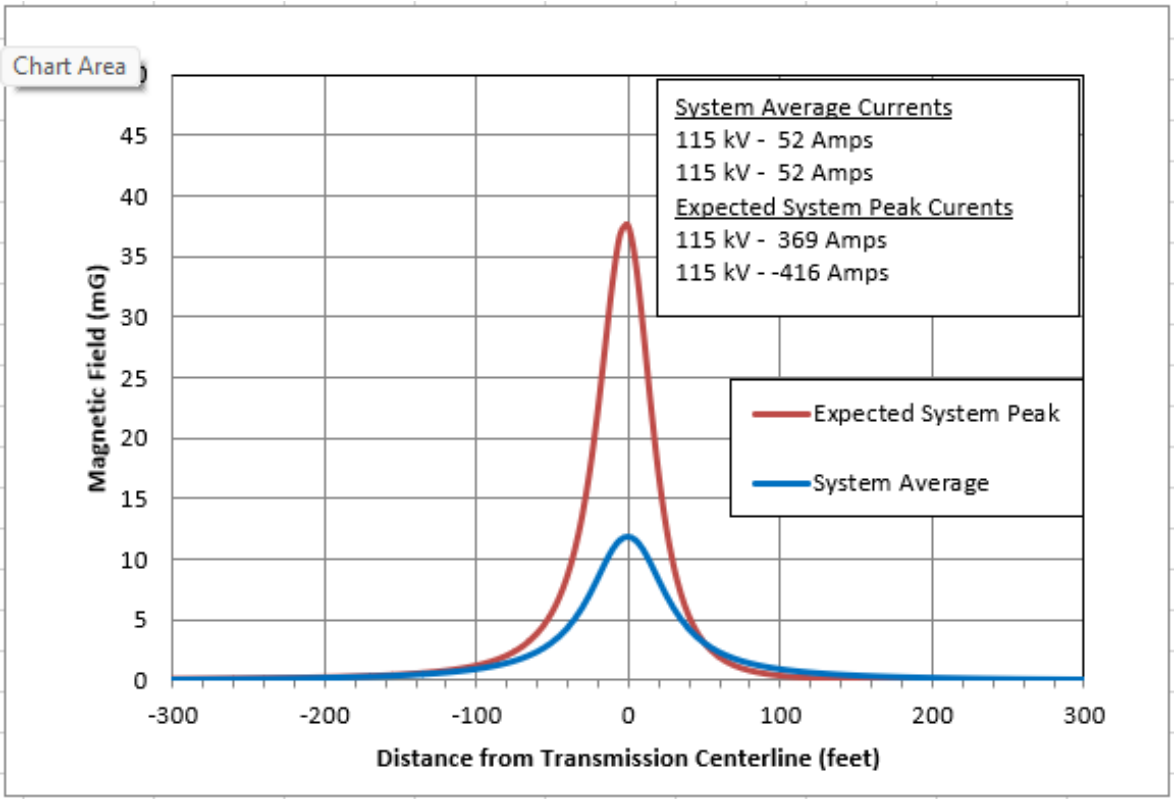


Diagram 7-4. 115-kV Double Circuit Line Magnetic Field Profile



7.3.4.4 Impacts and Mitigation

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.[51] Other studies have come to similar conclusions.[52]

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."[53] 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."[54] The Commission adopted this finding on July 15, 2010.[55]

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[51] 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 August 2024.

[52] 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 August 2024.

[53] 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 Project and Associated Facilities (August 1, 2007).

[54] *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).

[55] *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).

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 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.

7.3.5 Air Quality and Greenhouse Gases

7.3.5.1 Criteria Pollutants

The Clean Air Act (42 USC 7401 et seq. as amended in 1977 and 1990) is the principal federal statute governing air pollution. Under the Clean Air Act, the USEPA set National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants considered harmful to public health and the environment: carbon monoxide (CO), ozone, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead, particulate matter equal to or less than 10 microns in diameter (PM_{10}), and fine particulate matter equal to or less than 2.5 microns in diameter ($PM_{2.5}$). The NAAQS include primary standards that are designed to protect human health and secondary standards that are intended to protect public welfare, including visibility and damage to crops and vegetation.

The USEPA and state agencies operate a system of air quality monitoring stations. Data from these monitoring stations are compared to the 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.

7.3.5.2 Emissions Related to Construction

During construction, temporary air emissions will occur from the operation of construction equipment, vehicular traffic, and soil disturbance. 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 7.3-4 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. Detailed emission calculations are provided as **Appendix M**.

Table 7.3-4. Construction Emissions of Criteria Pollutants (tons)

Description	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$
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:
NO_x – nitrogen oxide
CO – carbon monoxide
VOC – volatile organic compounds
SO_2 – sulfur dioxide
PM_{10} – particulate matter equal to or less than 10 microns in diameter
$PM_{2.5}$ – fine particulate matter equal to or less than 2.5 microns in diameter

7.3.5.3 Emissions Related to Operation

During operation, potential air emissions from a transmission line result from corona effects. Ionization of air molecules near the conductor can produce ozone and oxides of nitrogen. Ozone is a reactive form of oxygen molecule that combines readily with other elements and compounds in the atmosphere, making it relatively short lived. Ozone forms naturally in the lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants such as hydrocarbons from auto emissions. The natural production rate of ozone is directly proportional to temperature and sunlight, and inversely proportional to humidity. Thus, the conditions that are most likely to cause corona formation on a transmission line – humid, rainy, or foggy conditions – actually inhibit the production of ozone.

Corona-induced ozone and nitrogen oxides (NO_X) are typically not a concern for power lines like the Project with operating voltages below 161-kV because the EF intensity is too low to produce significant corona. Therefore, the Applicants expect ozone and NO_X concentrations associated with the Project to be negligible, and well below all federal standards (NO2 – 100 parts per billion (ppb) as one-hour average, 53 ppb as annual average; ozone 70 ppb as 8-hour average).[56]

7.3.5.4 Impacts and 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 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:

[56] "The Clean Air Act, which was last amended in 1990, requires USEPA to set National Ambient Air Quality Standards (40 CFR part 50) for six principal pollutants ("criteria" air pollutants) which can be harmful to public health and the environment. The Clean Air Act identifies two types of national ambient air quality standards. ***Primary standards*** provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. ***Secondary standards*** provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings." https://www.epa.gov/criteria-air-pollutants/naaqs-table.

- 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.

No impacts to air quality are anticipated due to the operation of the Project; therefore, no mitigation is proposed.

7.3.5.5 Greenhouse Gas Emissions

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 7.3-5** 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. Detailed emission calculations are provided as **Appendix M**. At the completion of construction activities, all construction-related air impacts will cease.

Table 7.3-5. 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**

Notes:
CO_2 – carbon dioxide
CH_4 – methane; 1 short ton CH_4 = 25 short tons CO_2e
N_2O – nitrous oxide; 1 short ton N_2O = 298 short tons CO_2e
CO_2e – carbon dioxide equivalent
Source: 40 CFR 98 Table A-1: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98#Table-A-1-to-Subpart-A-of-Part-98.

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

[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 August 2024.

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).

Impacts and Mitigation

USEPA's Greenhouse Gas Reporting Tool[58] shows emissions within Minnesota totaled 36,492,873 metric tons (40,872,018 tons) of 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.

7.3.5.6 Climate Resiliency

Climate change is the change in global or regional climate patterns over time. 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 precipitation, heavier downpours, increased summer heat, and the potential for longer dry spells.[59] 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.[60]

7.3.5.7 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.

[58] USEPA. Facility Level Information Greenhouse Gas Tool. Available online at: https://ghgdata.epa.gov/. Accessed August 2024.

[59] MDNR. 2024. Climate Trends. Available online at: https://www.dnr.state.mn.us/climate/climate_change_info/climate-trends.html. Accessed August 2024.

[60] MDNR. Undated. Minnesota Climate Trends Tool. Available online at:https://arcgis.dnr.state.mn.us/ewr/climatetrends/ . Accessed August 2024.

7.4 Land-based Economies

7.4.1 Agriculture

According to the 2022 U.S. Department of Agriculture (USDA) Census of Agriculture[61], 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 7-2**). 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 Applicants allow 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[62], 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[63] is located approximately 3 miles northwest of the existing Benson substation.

7.4.1.1 Impacts and Mitigation

Approximately 197.0 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.

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

[61] 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.

[62] USDA. No Date. Organic Integrity Database. Available online at: https://organic.ams.usda.gov/integrity/. Accessed August 2024.

[63] Minnesota Department of Agriculture. No Date. Bee Check. Available online at: https://mn.beecheck.org/map. Accessed August 2024.

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.

The Applicants allow continued agricultural land use within the transmission line ROW after construction activities are complete; therefore, the transmission line is compatible with future and ongoing use as pasture, hay, or other crop cultivation.

Up to approximately 25 acres of agricultural land will be permanently removed from production associated with the installation of new substations and pole structures.

7.4.2 Forestry

Based on forested areas shown on the aerial maps provided in **Appendix A,** the Applicants will clear or trim approximately 9.9 cumulative acres of trees over approximately 0.9 mile within the 100-foot-wide ROW. Trees are primarily located on private residential and city-owned properties. No commercial forestry operations were identified within the Proposed Route.

7.4.2.1 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.

7.4.3 Tourism

As discussed in Section 7.2.6, Swift County partners with Western Minnesota Prairie Waters[64] 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[65]. 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, Larson Landing Public Water Access Site (see Section 7.4.5 and **Appendix A)**.

WMAs are tourist destinations as they provide recreation for hunters and trappers and wildlife watching opportunities[66]. 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 7-4**, and **Appendix A**). 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 7-4**, and **Appendix A)**.

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

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

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

7.4.3.1 Impacts and Mitigation

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 7.2.7, 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. Access to the WMA will not be impacted by construction activities.

7.4.4 Mining

According to the Aggregate Resource Mapping Program[67], 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 (see **Appendix A**). Additionally, the Proposed Route crosses access to one existing active gravel pit along 60th Street SW (see **page 4 of Appendix A**). The Applicants will work with future proponents as needed regarding ant future proposed mining operations and will ensure the Project does not preclude access to the existing gravel pit.

7.4.4.1 Impacts and Mitigation

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

7.4.5 Recreation

Recreational resources near the Proposed Route, including local parks and recreational areas, snowmobile trails, and watercourses are shown on **Figure 7-4** and **Appendix A**.

As discussed in Section 7.4.3, the Proposed Alignment and ROW cross the Pomme de Terre River, a state water trail, and are adjacent to the MDNR-administered Pomme de Terre River, Larson

[67]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 August 2024.

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[68] (see **Figure 7-4** and **Appendix A**). 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 the Project 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[69]. Lac qui Parle Lake and Marsh Lake are the most prominent features[70]. 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[71], [72].

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.

7.4.5.1 Impacts and Mitigation

The Applicants have designed the Project to avoid impacts to the recreational opportunities in the Project area. The Project, including substation relocations and expansions, will not preclude recreational activities or appreciably diminish the use or experience at these locations. 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.

Direct impacts to watercourses are not anticipated (see Section 7.6.4) and the Applicants do not anticipate disrupting recreational activities along the state water trails.

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.

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

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

[70] 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 August 2024

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

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

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. As discussed in Section 7.2.7, 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.

7.5 Archaeological and Historic Resources

Merjent, Inc. (Merjent) conducted a cultural resource literature review for features within a half-mile buffer of the Proposed Alignment (the 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 provided to the Minnesota SHPO in a letter dated October 22, 2024 (see **Appendix K**[73]). The results of the literature review are summarized below.

Merjent, on behalf of the Applicants, conducted a Phase IA Literature Review based on cultural resources site information (i.e., archaeological sites and historic structures) and previous survey files from the SHPO. Merjent Cultural Resource Specialists reviewed archaeological site files on the OSA Portal,[74] as well as the General Land Office (GLO) maps and available historical aerial photography accessed online through the OSA Portal.

Merjent reviewed nineteenth century GLO maps and notes on file with the Bureau of Land Management to evaluate historic site conditions and identify potential cultural features within the Project area.[75] The GLO map of the Project area illustrated conditions in 1870 as being prairie, with many lakes and wetlands and connecting streams and rivers. No cultural features are present on the GLO map of the Project area. Proximity to water is an indication of high site potential. Aerial photographs from 1938 show the presence of established roads, farmsteads, and railroads in the area. Subsequent historic and modern aerial photographs show that the landscape of the Project area has remained largely the same since that time, with roads being the main addition to the area.

According to the OSA and SHPO files, there is one site within the Merjent Study Area that does not intersect the Proposed Route. There are no sites within 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. According to Google Streetview, this area is a small preserve (Ambush Park) with a short, paved trail located adjacent to the Benson Golf Club. Historic aerial photographs and GLO maps

[73] 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).

[74] OSA Portal. 2023. https://osaportal.gisdata.mn.gov/. Accessed August 2024.

[75] Bureau of Land Management General Land Office Records. 2023. https://glorecords.blm.gov/. Accessed August 2024.

show that this area has remained relatively the same since the 1870s. The GLO map shows a short unnamed trail just south of the site. The site and the unnamed trail are more than 0.4 mile north and east of the proposed Project, and the Project is not within the viewshed of 21SWc.

Although not directly applicable to this Project, Appendix B of the Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission (September 2004) was used to determine the proposed area of potential effect (APE) for visual effects for the Project. Under that guidance, the APE is a half mile radius for structures 200 feet or less in overall height. Therefore, structures more than a half mile from the proposed Project will not be subject to visual or indirect effects.

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. This property has been surveyed as an individual property, as well as a portion of the larger Chicago Milwaukee and St. Paul Railway Company rail lines. According to SHPO comments from May 4, 2021, listing nomination, this portion is not individually eligible for the National Register of Historic Places (NRHP). However, as a contributing section to the larger rail-line, the property was evaluated as Eligible for listing on the NRHP on May 4, 2021, with a reevaluation on March 8, 2023, with concurring results. It 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 foreign transmission line. Additionally, 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. Trunk Highway 7 was determined Not Eligible for the NRHP on October 23, 2020.

3. The Proposed Alignment intersects Trunk Highway 59 (i.e., U.S. Highway 59) at intersection with 60th St SW. Trunk Highway 59 was constructed in 1935 and was determined Not Eligible for the NRHP on July 13, 2022.

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 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. It was determined Not Eligible for the NRHP on October 23, 2020.

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. It was determined Not Eligible for the NRHP on January 5, 2021.

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.

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 MIAC in its Project notification letters sent on September 5, 2024. Letters were sent to the THPOs in addition to the executive leaders of Tribal governments. The Applicants have received a response from the Leech Lake Band of Ojibwe THPO confirming that the Leech Lake Band of Ojibwe does not have any recorded historic properties within the Project area (see **Appendix K**). 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 (see **Appendix K**). 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 will continue to keep Tribes updated regarding the Project.

7.5.1.1 Impacts and Mitigation

Given that the Project is located in an area with several existing overhead distribution lines and will be constructed along and within areas of previous disturbance, such as existing ROW and agricultural fields, Merjent recommended no survey required ahead of Project construction in its October 22, 2024, letter to the SHPO. On November 26, 2024, the SHPO responded that archaeological surveys are recommended based on the location and nature of the Project (see **Appendix K**). The Applicants intend to conduct an archaeological survey on the selected route.

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

7.6 Natural Environment

7.6.1 Topography

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 7-5**).

7.6.1.1 Impacts and Mitigation

Construction of the Project will not significantly alter the topography along the Proposed Alignment; therefore, no mitigation is proposed.

7.6.2 Geology

The Minnesota River Prairie subsection[76] of the Ecological Classification indicates that glacial drift is generally 100 - 400 feet thick. Bedrock primarily consists of cretaceous shales, sandstones, and clays.

7.6.2.1 Impacts and Mitigation

Few geological constraints on design, construction, or operation are anticipated in the Project area. As discussed in Section 6.2.1, 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.

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

7.6.3 Soils

As discussed in Section 7.1, the Project is in the MDNR Ecological Classification System's Minnesota River Prairie subsection. Soils in this subsection are primarily well- to moderately well-drained loamy soils formed in gray calcareous till of Des Moines lobe origin[77]. Most of the soils in this subsection are Udolls and Aquolls on relatively level topography, generally with 15 feet or

[76] 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 August 2024.

[77] MDNR. Undated. Minnesota River Prairie Subsection: https://www.dnr.state.mn.us/ecs/251Ba/index.html#:~:text=Soils,soils%20in%20the%20subsection%20(Dept.. Accessed September 2024.

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. The STATSGO2 Database[78] is also referred to as the Digital General Soil Map of the United States and is a broad-based inventory of soils for use in broad planning. Soils are organized by general association units which are derived from more detailed soil survey maps. The general association units were determined by transecting or sampling areas on the detailed maps and then statistically expanding the data to characterize the whole map unit. Each association unit represents a distinctive pattern of soils, relief, and drainage, and is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. There are six soil association units that intersect the Proposed Route. These soil associations are listed in **Table 7.6-1** and shown in **Figure 7-5**.

Table 7.6-1. Soil Association Units in the Project Area

Soil Association[79]	General Description[80]	Route Width (acres)	ROW Width (acres)
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	67.9	17.0

[78] 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.

[79] 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.

[80] USDA NRCS. Undated. Official Soil Series Descriptions. https://www.nrcs.usda.gov/resources/data-and-reports/official-soil-series-descriptions-osd.Accessed August 2024.

Soil Association[79]	General Description[80]	Route Width (acres)	ROW Width (acres)
	deep, poorly drained, soils that formed in clayey and sandy glaciolacustrine sediments. Slopes range from 0 to 18 percent.		
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

The USDA NRCS Soil Survey Geographic Database[81] (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 7.6-2**, 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.

[81] 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.

Table 7.6-2. 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**

7.6.3.1 Impacts and Mitigation

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. As described in Section 6.3, the Applicants will take measures to alleviate soil compaction where needed. Also, as described in Section 6.3, 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. As described in Section 6.3, exposed soils will be revegetated as soon as possible to minimize erosion. Further details are outlined in the Applicants' draft VMP provided in **Appendix L**.

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 General Permit and will prepare a Stormwater Pollution Prevention Plan.

7.6.4 Water Resources

Hydrologic features in the Project area and along the Proposed Route are shown in **Figures 7-6** and **7-7**. Hydrologic features such as wetlands, lakes, rivers, and floodplains perform several important functions within a landscape, including flood attenuation, groundwater recharge, water

quality protection, and wildlife habitat production. 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.[82]

7.6.4.1 Groundwater

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 (see **Figure 7-6**).[83]

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.[84] 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.[85] 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.[86] 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.[87]

The eastern segment of the Proposed Route intersects the Benson WHPA (see **Figure 7-6**). The WHPA corresponds to the Benson DWSMA. The Benson DWSMA Vulnerability is Moderate where the DWSMA intersect the Proposed Route.[88]

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

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[82] MDNR. Undated. Minnesota's watershed basins. https://www.dnr.state.mn.us/watersheds/map.html. Accessed August 2024.

[83] MDNR. 2021. Minnesota groundwater provinces 2021. https://www.dnr.state.mn.us/groundwater/provinces/index.html. Accessed August 2024.

[84] MDH. Undated. Laws and Rules. https://www.health.state.mn.us/communities/environment/water/rules/index.html. Accessed August 2024.

[85] MDH. Undated. Wellhead Protection. https://www.health.state.mn.us/communities/environment/water/rules/wellhead.html. Accessed August 2024.

[86] MDH. 2019. Wellhead Protection Areas. Available online at: https://gisdata.mn.gov/dataset/water-wellhead-protection-areas. Accessed August 2024.

[87] MDH. Undated. Source Water Protection Map Viewer. Available online at: https://www.health.state.mn.us/communities/environment/water/swp/mapviewer.html. Accessed August 2024.

[88] 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.

materials encountered during drilling and later interpreted by geologists at the MGS[89]. Wells supplying public water are not included in the CWI due to federal security requirements[90].

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 7.6-3**.

Table 7.6-3. 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

7.6.4.2 Lakes or Ponds

There are no lakes or ponds that intersect the Proposed Route (see **Figure 7-7**). 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.

7.6.4.3 Rivers and Streams

The MDNR National Hydrography Dataset[91] indicates that a total of 19 rivers and streams are located within the Proposed Route, described in **Table 7.6-4** and shown on **Figure 7-7** and **Appendix A**.

[89] MGS. Undated. County Well Index. Available online at: https://cse.umn.edu/mgs/cwi. Accessed August 2024.

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

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

Table 7.6-4. Rivers/Streams Crossed by the Proposed Route

River/Stream Location (Appendix A page)	Name	Length Crossed by ROW (feet)	Notes
West of 200th Ave SW / 60th St SW (**page 6 of Appendix A**)	Pomme de Terre River	85	Public Waters Inventory (PWI) Watercourse, Impaired Stream, State Water Trail
West of County Road 9 / 60th St SW (**page 9 of Appendix A**)	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 (**page 9 of Appendix A**)	Unnamed	8	-
West of Burlington Northern Railroad / Proposed Route (**page 10 of Appendix A**)	Unnamed	0	Small bend of stream crosses into and then out of the Proposed Route.
Crosses 150th Ave SW and Proposed Route (**page 11 of Appendix A**)	Unnamed	20	-
East of 40th St SW / 150th Ave SW (**page 12 of Appendix A**)	Unnamed	75	Aerial imagery indicates mapped stream is realigned into agricultural ditches.
East of 40th St SW / 130th Ave SW (**page 14 of Appendix A**)	Unnamed	0	-
East of 40th St SW / 130th Ave SW (**pages 14-15 of Appendix A**)	Cottonwood Creek	15	PWI Watercourse
West of 40th St SW / 110th Ave SW (**page 15 of Appendix A**)	Unnamed	0	Small bend of stream crosses into and then out of the Proposed Route.
West of 40th St SW / 110th Ave SW (**page 15 of Appendix A**)	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 (**page 16 of Appendix A**)	Judicial Ditch 8	30	PWI Watercourse/Ditch, Impaired Stream
North of 30th St SW / 80th Ave SW (**page 19 of Appendix A**)	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 (**page 21 of Appendix A**)	Unnamed	15	Aerial imagery indicates mapped stream is realigned into agricultural ditches.
West of 30th St SW / 45th Ave SW (**page 21 of Appendix A**)	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 (**page 22 of Appendix A**)	County Ditch 3	40	PWI Watercourse/Ditch, Impaired Stream

River/Stream Location (Appendix A page)	Name	Length Crossed by ROW (feet)	Notes
West of 20th St SW / 30th Ave SW (**page 23 of Appendix A**)	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 (**page 24 of Appendix A**)	Unnamed Drainage Ditch	20	-
North of 20th St NW (**page 26 of Appendix A**)	Unnamed Stream	0	Aerial imagery indicates that the stream may not be present due to historic industrial development
West of 22nd St / Kansas Ave (**page 28 of Appendix A**)	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 August 2024. MDNR. 2019. National Wetland Inventory for Minnesota. May 23, 2019. Available online at: https://gisdata.mn.gov/dataset/water-nat-wetlands-inv-2009-2014. Accessed August 2024. MDNR. 2020. Public Waters (PW) Basin and Watercourse Delineations. Available online at: https://gisdata.mn.gov/dataset/water-mn-public-waters. Accessed August 2024.			

The Proposed ROW crosses two BWSR administered RIM easements just west of the City of Benson along the Chippewa River (see **pages 27 and 28 of Appendix A**). 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[92]. 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 (kittle number M-055-158-014-002) (see **page 10 of Appendix A**). 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.

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[93]. 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

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

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

resources are not currently located within the easements where they are intersected by the Proposed Alignment.

7.6.4.4 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, which are identified on the MDNR PWI maps.

MDNR PWI basins and wetlands are not intersected by the Proposed Route, Alignment, or associated ROW; however, four PWI watercourses are intersected by the Proposed Alignment and associated ROW (see **Figure 7-7**) and are identified in **Table 7.6-4**: 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.

7.6.4.5 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 and last updated its 303(d) list in 2024.

Four impaired watercourses[94] are crossed by the Proposed Route and three impaired watercourses are crossed by the Proposed Alignment and associated ROW, which are identified in **Table 7.6-4** and on **Figure 7-7**. The Pomme de Terre River (see **page 6 of Appendix A**) is impaired for fecal coliform, mercury in fish tissue, turbidity, fishes bioassessments, and aquatic macroinvertebrate bioassessments. Judicial Ditch 8 is impaired for fishes bioassessment (see **page 16 of Appendix A**) and County Ditch 3 is impaired for *Escherichia coli* (*E. coli*) (see **page 22 of Appendix A**).

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 (see **page 28 of Appendix A**).

7.6.4.6 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 Wetland Conservation Act.

The USFWS produced maps of NWI wetlands based on aerial photographs and NRCS soil surveys starting in the 1970s. The NWI data were further updated for the state of Minnesota through a multi-agency effort lead by the MDNR and were published in 2019. Wetlands identified by the

[94] MPCA. 2024. Impaired Waterbodies, Minnesota, 2024. April 25, 2024. Available online at: https://gisdata.mn.gov/dataset/env-impaired-water-2024. Accessed August 2024.

Minnesota NWI may be inconsistent with current wetland conditions; however, Minnesota NWI data is the most accurate and readily available database of wetland resources within the Project area and were therefore used to identify potential wetlands occurring within the Proposed Route.

Thirty-seven wetlands intersect the Proposed Route (see **Figure 7-7** and **Appendix A**). Thirteen of the wetlands are crossed by the 100-foot-wide ROW and eight are crossed by the Proposed Alignment. **Appendix N** identifies the wetlands and communities crossed by the Proposed Route, ROW and Proposed Alignment with the area or length crossed by each Project component. These wetland features are also shown by corresponding wetland ID in **Appendix A**. **Table 7.6-5** summarizes the mapped wetland communities intersected by the Project. All wetlands are located in an agricultural setting.

Table 7.6-5. Wetlands Crossed by the Project

NWI Wetland Community (Cowardin Classification)	Proposed Route Count / Acres	ROW Count / Acres	Alignment Count / Feet
Palustrine Emergent	24 / 21.9 ac	11 / 3.2 ac	8 / 1,691 ft
Palustrine Forested	5 / 1.6 ac	1 / <0.1 ac	0.0 / 0.0
Palustrine Scrub-Shrub	10 / 5.8 ac	1 / <0.1 ac	0.0 / 0.0

Calcareous fens are a rare and unique type of peat-accumulating wetland with unique vegetation influenced by its calcium-rich (non-acidic) chemistry, low oxygen and relatively cold soil conditions, and upwelling groundwater hydrology.[95] Fens are protected under Minn. Stat. 103G.223, which provides that calcareous fens may not be filled, drained, or otherwise degraded, wholly or partially, by an activity, unless approved by the MDNR through a management plan. Based on the review of the MDNR's Calcareous Fen geospatial dataset,[96] there are no fens within 5 miles of the Project. The closest fen is 11 miles to the southeast of the Project.

7.6.4.7 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.[97] However, the Project also crosses Special Flood Hazard Areas, including: Zone A unmapped floodplain, Zone AE mapped flood fringe, and Zone AE mapped floodway[98]. 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

[95] MDNR. Undated. Calcareous Fens: Amazing, Rare, Irreplaceable. https://files.dnr.state.mn.us/natural_resources/water/wetlands/calcareous_fen_fact_sheet.pdf.

[96] MDNR. 2024. Calcareous Fens – Source Feature Points. Available from the Minnesota Geospatial Data Commons: https://gisdata.mn.gov/dataset/biota-nhis-calcareous-fens. Accessed August 2024

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

[98] The flood fringe is the portion of the floodplain outside of the floodway. https://emilms.fema.gov/is_0727/groups/36.html.

discharge the base flood without cumulatively increasing the water-surface elevation by more than a designated height. **Table 7.6-6** summarizes Special Flood Hazard Area (SFHA) crossings by the Project. SFHA crossings are also presented on **Figure 7-7**.

Table 7.6-6. 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.		

7.6.4.8 Impacts and Mitigation

Groundwater

The Applicants do not anticipate impacts to groundwater as a result of the Project. 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 7.6-3 provides the list of currently known wells located within the Proposed Route based on 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 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 (see **Appendix K**).

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 (see **Appendix K**). 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.

Public Waters

PWI basins and wetlands are not crossed by the Proposed Route; however, as stated above and identified in **Table 7.6-4**, four PWI watercourses are intersected by the Proposed Alignment and associated ROW.

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.

Impaired Waters

As noted in **Table 7.6-4**, 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
- installing erosion and sediment control BMPs to mitigate the potential to increase turbidity due to sedimentation from construction.

Wetlands

The Proposed Alignment crosses eight mapped wetlands, and the associated ROW crosses five additional wetlands (see **Table 7.6-5**). 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. As discussed in Section 6.2, 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 (see **Appendix N**). 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 L)**.

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 7.6-5** and **Appendix N**, this is less than 0.1 acre based on the Proposed Alignment and associated 100-foot-wide ROW.

Floodplains

The Applicants will not place structures with 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.

7.6.5 Flora and Fauna

7.6.5.1 Flora

Flora can be generally characterized for the Project area using the Ecological Classification System.[99] 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[100] "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." 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[101] "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 marsh, wetland prairie, and wet meadow communities. Rugged terrain and lands deeply dissected by rivers supported a mosaic of prairie and wooded communities"

[99] MDNR. Undated. Ecological Classification System. Available online at: https://www.dnr.state.mn.us/ecs/index.html. Accessed August 2024.

[100] MDNR. Undated. Ecological Classification System: Prairie Parkland. Available online at: https://www.dnr.state.mn.us/ecs/251/index.html. Accessed August 2024.

[101] 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 August 2024

The Minnesota River Prairie subsection[102] further 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." The current vegetation and land use is primarily agricultural. Upland prairies are common throughout; however, remnant tallgrass prairies are rare.

7.6.5.2 Fauna

The Project is located in the MDNR Nongame Wildlife – South Region.[103] 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 (see Section 7.4.5, **Figure 7-4,** and **Appendix A).** This WMA may support game species including deer, small game, forest upland birds, pheasants, waterfowl, and turkey[104].

As presented on **Figure 7-4**, the western portion of the Proposed Route overlaps with the Lac qui Parle - Big Stone 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[105].

Rare and natural flora and fauna are discussed in more detail in Section 7.6.7.

7.6.5.3 Impacts and Mitigation

Minimal impacts to native vegetation are anticipated. The Proposed Route is located in a mostly agricultural area and will generally follow existing transmission line and road corridors, which will minimize impacts to previously undisturbed vegetation in that area. As described in Section 7.4.2, the Applicants anticipate clearing less than 10 acres of trees within the

[102] 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 August 2024.

[103] MDNR. Undated. Nongame Wildlife – South Region. Available online at: https://www.dnr.state.mn.us/eco/nongame/south.html. Accessed August 2024.

[104] MDNR. 2024. Wildlife Management Areas – Clair Rollings WMA. Available online at: https://www.dnr.state.mn.us/wmas/detail_report.html?id=WMA0141000. Accessed August 2024.

[105] Audubon Minnesota. Undated. Minnesota Important Bird Areas. Lac qui Parle - Big Stone. Available online at: https://mn.audubon.org/node/4281. Accessed August 2024.

100-foot-wide ROW associated with the Proposed Alignment. Clearing will be minimized to the extent practicable. Further details are provided in the Applicants' draft VMP (see **Appendix L)**.

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.

The Applicants will restore the construction workspace in accordance with the draft VMP provided in **Appendix L**. The Applicants will allow for and encourage native species to naturally re-establish temporarily disturbed areas. Permanent seed mixes for the Project include native seed varieties commonly found and/or available from local seed distributors. The permanent seed mixes are designed to augment the natural colonization of bare ground by local, native seed sources.

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 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.

7.6.6 Invasive Species Management

The movement of construction equipment to, from, and between various work sites has the potential to introduce and/or spread invasive species. Terrestrial plant invasive and noxious species in Minnesota are regulated by the Minnesota Department of Agriculture (MDA),[106] and aquatic invasive and noxious species are regulated by the MDNR.[107] The MDNR also manages terrestrial plant invasive and noxious species on public lands and at public waters. The MDNR maintains a geospatial dataset of terrestrial invasive and noxious species observations.[108] According to this dataset, purple loosestrife (*Lythrum salicaria*) has been documented at three locations along 20th St SW and along County Road 3; leafy spurge (*Euphorbia esula)* has been documented at one location along 60th St SW; Canada thistle (*Cirsium arvense*) has been documented along 40th St SW; and yellow toadflax (*Linaria vulgaris*) has been documented along Pacific Avenue.

[106] Minn. Stat. § 18.75-18.913

[107] https://www.dnr.state.mn.us/invasives/index.html

[108] https://gisdata.mn.gov/dataset/env-invasive-terrestrial-obs

7.6.6.1 Impacts and Mitigation

The Applicants will manage documented occurrences of terrestrial plant invasive and noxious species that are listed as "eradicate"[109] or "control"[110] under the "Prohibited Noxious Weed" category by the MDA. Further, the Applicants will adhere to the conditions set forth by the MDNR Utility License to Cross Public Waters and requirements of the Natural Heritage Review consultation process. The Applicants will implement the following BMPs during Project construction, if required in the General Permit, to minimize the potential for the introduction or spread of terrestrial plant invasive and noxious species:

- Limiting grading and excavation to areas surrounding structure foundations, and only as needed along access roads and workspace areas for a level and safe working area.
- All disturbed areas will be revegetated using seed mixes labelled "Noxious Weeds; None Found" in accordance with regulations and will utilize yellow tag seed when available.
- Compliance with General Permit, including stabilization requirements, and inspection, maintenance and repair of erosion and sediment control BMPs. Certified weed-free straw or weed-free hay will be used for erosion and sediment control BMPs.
- All construction equipment will be clean prior to entering and before leaving the work site.
- Manual, mechanical, or chemical management of infestations of MDA-listed eradicate or control species.

The Applicants have also developed a draft VMP for this Project that incorporate these BMPs, as applicable/required (see **Appendix L**). The Applicants will not conduct activities within waterbodies; therefore, no mitigation to manage aquatic invasive and noxious species are proposed.

7.6.7 Rare and Unique Natural Resources

7.6.7.1 Federal Species

The Applicants reviewed the USFWS Information for Planning and Consultation (IPaC) website[111] 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 (see **Appendix K**), three species federally listed under Endangered Species Act (ESA), one species proposed for listing, and one candidate species have been previously

[109] Prohibited noxious weeds placed on the noxious weed eradicate list are plants that are not currently known to be present in Minnesota or are not widely established. These species must be eradicated (Minnesota Statute §18.771 (b)(1)). This list is available at: https://www.mda.state.mn.us/plants-insects/minnesota-noxious-weed-list.

[110] Prohibited noxious weeds placed on the noxious weed control list are plants that are already established throughout Minnesota or regions of the state. Species on this list must be controlled (Minnesota Statute §18.771 (b)(1)). This list is available at: https://www.mda.state.mn.us/plants-insects/minnesota-noxious-weed-list.

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

documented within the vicinity of the Proposed Route (see **Table 7.6-7**). No federally designated critical habitat is present within the Proposed Route. Species proposed for listing and candidate species are not legally protected under the ESA.

Table 7.6-7. 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*	Candidate
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.[112]

Suitable habitat for the northern long-eared bat is present within the Proposed Route.

Dakota Skipper

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[113].

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,

[112] 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 August 2024.

[113] USFWS. Undated. Dakota skipper (*Hesperia dacotae).* Available online at: *https://www.fws.gov/species/dakota-skipper-hesperia-dacotae. Accessed August 2024.*

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.[114]

On December 17, 2020, the USFWS published the result of its 12-month review of the monarch butterfly and determined that listing the species under the ESA was "warranted but precluded," meaning the species meets the criteria for listing as an endangered or threatened species, but the USFWS cannot currently implement the listing because there are other listing actions with a higher priority. The species is now a candidate for listing; however, candidate species are not protected under the ESA.[115] The USFWS intends to reassess the species and determine if it is warranted for listing under the ESA by December 4, 2024. If listing is still warranted and an endangered or threatened status is proposed at that time, a final rule would be published within 12 months of the proposed rule and protections would be effective within 30 to 60 days or around January 2026.

Suitable habitat for the monarch butterfly is present within the Proposed Route.

Regal Fritillary

The regal fritillary (*Speyeria idalia*) 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[116].

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 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.

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

[114] USFWS. Undated. FWS Focus: Monarch Butterfly (*Danaus plexippus*). Available online at: https://www.fws.gov/species/monarch-butterfly-danaus-plexippus. Accessed August 2024.

[115] USFWS. 2020. Endangered and Threatened Wildlife and Plants; 12-Month Finding for the Monarch Butterfly. 85 Federal Register 81813 (December 17, 2020). Document No. 2020-27523. Available online at: https://www.fws.gov/species-publication-action/endangered-and-threatened-wildlife-and-plants-12-month-finding-monarch. Accessed August 2024.

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

7.6.7.2 State-Listed Species

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). An official response was received on January 18, 2024**.** The Applicants will further consult with the MDNR on the resources identified in **Table 7.6-8** once a final alignment is available.

Pursuant to Minn. R. 6212.1800 to 6212.2300, "a person may not take, import, transport…, or possess a threatened or endangered plant or animal without a permit from the commissioner." There are no prohibitions against take, direct or indirect, or state-special concern species.

Table 7.6-8. State 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 variety of wetland types and riverine habitats.[117] 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 7.6-5**, 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 originally found in many rivers throughout Minnesota, but now, it is mostly found only in the St. Croix River and some of its tributaries. Suitable habitat for

[117] 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=elementDetail&selectedElement=ARAAD04010. Accessed August 2024.

the elktoe includes medium to large rivers with sand and gravel substrates and moderate to fast flow.[118]

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 originally 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 course sand and gravel[119].

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

Black Sandshell

The black sandshell used to be common in rivers throughout Minnesota, with the exception of the smallest rivers. The black sandshell is still found in the St. Croix River and has recently been reported in rivers in northern Minnesota. This species prefers riffles and runs in medium to large rivers dominated by sand and gravel[120].

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

[118] 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 August 2024.

[119] 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 August 2024.

[120] 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 August 2024.

sections of larger rivers. Within these rivers, it prefers sand, fine gravel, and mud substrates and typically colonizes downstream of riffles and small pools[121].

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 summer and is mostly found in the northwestern corner of Minnesota. Its winter population has also declined.

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[122].

Suitable nesting habitat may be present within the vicinity of the Proposed Route, and they 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[123].

Suitable habitat for the Great Plains toad is present within the Proposed Route.

7.6.7.3 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

[121] 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 August 2024.

[122] 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 August 2024.

[123] 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 August 2024.

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.

The Proposed Route also crosses areas of potentially undisturbed land, which was determined by South Dakota State University[124][125]. These areas of potentially undisturbed land were determined using aerial imagery, identifying and removing land with visible tillage or physical land disturbance to identify areas with the highest probability of being native sod.

7.6.8 Impacts and Mitigation

This Project will occur largely adjacent to or within existing ROW and tree clearing activities will be limited (see Section 7.4.2). Further, ground disturbance activities will be limited to the installation of new structures and removal of the old 41.6-kV or 115-kV structures, in addition to the substation construction activities. This minimizes impacts to potentially suitable habitat in this area. The Applicants will continue to coordinate with the MDNR and USFWS to avoid and further minimize Project impacts on sensitive species.

The following general measures will be used to help avoid or minimize impacts to area wildlife and rare natural resources during and after the completion of the proposed transmission line:

- The Applicants will adhere to the General Permit and will install BMPs for erosion and sediment control.
- Where soil excavation is required for the installation of structure and/or substation foundations, the Applicants will protect topsoil and replace topsoil and will stabilize and restore soil in accordance with the draft VMP (see **Appendix L**).
- The Applicants will implement measures to manage invasive and noxious species (see Section 7.6.6).
- Disturbed areas will be re-vegetated with native species and wildlife conservation species, where applicable if the landowner agrees in accordance with the draft VMP (see **Appendix L**). In accordance with the General Permit recommendations, the Applicants will use using types of netting practices that are considered "wildlife friendly," including those that use natural fiber or 100 percent biodegradable materials and that use a loose weave with a non-welded, movable jointed netting. Products that are not wildlife friendly include square plastic netting that are degradable (e.g., photodegradable, UV-degradable, oxo-degradable), netting made from polypropylene, nylon, polyethylene, or polyester.

[124] Minnesota Geospatial Commons. 2015. Potentially Undisturbed Land (Virgin Sod) – FSA Common Land Unit Derived. Available online at: https://gisdata.mn.gov/dataset/env-potentially-undisturbed-land. Accessed September 2024.

[125] MNDNR Native Prairies. Available online at: https://gisdata.mn.gov/dataset/biota-dnr-native-prairies. Accessed August 2024.

7.6.8.1 Federal Species

Northern Long-eared Bat

Potential impacts to individual NLEBs may occur if clearing or construction takes place when the species is roosting in its summer habitat, in trees outside of hibernacula. Bats may be injured or killed if occupied trees are cleared during this active window. Tree clearing activities conducted when the species is in hibernation and not present on the landscape will not result in direct impacts to individual bats but could result in indirect impacts due to removal of suitable roosting habitat. The Applicants will comply with applicable USFWS guidance in effect at the time of Project construction.

Dakota skipper

Based on a desktop and field-based assessment, suitable habitat for the Dakota skipper is not present within the Proposed Route.

Monarch Butterfly

Suitable habitat for monarchs is present within the Proposed Route. If the USFWS determines the species should be listed and protections for the species coincide with Project planning, permitting, and/or construction, the Applicants will review Project activities for potential impacts to the species and develop appropriate avoidance and conservation measures in coordination with the USFWS.

Regal Fritillary

Suitable habitat for the regal fritillary may be present within the Proposed Route. If the USFWS determines the species should be listed and protections for the species coincide with Project planning, permitting, and/or construction, the Applicants will review Project activities for potential impacts to the species and develop appropriate avoidance and conservation measures in coordination with the USFWS.

7.6.8.2 State-listed Species

Blanding's Turtle

Suitable habitat for the Blanding's turtle may be present within the Proposed Route. In accordance with the MDNR's MCE letter, the Applicants will implement the following avoidance measures:

- 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

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 (i.e., grasslands, marshes, and peatlands) during the nesting season, May through June. 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 Applicants will also use the seed mix recommended by the MDNR associated with the crossing of the Holloway Railroad Prairie Site of Biodiversity Significance, as needed.

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 also use the seed mix recommended by the MDNR associated with the crossing of the Benson Prairie Site of Biodiversity Significance, as needed.

In addition, the Applicants will implement the following measures recommended by the MDNR in their January 18, 2024, National Heritage Information System response at both sites:

- 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 the working during frozen conditions.
- Install effective erosion and sediment control BMPs.
- Revegetation disturbed soil with native species suitable to the local habitat as soon after construction as possible.
- Use only weed-free mulches, topsoil and seed mixes.

7.7 Summary of Potential Environmental Effects

The Applicants analyzed the potential environmental effects of the proposed Project. Generally, Project effects are anticipated to be temporary and/or minor. The Project will largely occur within or adjacent to existing ROW and will parallel existing roads.

Potential effects include a change in aesthetics associated with new/modified substations, new transmission line infrastructure, and taller structures relative to the existing structures. No homeowners will be displaced by the Project, and the Applicants will comply with applicable noise standards during construction and operations. EJ communities are crossed by the Proposed Alignment. These communities may temporarily see increased traffic and demand for public services during construction activities; however, Project benefits include a temporary increase in local business revenue and long-term increased reliability of electrical services.

Temporary and localized air quality impacts caused by construction vehicle emissions and fugitive dust from ROW clearing and construction are expected to occur. Vehicle emissions will be mitigated by limiting vehicle idling to only times when necessary.

The EFs associated with the new lines (1.59 to 2.68-kV/m) will be significantly less than the maximum levels permitted by state regulators (8-kV/m). No stray voltage issues are anticipated.

All land impacted during construction will be restored to the extent possible, and landowners will be compensated for any damages due to construction operations or structure and conductor placement. The routing of the Project minimizes potential tree removal but may require the permanent removal of approximately 9.9 acres of trees within its ROW.

Potential effects also include the temporary disruption of access to recreational activities along the Proposed Route (e.g., snowmobile trails) during construction.

Substation relocations and upgrades will not be placed in wetlands or waterbodies. The Proposed Alignment crosses eight mapped wetland communities, and the associated ROW crosses five additional wetland communities (see **Table 7.6-5**). As discussed in Section 6.2, clearing in wetlands will be conducted during frozen conditions, using low ground pressure equipment and/or construction mats will be installed to minimize impacts to vegetation. Staging or stringing setup areas will not be placed within or adjacent to water resources to the extent practicable. The Applicants will avoid placing structures within wetlands to the extent practicable.

The Applicants will install structures within a Site of Biodiversity Significance managed by the MDNR; however, the Applicants will mitigate impacts by siting the structures along existing road ROW and will implement additional mitigation recommended by the MDNR. The Applicants have minimized impacts to BWSR RIM easements by siting the Proposed Alignment along the edge of the easements and will continue to work with BWSR to avoid and/or mitigate impacts to these easements.

The Applicants do not anticipate impacts to groundwater resources within the Project area and will continue to coordinate with the MDH and the City of Benson to protect its DWSMA and WHPA. The Applicants will also continue to coordinate with both the USFWS and MDNR regarding potential impacts to federal and state listed species, respectively.

With respect to potential cumulative effects, the Applicants are not aware of any planned projects within the vicinity of the Project by any local governments or MnDOT at this time.

7.8 Unavoidable Impacts

Minn. R. 7850.1900, subpart 3(G) requires that an application discuss "human and environmental effects that cannot be avoided if the facility is approved at a specific site or route." The Project will be designed, constructed, and operated using processes and procedures, as described in this Application, which will avoid, minimize, and mitigate potential impacts. The impacts from construction activities will include aesthetic (i.e., visual) impacts, short-term traffic delays, 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. The nominal impacts from operations will include the continued maintenance of tall growing vegetation, visual impacts, interference with AM radio signals, and individual wildlife impacts from habitat reduction and avian collisions.

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.

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8.0 AGENCY AND TRIBAL OUTREACH

The Applicants employed various methods to engage and inform the public and federal, state, and local agencies and Tribes regarding the Project.

8.1 Public Outreach

The Applicants hosted in-person public open houses to gather feedback on the Proposed Route for the Project. Copies of the communications supporting this effort are provided in **Appendix B**.

The open houses were held at the Appleton Civic Center in the City of Appleton, on November 1, 2023, and at McKinney's in the City of Benson on November 2, 2023. Prior to the open houses, the Applicants developed a list of key stakeholders, which included local, regional, and state elected officials, community organizations, agencies, and school districts. The Applicants sent stakeholders and landowners/residents correspondence informing them of the open houses. Letters, including a Project fact sheet with map, were mailed to stakeholders on October 18, 2023.

A newspaper advertisement was published in the *Swift County Monitor-News* on October 21, October 25, October 28, and November 1, 2023, and in the *Appleton Press* on October 18 and 19, 2023. Advertisements were used to promote the open houses, engage the communities near the Project area, and drive traffic to the Project website. Copies of the tear sheets from these publications are also provided in **Appendix B**.

Approximately 34 people signed in at the open houses. Some attendees chose not to sign-in and were not included in the sign-in sheets. The Applicants' technical representatives provided information about the Project and answered questions and/or responded to comments concerning:

- the reason for the Project;
- the process for permitting;
- tree/vegetation cutting or removal;
- what would be needed for easements;
- how easements are acquired; and
- when the permitting and construction process would occur.

There were no formal presentations; attendees were welcome to come anytime during the meeting times to review and provide feedback on the Proposed Route. Large posters showing the proposed transmission line alignment and pictures of what the structures would look like were also available for review.

Comments and questions at the open houses were typical for projects of this kind and location. Some landowners expressed concern regarding the Project's impact on their property, including their property value, and/or impacts to operations on their property (e.g., location of the Project near existing or planned structures, impacts to farming and dairy operations), and had concerns about potential damage to their drainage systems.

In addition, the following website includes information about the Project: https://greatriverenergy.com/transmission_project/appleton-to-benson-115-kv-transmission-line/.

The Applicants also implemented their Notice Plan, as approved by the Commission, by mailing a notice letter to local and Tribal officials, as well as landowners within the identified notice area. Notice was published in the *Star Tribune* and the *Swift County Monitor-News*.

The public will be afforded additional opportunities to participate and comment on the Project in accordance with Minnesota laws and regulations. This process is described in Section 2.3. The first opportunity for public involvement in the regulatory process is a public information and scoping meeting conducted by Commission staff and DOC-EERA staff after the Commission's acceptance of this Application as complete.

The public and interested stakeholders will have the opportunity to review this Application and to submit comments to the Commission about the Project. A copy of the Application will be available on the DOC's energy project website (http://mn.gov/commerce/energyfacilities). Additionally, this application will be available for the public to review at:

Benson City Hall
1410 Kansas Avenue
Benson, MN 56215

Appleton Public Library
323 West Schlieman Avenue
Appleton, MN 56208-1229

Public information and scoping meetings will be held in the Project area by Commission and DOC-EERA staff after the Commission's acceptance of this Application as complete to answer questions about the Project and to solicit public comments and suggestions for matters to examine during environmental review. After DOC-EERA prepares an EA for the Project, public hearings will be held in the Project area, and members of the public will be given an opportunity to ask questions and submit comments.

Persons interested in receiving notices and other announcements about the Project's Certificate of Need and Route Permit Application can subscribe to the dockets by visiting https://mn.gov/puc/, clicking on "eDockets", clicking on "Go to eDockets" in the middle of the page, clicking on "eFiling Home/Login" in the left menu, clicking on the "Subscribe to Dockets" button, entering their email address and select "Docket Number" from the "Type of Subscription" dropdown box, then select "[24]" from the first Docket Number drop down box and enter "[263]" in the second box before clicking on the "Add to List" button. You must then click the "Save" button at the

bottom of the page to confirm your subscription to the Project's Certificate of Need docket. These same steps can be followed to subscribe to the Project's Route Permit docket (24-264).

Persons wanting to have their name added to the Project Route Permit proceeding mailing list (Docket No. ET3/TL-24-264) may register by contacting the public advisor in the consumer affairs office at the Commission at consumer.puc@state.mn.us, or (651) 296-0406 or 1-800-657-3782. Please be sure to note: 1) how you would like to receive notices (i.e., regular mail or email); and 2) your complete mailing or email address.

A separate mailing list is maintained for the Certificate of Need proceeding. To be placed on the Project Certificate of Need mailing list (MPUC Docket No. ET3/CN-24-263), email eservice.admin@state.mn.us or call 651-201-2246.

Contact information for the Minnesota state regulatory staff for this Project are listed below:

Minnesota Public Utilities Commission

Sam Lobby
121 7th Place East, Suite 350
St. Paul, Minnesota 55101
(651) 201-2205
1-800-657-3782
sam.lobby@state.mn.us
Website: www.mn.gov/puc/

Minnesota Department of Commerce DOC-EERA

Jessica Livingston
85 7th Place East, Suite 280
St. Paul, Minnesota 55101
(651) 539-1823
1-800-657-3710
jessica.livingston@state.mn.us
Website: www.mn.gov/commerce

8.2 Agency and Tribal Outreach

The Applicants began contacting agencies with potential interest in the Project in October 2023. Then, once the Proposed Alignment was developed after the open houses described in Section 8.1, the Applicants sent initial notification letters to federal, Tribal, state, and local agencies listed below on September 5, 2024. Copies of these letters, as well as all other correspondence to date, are included in **Appendix K**. The Applicants have incorporated information received during agency consultations into the relevant sections of this Application. Where additional coordination has occurred, the Applicants have summarized that outreach below with references to the section of this Application which provides additional detail.

Federal Agencies

- U.S. Army Corps of Engineers
    - Section 404 Regulatory Division
- U.S. Fish and Wildlife Service
    - In August 2024, the Applicants submitted an IPaC review through USFWS's online program. Results of the USFWS automated review include the following topics, which are addressed in the respective section of this Application: bald and golden

eagles and migratory birds (see Section 7.6.5); and federally listed species (see Section 7.6.7).

- The USFWS responded to the Applicants' September 2024 Project notification letter asking the Applicants to complete an IPaC review and develop an Official Species List. Communications are included in **Appendix K.** See discussion in Section 7.6.7.

- U.S. Department of Agriculture, Natural Resources Conservation Service

Tribal Nations

- Bois Forte Band of Chippewa
- Fond du Lac Band of Lake Superior Chippewa
- Grand Portage Band of Ojibwe
- Leech Lake Band of Ojibwe
    - The Applicants received a response from the Leech Lake Band of Ojibwe THPO as discussed in Section 7.5, provided in **Appendix K**.
- Lower Sioux Indian Community
- Mille Lacs Band of Ojibwe
- Prairie Island Indian Community
- Red Lake Nation
- Shakopee Mdewakanton Sioux Community
    - The Applicants received a response from the Shakopee Mdewakanton Sioux Community THPO requesting a copy of the Phase IA Literature Review, as discussed in Section 7.5 and provided in **Appendix K**.
- Upper Sioux Community
    - The Applicants received a response from the Upper Sioux Community THPO requesting a copy of the Phase IA Literature Review, as discussed in Section 7.5 and provided in **Appendix K**.

- White Earth Nation
- Minnesota Chippewa Tribe

Minnesota State Agencies

- Board of Water and Soil Resources
    - The Applicants corresponded with BWSR regarding the RIM easements crossed by the Project in September and October 2024. This is further discussed in Section 7.6.4 and communications are included in **Appendix K.**
- Department of Agriculture
- Department of Health
    - The Applicants corresponded with the MDH in September and October 2024 regarding the Project crossing of the Benson WMA/DWMSA. This is further discussed in Section 7.6.4 and communications are included in **Appendix K.**
- Department of Natural Resources
    - The Applicants initiated communications with the MDNR in October 2023. In October 2023, the Applicants contacted the MDNR to request early coordination and review of route alternatives. The results of this coordination are discussed in **Chapter 5** and communications are included in **Appendix K.**
    - The Applicants submitted a request for a Natural Heritage Review through MDNR's online MCE program in January 2024. Results of the MCE automated review include the following topics, which are addressed in the respective section of this Application: tree removal (see Section 7.4.2); ecologically significant areas including Sites of Biodiversity Significance and Native Plant Communities (see Section 7.6.7), and WMAs (see Sections 7.4.3, 7.4.5 and 7.6.5); state-listed endangered, threatened, or special concern species and federally listed species (IPaC review and bat species) (see Section 7.6.7); impacts to wetlands and waterbodies (see Section 7.6.4).
    - In September 2024, the Applicants sent additional communication to the MDNR to confirm tract boundaries of the Clair Rollings WMA and to identify public water crossing locations. The results of this coordination are discussed in Section 7.4.5 and communications are included in **Appendix K.**

- Minnesota Department of Transportation
    - The Applicants met with the MnDOT on November 14, 2024 and submitted the Early Notification Memo on December 20, 2024. These communications are included in **Appendix K**.
- Minnesota Indian Affairs Council
- Office of State Archaeologist
- State Historic Preservation Office
    - The Applicants submitted the results of their literature review and Phase IA Cultural Resources Assessment to SHPO in October 2024. The SHPO provided a response on November 26, 2024. Communications are included in **Appendix K.** See discussion in Section 7.5.

Local Agencies

- Swift County
    - The Applicants corresponded with Swift County regarding the Wetland Conservation Act, which is provided in **Appendix K**.

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9.0 CONCLUSION AND REQUEST FOR COMMISSION APPROVAL

For all the reasons set forth in this Application and as supported by the Appendices hereto, the Applicants respectfully request that the Commission issue a Certificate of Need and Route Permit authorizing construction of the Appleton to Benson Transmission Project.

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10.0 GLOSSARY OF TERMS

Term	Definition
AC	alternating current
ACSR	Aluminum Conductor Steel Reinforced
AEO2025	Energy Information Administration Annual Energy Outlook 2025
AG	Agralite's service territory
Agralite	Agralite Electric Cooperative
ALJ	Administrative Law Judge
APE	area of potential effect
Applicants	Great River Energy, Otter Tail Power Company, Western Minnesota Municipal Power Agency, Agralite Electric Cooperative, and the City of Benson
Application	Joint Application for a Certificate of Need and Route Permit for the Appleton to Benson Transmission Line Project
BAL Study	2020 Benson Area Load Serving Study
BK	Benson to Kerkhoven line
BMPs	best management practices
BNSF	Burlington Northern and Santa Fe Railway
BWSR	Minnesota Board of Water and Soil Resources
CFR	Code of Federal Regulations
CH4	methane
CO	carbon monoxide
CO2	carbon dioxide
CO2e	carbon dioxide equivalent
Commission or MPUC	Minnesota Public Utilities Commission
cm	centimeters
CWI	County Well Index
dBA	A-weighted decibel
DC	direct current
DOC	Department of Commerce
DOC-EERA	Department of Commerce, Energy Environmental Review and Analysis
DSM	demand side management
DWSMA	Drinking Water Supply Management Area
E. coli	Escherichia coli
EA	Environmental Assessment
EF	electric fields
EJ	Environment Justice

EJScreen	Environmental Justice Screening Tool
ELF	extremely low frequency
EMF	electric and magnetic fields
EQB	Minnesota Environmental Quality Board
ESA	Endangered Species Act
Exemption Order	Commission Order dated October 1, 2024, approving the Applicant's request to be exempt from certain filing requirements under Minn. R. Ch. 7849
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
General Permit	NPDES Construction Stormwater General Permit
GLO	General Land Office
HAPS	Hazardous Air Pollutants
HVDC	high-voltage direct-current
HVTL	high voltage transmission line
IBA	Important Bird Area
IMDs	implantable medical devices
IPaC	USFWS Information, Planning, and Consultation
kV	kilovolt
kV/m	kV per meter
L_5	noise level exceeded 5 percent of the time
L_{10}	noise level exceeded 10 percent of the time
L_{50}	noise level exceeded 50 percent of the time.
mA rms	milliAmperes root square mean
MCE	Minnesota Conservation Explorer
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
Merjent	Merjent, Inc.
Merjent Study Area	The half-mile buffer around the Proposed Alignment
MF	magnetic fields
mG	milliGauss
MGS	Minnesota Geological Survey
MIAC	Minnesota Indian Affairs Council
Minn. R. Ch.	Minnesota Rules Chapter
Minn. Stat. §	Minnesota Statutes Section
MISO	Midcontinent Independent System Operator
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
mph	miles per hour

MRES	Missouri River Energy Services
MTEP	MISO Transmission Expansion Project
MVAr	megavolt-ampere reactive
MW	megawatt
MWh	megawatt-hour
N2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAC	Noise Area Classification
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NIEHS	National Institute of Environmental Health Sciences
NLEB	Northern Long-Eared Bat
NO2	nitrogen dioxide
NOx	nitrogen oxides
NPC	Native Plant Community
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OSA	Office of the State Archeologist
Otter Tail Power or OTP	Otter Tail Power Company
PAH	polycyclic aromatic hydrocarbon
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
ppb	parts per billion
Project	Appleton to Benson Transmission Line Project
Promising Practices	Promising Practices for EJ Methodologies in NEPA Reviews
Proposed Alignment	Centerline location of the transmission line and structures.
Proposed Route or Route Width	A larger area than the proposed right-of-way that is inclusive of the Proposed Alignment and the substation improvements. More information on the Proposed Route can be found in Sections 1.3 and 3.1.3.
PSSE	Power System Simulator for Engineering
PW	Public Waters
PWI	Public Waters Inventory
RA	Route Alternative
REA	Runestone Electric Association
RIM	Reinvest in Minnesota
ROW	right-of-way

SF6	sulfur hexafluoride
SHPO	State Historic Preservation Office
SLT	Shible Lake Tap
SO2	sulfur dioxide
SSURGO	Soil Survey Geographic Database
STATSGO2	Digital General Soil Map of the United States
subps	subparts
THPO	Tribal Historic Preservation Officer
Update	Updated Benson Area Load Serving Study
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMP	Vegetation Management Plan
VOC	volatile organic compounds
Western Minnesota	Western Minnesota Municipal Power Agency
WHP	Wellhead Protection
WHPA	Wellhead Protection Area
WMA	Wildlife Management Area
Working Group	USEPA Federal Interagency Working Group on EJ
WPA	Waterfowl Production Area